

Forensic Odontology as a Primary Identifier: Developing a Sustainable DVI Protocol for Mass Fatality Incidents in Resource-Limited Contexts

Jani Grey Kasunda*

Jinan University, Guangzhou, China

Abstract

This theoretical study investigates the viability of forensic odontology as a primary identifier for developing a sustainable Disaster Victim Identification (DVI) protocol in resource-limited contexts. Triggered by the catastrophic cyclones that have recently struck Malawi, resulting in hundreds of fatalities and overwhelming national response capacities, the research addresses a critical gap in humanitarian logistics. The study employs a mixed-methods approach, combining a qualitative analysis of post-cyclone DVI challenges in Malawi with quantitative, comparative modelling of resource allocation. It theoretically critiques the current, resource-intensive Interpol DVI standards, arguing for a context-specific protocol that prioritizes odontology over DNA and fingerprinting due to its relative cost-effectiveness, rapid deployment, and durability in tropical environments. Empirically, the research proposes a structured protocol integrating simplified odontological data collection with local healthcare infrastructure and international forensic support. The findings provide a scalable, practical framework that enhances identification rates, respects the deceased's dignity, and supports psychosocial recovery for affected communities, thereby contributing to both the practical and ethical dimensions of international disaster management.

Introduction

The increasing frequency and intensity of climate-induced natural disasters present profound challenges to global humanitarian systems, with Mass Fatality Incidents (MFIs) posing a particularly acute crisis for developing nations. A case in point is the recent cyclones-Idai in 2019 and Freddy in 2023-that devastated 14 districts in southern Malawi. According to the Government of Malawi [1], the climate-induced disaster caused 679 deaths, with 537 people reported missing. Overall, approximately 2.3 million people were affected, and over 600,000 people were displaced from their homes. The cyclones' resultant loss of hundreds of lives and the widespread displacement underscore a critical gap in international disaster management: the effective and dignified identification of the deceased in resource-limited contexts [2]. The established global standard for MFI response, the Interpol Disaster Victim Identification (DVI) protocol, prioritizes a multimodal approach that combines fingerprints, dental records, and DNA analysis [3]. However, as scholars like Cordner & Tidball-Bigg [4] argue, this model is predicated on a level of infrastructural, financial, and technical capacity often absent in countries like Malawi, where civil registries are largely incomplete or nonexistent and forensic resources are scarce.

This thesis argues that a paradigm shift is necessary towards context-specific DVI protocols that prioritize forensic odontology (dental identification) as the primary identifier. The justification for this study lies in the urgent need to develop sustainable, effective, and culturally sensitive practices that can be operationalized in the immediate aftermath of a disaster when resources are most strained. Forensic odontology offers significant advantages in such settings; dental structures are highly durable, even in tropical decomposition environments, and the methodology requires less complex technological infrastructure than DNA analysis [5]. Furthermore, as Tomasini & Van Wassenhove [6] observe, the training of local personnel in basic odontological data collection can build sustainable in-country capacity, a principle central to effective humanitarian logistics.

The primary research question guiding this study is: How can forensic odontology be operationalized as the primary identifier within a sustainable DVI protocol for mass fatality incidents in resource-limited contexts like Malawi? This central question is supported by three sub-questions:

1. What are the specific limitations of the current Interpol DVI standards when applied to the post-cyclone context of Malawi?
2. What are the comparative advantages and logistical requirements of forensic odontology over DNA and fingerprinting in such settings?
3. What are the essential components of a sustainable DVI protocol that integrates local capacity with international forensic support?

The study acknowledges its limitations, primarily its focus on a single case study (Malawi), which, while providing depth, may limit the immediate generalizability of findings to all resource-limited contexts. The research is delimited to natural disaster MFIs and does not address identification in conflict or terrorism-related events, which involve distinct legal and operational complexities. By bridging the theoretical critique of standardized DVI protocols with an empirical analysis of Malawi's specific challenges, this research aims to contribute a practical framework that enhances operational effectiveness while upholding the fundamental human right to identity.



Problem Statement

The core problem addressed by this research is the critical mismatch between internationally prescribed DVI standards and the operational realities of resource-limited countries facing mass fatality incidents. When cyclones Idai and Freddy struck Malawi, the national disaster response mechanisms were overwhelmed, and the systematic identification of the deceased was severely hampered. The absence of a pre-planned, contextually appropriate DVI protocol led to ad-hoc efforts, potentially resulting in misidentifications, mass burials, and prolonged psychosocial trauma for families seeking closure Morgan et al. [7]. This problem is not unique to Malawi but is symptomatic of a broader issue in international disaster management, where standardized protocols from high-income nations are often transposed onto contexts with vastly different capacities.

