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Green Humanitarianism: Environmental Sustainability of Interventions in Disaster Affected Regions

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Abstract

Climate-related disasters are increasing in frequency and intensity, placing growing pressure on humanitarian response systems worldwide. While humanitarian interventions are essential for saving lives and providing emergency assistance, these operations can also generate unintended environmental impacts through logistics systems, temporary infrastructure, and relief supply chains. This study examines how humanitarian interventions can integrate environmental sustainability without compromising the delivery of immediate life-saving assistance. Using a qualitative desk review approach, the study synthesises peer-reviewed literature, policy reports from international organisations, and documented case studies of humanitarian interventions published between 2015 and 2025. The analysis identifies three key themes: the environmental impacts of humanitarian operations, emerging sustainable practices within humanitarian response, and institutional and operational barriers that limit the adoption of green humanitarian approaches. The findings indicate that while awareness of environmental sustainability in humanitarian practice is increasing, its integration into disaster response remains uneven due to operational urgency, funding structures, and limited implementation frameworks. However, emerging initiatives such as greener logistics systems, sustainable procurement practices, and community-based resource management demonstrate potential pathways toward more environmentally responsible humanitarian action. The study contributes to the growing discussion on green humanitarianism by highlighting the need for practical frameworks that balance rapid emergency response with environmental sustainability and long-term resilience in disaster-affected regions.

Keywords: Green Humanitarianism, Environmental, Sustainability, Disaster, Affected Regions, Interventions



Introduction

Climate-related disasters are increasing in both frequency and intensity across the world, creating growing humanitarian needs and placing significant pressure on emergency response systems. Extreme weather events such as floods, droughts, cyclones, and heatwaves are becoming more severe as a result of climate change, affecting millions of people annually and increasing the demand for humanitarian assistance (Impacts, adaptation and vulnerability 2022). As disasters intensify, humanitarian organisations are required to respond more frequently and at larger scales, often operating in fragile environments where infrastructure is damaged, resources are scarce, and communities are highly vulnerable. These trends have intensified global discussions on how humanitarian systems can respond effectively while also supporting long-term resilience and sustainability in disaster-affected regions (Kelman, 2020; Thomas & López, 2015).

Within this context, the concept of green humanitarianism has emerged as an important area of discussion in humanitarian policy and research. Green humanitarianism refers to efforts to reduce the environmental footprint of humanitarian interventions while maintaining the effectiveness of life-saving assistance. Humanitarian operations often involve extensive logistics networks, temporary infrastructure, transportation systems, and the large-scale distribution of relief supplies. While these activities are essential for saving lives, they can also generate environmental impacts such as increased carbon emissions, waste generation, and pressure on natural resources (United Nations Environment Programme & United Nations Office for the Coordination of Humanitarian Affairs, 2019). Scholars studying humanitarian logistics note that environmental sustainability has historically received limited attention within humanitarian supply chains, where operational speed and efficiency often dominate decision-making (Kunz & Reiner, 2012; Anjomshoe et al., 2019).

The environmental consequences of humanitarian response become particularly visible in disaster-affected regions where ecosystems are already fragile. Communities recovering from disasters frequently depend directly on natural resources such as forests, land, and water systems for survival and recovery. Humanitarian interventions that overlook environmental sustainability may therefore unintentionally contribute to environmental degradation. For example, emergency shelter construction can increase pressure on local forests through timber use, while the large-scale distribution of relief supplies often generates plastic and packaging waste that local waste management systems cannot effectively manage (Sphere Association, 2018; International Federation of Red Cross and Red Crescent Societies, 2021). In addition, poorly planned emergency settlements or camps may place further stress on water resources, sanitation infrastructure, and surrounding ecosystems (Corsellis & Vitale, 2005).

Despite growing recognition of these challenges, much of the existing literature on humanitarian response continues to focus primarily on operational efficiency, coordination, and rapid aid delivery. Although environmental sustainability is increasingly discussed in humanitarian policy reports and guidelines, it remains insufficiently integrated into practical operational frameworks that guide field-level interventions during disasters (Brangeon, 2020; Maxwell & Majid, 2016). Consequently, there remains a significant gap between sustainability principles and their practical implementation within humanitarian response systems.

Against this backdrop, this paper examines the role of green humanitarianism in promoting environmentally sustainable humanitarian interventions in disaster-affected regions. Specifically, the study critically examines how humanitarian interventions can integrate environmental sustainability without compromising the delivery of immediate life-saving assistance. By exploring practical approaches that reduce the environmental footprint of humanitarian operations while maintaining



operational effectiveness, the study contributes to ongoing discussions on how humanitarian systems can balance urgent relief efforts with environmentally responsible practices and support both immediate humanitarian outcomes and long-term ecological resilience.