The current reliance of the Interpol DVI guidelines on DNA analysis as a primary identifier is a significant point of failure in these contexts. As Hans et al. [8] note, DNA analysis is expensive, time-consuming, and requires sophisticated laboratory facilities and chain-of-custody procedures that are difficult to establish amidst the chaos of a disaster in a developing country. This creates a practical and ethical impasse: the international community's gold standard is often unattainable, leaving local authorities with insufficient guidance and resulting in a failure to fulfill the basic obligation of identifying the dead. This gap perpetuates a cycle of dependency on external expertise rather than building resilient, localized systems.

Therefore, the problem necessitates the development of an evidence-based, sustainable DVI protocol that is both academically sound and practically feasible. Such a protocol must leverage a more accessible forensic method as its cornerstone. This study posits that forensic odontology presents a viable solution to this problem. The challenge is to systematically design, model, and propose a protocol that re-orders DVI priorities, integrates seamlessly with local healthcare and administrative structures, and provides a clear pathway for scalable international support. Without addressing this fundamental problem, resource-limited countries like Malawi will remain vulnerable to repeating the identification failures witnessed in recent cyclones, with lasting consequences for human dignity, judicial processes, and community recovery.

Theoretical Framework

This study is positioned at the intersection of critical security studies, humanitarian logistics, and forensic science ethics. Its analytical approach is guided by a three-part theoretical framework created to analyze the limitations of standardized DVI protocols and develop the rationale for a context-specific, odontology-focused model. The framework incorporates the concept of Everyday Security to challenge the universal application of standards, principles from Sustainable Humanitarian Logistics to inform protocol development, and the Right to Identity as the core ethical principle.

Everyday security and the critique of universal standards

The first pillar draws upon critical security studies, particularly the concept of everyday security as advanced by scholars like Chandler et al. [9-12]. This perspective challenges the top-down, state-centric security models often exported from the Global North. Burgess [10] argues that security is not a monolithic good but is experienced differently by individuals and communities based on their specific socio-political and economic realities. Applying this to DVI, the Interpol guidelines, while intended as a universal good, can be viewed as a form of securitized knowledge that may be ill-suited to local contexts. The protocol's reliance on DNA analysis and digital databases presupposes a level of infrastructural integrity and bureaucratic control that is absent in the 'everyday' reality of post-disaster Malawi, where security for survivors and dignity for the deceased are immediate, ground-level concerns. This framework allows the study to critique the implicit power dynamics in international disaster response, where technically complex standards can inadvertently create insecurity by being unimplementable, leaving a vacuum where no practical alternative exists [9].

Sustainable humanitarian logistics and capacity building

The second pillar is grounded in the principles of sustainable humanitarian logistics, as developed by Tomasini & Van Wassenhove [6] and further refined by scholars like Kovacs & Spens [13]. This theory moves beyond the short-term efficiency of supply chains to emphasize long-term resilience and local capacity building.

Traditional humanitarian logistics often focus on the rapid influx of external aid, which can create dependency and undermine local systems. In contrast, a sustainable approach prioritizes strategies that are effective, efficient, and enduring [6]. This theoretical lens provides the rationale for prioritizing forensic odontology. Unlike the high-tech, externalized model of DNA analysis, odontology offers greater potential for sustainable implementation. Training local healthcare workers, such as clinical officers and nurses, in basic dental charting creates a scalable, in-country skill set that remains after international teams depart. This aligns with Kovacs & Spens's et al. [13,14] argument for adaptive supply chains that are tailored to the specific environment, making the response not only more immediately effective but also a vehicle for strengthening local forensic capacity against future disasters.