Literature Review

Recent scholarship highlights the growing relationship between climate change and humanitarian crises. Climate-related disasters are increasing globally, forcing humanitarian organisations to operate in more complex and resource-constrained environments. Researchers note that the traditional humanitarian model, which primarily focused on emergency relief and rapid response, is increasingly challenged by the long-term environmental and social consequences of disasters (Arcos González, 2024).

At the same time, humanitarian systems are undergoing conceptual transformation as scholars call for more sustainable approaches to disaster response. Climate change is widely recognized as a major driver of humanitarian emergencies, intensifying disasters while also exposing structural vulnerabilities within humanitarian systems (Schwerdtle et al., 2024).

These developments have stimulated debates around how humanitarian action can respond to urgent crises while simultaneously addressing environmental sustainability and resilience.

Buttressing further growing body of literature examines the environmental footprint of humanitarian interventions. Humanitarian response typically requires large-scale logistics operations involving transportation networks, emergency shelter systems, supply chains, and temporary infrastructure. While these activities are essential for delivering life-saving aid, they can also generate significant environmental impacts, including carbon emissions, waste generation, and pressure on natural resources.

Studies on humanitarian logistics emphasize that relief supply chains often prioritise speed and efficiency over environmental considerations, which can lead to unsustainable operational practices (Rodríguez-Espíndola et al., 2023). Similarly, research on humanitarian supply chains highlights that transportation systems and procurement practices in disaster response frequently contribute to high energy consumption and environmental degradation (Dubey et al., 2022).

In addition, humanitarian relief materials themselves can generate environmental challenges. For instance, the management of medical and pharmaceutical products in humanitarian operations has been shown to produce waste and environmental harm when supplies are poorly managed or inappropriate for local contexts (Patil et al., 2021). These findings suggest that humanitarian interventions may unintentionally contribute to environmental degradation if sustainability considerations are not integrated into operational planning.

In response to these concerns, recent studies have begun to explore the concept of green humanitarianism, which seeks to integrate environmental sustainability into humanitarian operations. Research on sustainable humanitarian supply chains has highlighted the need to incorporate environmental criteria into logistics planning, procurement, and distribution systems in disaster relief (Anjomshoe et al., 2025). Ramirez-Villamil & Jaegler, (2025) also emphasise the growing importance of green practices within humanitarian logistics, including the use of renewable energy, sustainable transportation systems, circular supply chains, and environmentally friendly materials in humanitarian operations.



Another emerging strand of research focuses on the barriers to sustainability within humanitarian systems. For example, studies show that funding constraints, operational uncertainty, lack of training, and weak institutional frameworks often prevent humanitarian organisations from adopting environmentally sustainable practices in disaster response (Baharmand et al., 2025). These structural barriers highlight the complexity of integrating sustainability into humanitarian action.

Despite growing attention to green humanitarianism, existing literature remains fragmented, with a predominant focus on logistics and supply chains, while broader interventions such as shelter, camp management, and community-based responses are underexplored; moreover, many studies emphasize technical solutions but pay limited attention to integrating sustainability into early-stage decision-making and offer weak links between policy frameworks and practical implementation in disaster contexts. Consequently, there is limited empirical and conceptual guidance on how to systematically operationalise environmental sustainability within humanitarian interventions in ways that effectively balance ecological considerations with the urgency, complexity, and life-saving demands of disaster response.

Theoretical Framework

This study draws on three complementary theoretical perspectives to explain how humanitarian interventions can integrate environmental sustainability without compromising immediate life-saving assistance: Sustainable Development Theory, Resilience Theory, and Humanitarian Logistics Theory. Together, these perspectives provide a conceptual foundation for understanding the relationship between humanitarian response, environmental sustainability, and disaster recovery.

Sustainable Development Theory

The concept of sustainable development provides an important theoretical foundation for understanding environmental sustainability in humanitarian interventions. The theory was popularised in 1987 through the Brundtland Report, which defines sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987). Sustainable Development Theory emphasises the integration of environmental protection, economic efficiency, and social well-being in development and policy processes.

In the context of humanitarian response, this theory highlights the importance of ensuring that emergency interventions do not undermine environmental systems that communities depend on for long-term recovery. Disaster-affected populations often rely heavily on natural resources such as forests, land, and water systems for rebuilding livelihoods. Therefore, humanitarian assistance that ignores environmental sustainability may inadvertently weaken local ecological resilience and increase vulnerability to future disasters (Kelman, 2020). Sustainable Development Theory, therefore, supports the idea that humanitarian interventions should be designed in ways that balance immediate relief with long-term environmental sustainability.

Resilience Theory

Resilience Theory was developed by C. S. Holling in 1973, who introduced the concept to explain how ecological systems absorb disturbances and maintain their core functions over time. Resilience Theory provides another important lens for understanding sustainable humanitarian interventions. Originally developed in ecological studies, resilience refers to the ability of systems, whether ecological, social, or



economic, to absorb shocks and recover from disturbances while maintaining essential functions (Holling, 1973). In disaster and humanitarian research, resilience theory has been widely used to explain how communities adapt and recover after crises.

From this perspective, environmental sustainability is closely linked to community resilience. Ecosystems play a critical role in supporting livelihoods, food systems, and water security in disaster-affected regions. When humanitarian interventions degrade local ecosystems, for example, through deforestation, waste generation, or overuse of natural resources, they may weaken the resilience of affected communities. Conversely, environmentally responsible humanitarian practices can support long-term resilience by protecting natural resources that communities depend on for recovery (Norris et al., 2008).

Humanitarian Logistics Theory

Humanitarian Logistics Theory was articulated by Gyöngyi Kovács and Karen M. Spens in 2007. Humanitarian Logistics Theory focuses on the planning, implementation, and coordination of supply chains used in disaster response. The theory emphasizes the importance of delivering the right resources, at the right place, and at the right time during emergencies (Kovács & Spens, 2007). Humanitarian logistics plays a central role in disaster response because it enables rapid delivery of food, shelter, medical supplies, and other forms of assistance to affected populations.

However, traditional humanitarian logistics systems often prioritize speed and efficiency, sometimes at the expense of environmental considerations. Recent scholarship has therefore begun to explore how sustainability principles can be incorporated into humanitarian logistics, including the use of greener transportation systems, environmentally responsible procurement practices, and improved waste management strategies (Dubey et al., 2022). Integrating sustainability into humanitarian logistics can help reduce the environmental footprint of relief operations while maintaining the effectiveness of emergency response.

Conceptual Integration

Together, these three theoretical perspectives provide a framework for understanding green humanitarianism. Sustainable Development Theory emphasizes the need to balance immediate humanitarian assistance with long-term environmental sustainability. Resilience Theory highlights the importance of protecting ecosystems to support community recovery and adaptation after disasters. Humanitarian Logistics Theory explains how operational systems used in disaster response can be redesigned to incorporate sustainability principles without undermining the speed and effectiveness of aid delivery.

By integrating these theoretical perspectives, the study examines how humanitarian interventions can adopt environmentally sustainable practices while still fulfilling their core objective of providing timely and effective assistance to disaster-affected populations.

Methodology

This study adopts a **qualitative desk review approach** to examine the environmental sustainability of humanitarian interventions in disaster-affected regions. Desk review methods are widely used in humanitarian and disaster research to synthesise existing knowledge, identify patterns across contexts, and critically assess policy and practice (Snyder, 2019). The review draws on three main sources of data: **peer-reviewed academic literature, policy reports and operational guidelines from international**



organizations, and **documented case studies of humanitarian interventions**. A systematic search strategy was used to identify relevant sources through academic databases such as **Scopus, Web of Science, and Google Scholar**, using keywords including *green humanitarianism*, *sustainable humanitarian response*, *environmental sustainability in disaster response*, and *humanitarian logistics sustainability*. The review focuses on literature published between **2015 and 2025**, reflecting the growing scholarly and policy attention to sustainability in humanitarian operations during the past decade. Inclusion criteria consisted of studies that examine the environmental impacts of humanitarian interventions, sustainability practices in disaster response, and policy frameworks related to environmentally responsible humanitarian action. Exclusion criteria included sources that did not directly address humanitarian interventions in disaster contexts or that lacked sufficient empirical or conceptual relevance to sustainability in humanitarian response. The selected literature and reports were analysed using **thematic synthesis**, allowing the study to identify recurring themes related to environmental impacts of humanitarian activities, sustainable humanitarian practices, and strategies for reducing the ecological footprint of relief operations (Ahmed, 2025). By integrating academic research, policy reports, and real-world case examples, this desk review provides a comprehensive understanding of how environmental sustainability is addressed within humanitarian response systems and helps identify practical approaches for promoting **green humanitarianism** in disaster-affected regions.

Findings

The desk review identified several recurring themes regarding the environmental sustainability of humanitarian interventions in disaster-affected regions. The findings reveal that while humanitarian operations are essential for delivering life-saving assistance, they also generate environmental impacts that are increasingly recognized in both academic research and humanitarian practice. Three major themes emerged from the analysis: environmental impacts of humanitarian operations, emerging sustainable practices in humanitarian response, and institutional barriers to green humanitarianism.