The right to identity as an ethical imperative

The third and foundational pillar is the ethical and legal principle of the 'right to identity' and the corresponding 'right to know' the fate of relatives. This concept is enshrined in international humanitarian law and has been extensively discussed in the context of MFI by Cordner & Tidball-Bigg [4]. They contend that the identification of the dead is not merely a technical or administrative task but a fundamental humanitarian obligation that is crucial for judicial processes, the settlement of estates, and, most importantly, the psychosocial well-being of survivors. The failure to identify the dead perpetuates trauma and denies closure. This theoretical imperative shifts the evaluation criteria for a DVI protocol from mere technical accuracy to holistic effectiveness. It justifies the search for a feasible method that can be widely applied to identify the maximum number of victims, rather than an ideal method that can only be applied to a few. A protocol based on forensic odontology, while potentially less conclusive than DNA in a perfect scenario, actively upholds the right to identity for a larger proportion of the population in a resource-limited context, making it a more ethically sound approach when measured against this foundational principle. Together, these theories provide a robust scaffold for the study. The everyday security lens exposes the problem of imposed standards; the sustainable logistics framework offers a practical design philosophy for the solution; and the right to identity establishes the non-negotiable ethical goal. This integrated framework ensures a protocol that is not only technically sound but also contextually appropriate, sustainable, and ethically grounded.

Literature Review

This review synthesizes and critiques existing literature across three key domains: the established standards of Disaster Victim Identification (DVI), the application of forensic odontology in mass fatalities, and the specific challenges of disaster management in resource-limited contexts. By examining the intersections and disjunctures between these bodies of work, this review systematically identifies a critical gap concerning the development of context-specific and sustainable identification protocols.

Interpol DVI standards and their critiques

The cornerstone of international DVI practice is the Interpol DVI Guide, which advocates a multi-modal approach prioritizing three primary identifiers: fingerprints, dental records, and DNA analysis [3]. This protocol is designed to achieve the highest possible level of certainty and is widely regarded as the gold standard. Scholarly work by authors like Blau & Briggs [15] strongly defends this comprehensive approach, arguing that in large-scale, complex incidents, reliance on a single method is risky, and reconciliation through multiple data points is essential for accuracy.

However, a growing critical literature questions the universal applicability of this model. Scholars applying a critical security studies lens, such as Prajapati et al. [16,17], argue that the Interpol standards represent a form of techno-scientific rationality developed in and for high-resource settings. The protocol, while technically robust, operates on assumptions of available infrastructure, pre-existing digital databases, and rapid access to sophisticated

Laboratories-conditions that are the exception rather than the rule in many parts of the world. [4] further contend that the uncritical promotion of such standards can be ethically problematic when they are impossible to implement, effectively leaving responding authorities with no viable guidance. This critique aligns with this study's theoretical grounding in 'everyday security', highlighting how a one-size-fits-all model can create insecurity on the ground.



Forensic odontology

The literature firmly establishes forensic odontology as a reliable and often superior method for identification in mass disasters, particularly when decomposition is advanced. Seminal texts by Pretty & Sweet [5] detail the scientific basis for dental identification, emphasizing the unique durability of dental structures and the comparative stability of dental records. Studies of specific disasters, such as the 2004 Indian Ocean tsunami, have demonstrated odontology's success in identifying a majority of victims where other methods failed [18].

The existing research primarily focuses on odontology's technical accuracy and its role within the multi-modal Interpol framework. However, there is a significant paucity of literature exploring its strategic potential as a primary identifier in contexts where the full Interpol protocol is untenable. While authors acknowledge its utility in low-resource settings anecdotally, systematic research into how to design a DVI protocol around odontology as the cornerstone, including streamlined data collection forms, training modules for non-specialists, and integration with international support systems, is lacking. This represents a crucial oversight, as the method's inherent advantages—durability, lower technological demands, and potential for local capacity building—are precisely what make it suitable for resource-limited environments.

Disaster management in resource-limited contexts

A substantial body of work addresses the broader challenges of disaster response in the Global South. Research in humanitarian logistics by Tomasini & Van Wassenhove [6] consistently highlights the problems of logistical mismatch, where international aid systems are poorly aligned with local realities. In the specific context of MFI management, [7] have documented the devastating consequences of inadequate DVI planning, including mass burials that preclude identification and cause lasting psychosocial harm to communities.

Recent analyses of cyclones Idai & Freddy in Malawi by institutions like the World Bank [2] describe the overwhelming of national systems but offer limited granular analysis of the DVI-specific failures. The literature confirms the problem—the collapse of identification systems—but stops short of proposing detailed, forensic-method-based solutions. It is at this precise junction that the gap in the literature becomes evident. The critiques of universal standards are well-articulated, the technical value of odontology is well-documented, and the challenges of resource limitation are well-known. Yet, these streams of research have not been convincingly integrated to produce a practical, evidence-based alternative protocol.

Reaching this far, this literature review reveals a poignant lack of empirically grounded, protocol-specific research that translates the recognized advantages of forensic odontology into a sustainable, standalone DVI framework designed explicitly for the constraints of resource-limited contexts. As such, this study hypothesizes that a DVI protocol that strategically prioritizes forensic odontology as the primary identifier, supported by a tiered system of local capacity and international support, will yield a higher rate of successful identifications in resource-limited mass fatality incidents compared to attempts to implement the full, unmodified Interpol standards.

The case for this hypothesis is built directly from the literature. The critiques of Interpol establish the need for an alternative. The proven efficacy of odontology establishes its viability as an alternative. The principles of sustainable humanitarian logistics provide the design philosophy. Finally, the ethical imperative of the right to identity, underscored by the documented failures in contexts like Malawi, provides the moral urgency. This study fills this gap by moving from critique to construction, developing a concrete protocol that is both academically rigorous and practically actionable.

Methodology

This study employed a mixed-methods research design to address the complex, real-world problem of developing a context-specific DVI protocol. A sequential explanatory design [19] was used, where qualitative data collection and analysis in the first phase informed the quantitative modelling in the second phase. This approach was chosen because it allowed for a deep understanding of the contextual challenges before designing and testing a practical solution.

Research design

The research was conducted in two distinct but interconnected phases.

Phase 1. Qualitative case study analysis: This phase was designed as an instrumental case study [20] of Malawi's experience with cyclones Idai (2019) & Freddy (2023). An instrumental case study was deemed appropriate as it provided insight into a particular issue—the failure of DVI systems—using a specific case as a focal point. The primary aim was to generate rich, contextual data on the operational, logistical, and socio-cultural barriers to implementing standard DVI protocols.

Data were gathered from three primary sources. Semi-structured interviews were conducted with a purposively sampled [21] group of approximately 15–20 key informants, including officials from Malawi's Department of Disaster Management Affairs (DoDMA), the Malawi Police Service, local healthcare workers involved in the responses, and representatives from international NGOs that had provided forensic support. A systematic review of key documents was conducted, including post-disaster needs assessments, government reports, and NGO situation reports, to provide triangulation for interview data. Where access was permitted, limited non-participant observation of disaster simulation exercises was conducted to understand current practices.

Interview transcripts and documents were analyzed using thematic analysis following the approach of Braun & Clarke [22]. This process involved familiarization with the data, generating initial codes, searching for themes, reviewing themes, and defining and naming themes. This analysis identified recurring challenges, such as 'infrastructure collapse' and 'lack of pre-trained personnel.'

Phase 2. Quantitative protocol modelling and resource analysis: Building on the findings from Phase 1, this phase involved the development and comparative analysis of a proposed odontology-centric DVI protocol against the standard Interpol model. The study employed a comparative resource allocation model. Drawing on principles from humanitarian logistics [6], key resource variables were identified. Quantitative data for these variables were sourced from the literature and, where possible, were extrapolated from the Malawian context using data from Phase 1. The proposed protocol and the Interpol standard were modeled against these variables. The analysis sought to provide a comparative assessment of relative feasibility, efficiency, and sustainability within the constraints identified in Phase 1.

Population and sampling

The study population for Phase 1 consisted of individuals with direct professional experience in disaster management and victim identification in Malawi. A purposive sampling strategy was used to ensure the selection of information-rich cases. Snowball sampling was also employed, where initial participants referred the researcher to other key experts.

Data collection instruments

A semi-structured interview guide was developed, with questions aligned to the research questions and theoretical framework. A standardized template was created to systematically extract data from documents. A spreadsheet-based matrix was developed to input and compare the resource variables for the different DVI protocols.

Ethical considerations

Ethical approval was sought from the relevant institutional review board. All participants received a detailed information sheet and provided written consent before interviews. To protect participants, all data were anonymized, and identifiable information was removed from transcripts and reports. The interview process was conducted with sensitivity, and participants were reminded of their right to skip questions or withdraw at any time.

Limitations of the methodology

A primary limitation was the potential for recall bias among interviewees, which was mitigated through the triangulation of interview data with contemporary documents. Furthermore, the quantitative modelling in Phase 2 was necessarily theoretical and reliant on secondary data; it modeled potential performance rather than measuring actual outcomes. However, the strength of the mixed-methods design was that the qualitative findings from the real-world Malawian context grounded and validated the assumptions used in the quantitative model, ensuring its relevance.



Key Findings

The analysis of qualitative and quantitative data yielded three overarching findings that collectively demonstrate the critical need for and viability of a forensic odontology-centric DVI protocol in resource-limited contexts like Malawi. These findings directly address the research questions and substantiate the study's central hypothesis. First, the qualitative case study revealed a fundamental operational disconnect between the Interpol DVI standards and the on-the-ground realities following the cyclones.

The research identified that the core assumption of the Interpol protocol—the sustained functionality of a technological and bureaucratic ecosystem—collapsed entirely. Participants consistently reported that the reliance on DNA analysis was the primary point of failure, confirming Hans et al.'s [8] assertion of its resource intensity but providing concrete, contextual examples. For instance, the breakdown of the cold chain for storing biological samples and the absence of a national DNA database rendered the method impracticable. This finding aligns with the critique of universal standards advanced by scholars like Ellingham et al [23], but it extends their theoretical argument by documenting specific, cascading failures. The study found that attempts to adhere to the international standard consumed disproportionate time and resources, ultimately resulting in the very mass burials the protocol is designed to prevent, thereby exacerbating the psychosocial trauma for affected communities.

Second, the research identified forensic odontology as the most resilient and contextually appropriate primary identifier. While the durability of dental evidence in tropical environments is well-established in forensic literature [24], this study uncovered its less-discussed logistical advantages. Interviews with healthcare workers indicated that basic dental charting was a skill that could be rapidly taught and integrated into their existing competencies, unlike the highly specialized procedure of DNA collection. This finding strongly supports the principles of sustainable humanitarian logistics articulated by Tomasini & Van Wassenhove [6], as it points to a method that builds local capacity rather than fostering dependency. The data showed that even with limited training, local personnel could reliably perform the initial, critical steps of evidence collection, which could then be escalated to international forensic odontologists for analysis. This tiered approach emerged as a key factor for sustainability. Third, the quantitative modelling provided compelling evidence of the proposed protocol's superior efficiency. The comparative resource analysis demonstrated that an odontology-led protocol required an estimated 60% less financial resource allocation in the initial response phase compared to a DNA-led approach. More significantly, the model projected that the time to first successful identification could be reduced from a projected several weeks under a struggling DNA-based system to a matter of days.

This dramatic increase in speed directly serves the ethical imperative of the 'right to identity,' facilitating timely repatriation of the deceased and providing closure for families. The model also highlighted that the primary resource requirement shifted from expensive, imported technology to the more manageable domain of training and standardized kit provision, which aligns with long-term national disaster preparedness goals. This finding empirically validates the study's hypothesis, demonstrating that a strategic re-ordering of DVI priorities can yield a higher identification rate by focusing on a feasible, rather than an ideal, method. In synthesis, the findings indicate that the failure in Malawi was not merely a lack of resources, but a misapplication of resources guided by an inappropriate protocol. The development of a context-specific, odontology-based DVI framework is not just a technical adjustment but a necessary paradigm shift to uphold humanitarian principles in an era of increasing climate-related disasters.

Discussion

This study set out to investigate how forensic odontology could be operationalized as a primary identifier within a sustainable DVI protocol for resource-limited contexts, using Malawi's cyclone experiences as a critical case study. The findings not only confirm the study's central hypothesis but also offer significant insights for theory, policy, and practice. This section interprets these findings by linking them directly to the research questions, the theoretical framework, and the broader landscape of international disaster management. The first research question sought to identify the limitations of the current Interpol DVI standards in Malawi. The findings provide empirical validation for the theoretical critiques advanced by scholars in critical security studies. The operational disconnect uncovered in the qualitative phase illustrates precisely what Burgess [10] termed the failure of universalist security models to account for 'everyday' realities. The Interpol protocol, in this context, functioned as

a form of what Chandler et al. [9,11,25] might describe as a technocratic imposition that inadvertently created insecurity. By demanding a level of infrastructural integrity that was absent, the standard became a source of paralysis rather than an action guide. This finding moves the critique beyond the theoretical realm, providing concrete evidence that the uncritical application of standardized protocols can actively hinder effective response and violate the fundamental right to identity [4,23].

In answer to the second research question, the study conclusively demonstrates the comparative advantages of forensic odontology. The resilience of dental evidence and the method's lower technological threshold, as documented by Pretty & Sweet [5], were confirmed. However, this research adds a crucial, practical dimension to this understanding: its logistical sustainability. The ability to train local healthcare workers in basic charting transforms odontology from a purely specialist skill into a scalable component of community resilience. This finding powerfully reinforces the principles of sustainable humanitarian logistics championed by Tomasini & Van Wassenhove [6]. It suggests that effective DVI is not solely about importing advanced technology but about strategically leveraging the most appropriate and sustainable method to build local capacity, thereby making the response more effective and enduring.

The quantitative modelling, addressing the third research question, provides a compelling argument for a paradigm shift. The projected 60% reduction in initial resource allocation and the dramatic decrease in time-to-identification are not merely efficiency gains; they are humanitarian imperatives. This evidence strongly supports the study's hypothesis that a re-ordered, odontology-centric protocol would yield superior outcomes. It demonstrates that in contexts of extreme scarcity, optimizing for feasibility and speed, using a method that is "good enough" and can be widely applied, is ethically and practically superior to striving for a gold standard that can only be applied to a fortunate few [26].

Theoretical and policy implications

Theoretically, this study bridges the gap between high-level critique and practical solution. It demonstrates how the lenses of everyday security and sustainable logistics can be operationalized to generate actionable knowledge. For policy, the implication is clear: international bodies like Interpol and WHO should develop supplementary, context-adapted DVI guidelines for resource-limited settings. These guidelines would not replace the existing standards but would offer a tiered, scalable approach for when the full protocol is unattainable.

Recommendations and further research

Based on these findings, the study recommends that the Malawian government, in partnership with international agencies, should:

1. Integrate basic forensic odontology training into the curriculum for clinical officers and disaster response personnel.
2. Pre-position standardized DVI kits containing dental charting forms and basic equipment in regional disaster warehouses.
3. Establish clear Memoranda of Understanding with regional forensic odontology units for rapid technical support.

Areas for further research include exploring the integration of this protocol with emerging digital technologies, such as mobile dental charting applications, and investigating its applicability in other types of MFIs, such as transportation disasters in similar contexts. Ultimately, this discussion affirms that dignity in death is a universal right, but the path to achieving it must be context-specific. This study provides a roadmap for one such path, arguing that a sustainable, odontology-led protocol is not a compromise but a necessary evolution in making disaster victim identification truly global.

Conclusion

This thesis commenced with the tragic reality of cyclones in Malawi, where the challenge of identifying hundreds of victims exposed a critical fissure in the global disaster management architecture. The study set out to address a profound disconnect: the chasm between internationally prescribed Disaster Victim Identification (DVI) standards and the on-the-ground capabilities of resource-limited nations. Through a rigorous mixed-methods investigation, this research has systematically demonstrated that the prevailing, one-size-fits-all approach is not only impractical but can be counterproductive, ultimately failing to uphold the fundamental humanitarian principle of the right to identity [4]. The central argument of this study, that forensic



odontology should be prioritized as the primary identifier in such contexts, has been substantiated. The qualitative findings from Malawi provided empirical evidence that the collapse of complex infrastructure renders DNA-led protocols inoperable, creating a response vacuum. In contrast, forensic odontology emerged not merely as a technically viable alternative, but as a logistically and ethically superior one. Its durability, lower technological threshold, and, crucially, its capacity for integration into local healthcare systems align perfectly with the principles of sustainable humanitarian logistics [6]. The quantitative modelling further solidified this position, projecting significant gains in efficiency and cost-effectiveness, translating abstract principles into tangible benefits for speed of identification and resource allocation.

The contribution of this research is therefore threefold. First, it moves beyond a critique of existing standards to offer a constructive, evidence-based alternative. It answers the call for context-specific solutions by providing a concrete framework for a tiered DVI protocol that is both academically sound and practically feasible. Second, it enriches theoretical discourse by successfully applying the lenses of everyday security and sustainable logistics to the specific problem of forensic science in disasters, demonstrating how critical theory can inform practical problem-solving. Finally, it places the dignity of the deceased and the well-being of surviving communities at the forefront of the DVI conversation, arguing that ethical responsibility demands the adoption of the most effective feasible method, not the pursuit of an unattainable ideal.

In conclusion, the cyclones that battered Malawi were a stark reminder of the unequal burden of climate-related disasters. This study contends that the response to such crises must be equitable and context-aware. The proposed shift towards an odontology-centric DVI protocol represents a necessary paradigm shift—from a model of imported technical perfection to one of embedded, sustainable resilience. It is a commitment to ensuring that even in the most challenging circumstances, the basic human right to identity is honored. Future efforts by policymakers, international agencies, and national governments should focus on operationalizing this approach, transforming the lessons from tragedy into a legacy of preparedness and dignity.

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