Environmental Impacts of Humanitarian Interventions

The literature consistently shows that humanitarian operations can produce significant environmental pressures in disaster-affected regions. One major source of environmental impact is humanitarian logistics, particularly the transportation of relief supplies and personnel. Studies indicate that humanitarian supply chains rely heavily on-air transport and diesel-based transportation systems, which contribute to high carbon emissions during emergency operations (Kunz & Reiner, 2012; Dubey et al., 2022). In addition, the distribution of packaged relief materials often generates large quantities of plastic and packaging waste that local waste management systems are unable to process effectively.

Another major environmental concern relates to temporary shelter and camp infrastructure. Research on humanitarian shelter systems shows that emergency housing frequently relies on materials such as timber, plastic sheeting, and metal structures that can contribute to deforestation, resource depletion, and long-term waste accumulation (Corsellis & Vitale, 2005). Large humanitarian camps and temporary settlements may also place pressure on surrounding ecosystems by increasing demand for water, firewood, and sanitation facilities (Sphere Association, 2018). These findings suggest that humanitarian interventions, while necessary, can unintentionally contribute to environmental degradation if sustainability considerations are not integrated into planning and implementation.

Emerging Sustainable Practices in Humanitarian Response



Despite these challenges, the review also identified growing efforts to incorporate sustainability into humanitarian operations. Recent studies highlight several emerging practices that aim to reduce the environmental footprint of humanitarian interventions. One approach involves greening humanitarian logistics, including the adoption of more efficient transportation systems, improved procurement practices, and the use of renewable energy sources in field operations (Anjomshoae et al., 2019; Dubey et al., 2022). Some humanitarian organizations have begun exploring alternatives such as solar-powered energy systems for field offices and camps, as well as local procurement strategies that reduce transportation-related emissions.

Another emerging strategy involves environmentally responsible shelter and infrastructure design. Researchers note that humanitarian actors are increasingly experimenting with recyclable materials, modular shelter systems, and locally sourced sustainable building materials in disaster response (Brangeon, 2020). These approaches aim to reduce environmental harm while also supporting local economies and strengthening community resilience.

The literature also highlights the importance of localization and community participation in promoting environmentally sustainable humanitarian practices. Local actors often possess knowledge of ecological conditions and resource management practices that can support more sustainable disaster response strategies (Maxwell & Majid, 2016). Incorporating local knowledge into humanitarian planning can therefore contribute to more environmentally responsible interventions.

Institutional and Operational Barriers

Despite increasing interest in green humanitarianism, the review found that several institutional and operational barriers continue to limit the integration of sustainability into humanitarian response. One key challenge is the urgency of emergency response, which often prioritizes speed and rapid delivery of aid over environmental considerations. Humanitarian organizations must often make decisions under extreme time pressure, which can limit opportunities to implement environmentally sustainable alternatives.

Another barrier relates to funding and institutional structures within the humanitarian sector. Many humanitarian funding mechanisms prioritize short-term emergency outcomes rather than long-term sustainability considerations. As a result, organizations may face limited incentives or resources to invest in environmentally sustainable practices during disaster response (UNEP & OCHA, 2019).

A third barrier identified in the literature is the lack of operational frameworks and guidelines that translate sustainability principles into practical field-level actions. While environmental sustainability is increasingly recognized in humanitarian policy discussions, many humanitarian actors lack clear tools or operational guidance for implementing sustainable practices during emergency interventions.

Discussion

The findings of this study highlight the growing tension between the urgency of humanitarian response and the need to integrate environmental sustainability into disaster interventions. The literature reviewed shows that humanitarian operations, particularly logistics systems, temporary shelter construction, and relief supply chains, can generate significant environmental pressures in disaster-affected regions. Humanitarian supply chains often rely on carbon-intensive transportation systems and large volumes of packaged relief goods, which contribute to greenhouse gas emissions and waste generation in already fragile environments (Dubey et al., 2022; Rodríguez-Espíndola et al., 2023). In addition, the rapid construction of emergency shelters and temporary settlements frequently increases pressure on local natural resources such as timber, water sources, and land. These findings indicate that while humanitarian



operations are designed to provide immediate life-saving assistance, they can inadvertently create environmental pressures that affect the long-term sustainability of disaster-affected regions.

The findings also reveal that environmental sustainability is gradually emerging as a concern within humanitarian practice, although its integration remains uneven. Recent studies highlight growing efforts to incorporate greener practices into humanitarian supply chains, including sustainable procurement systems, renewable energy solutions in humanitarian camps, and improved waste management practices (Ramirez-Villamil&Jaegler, 2025; Baharmand et al., 2024). These developments suggest a gradual shift toward environmentally responsible humanitarian interventions, reflecting broader global commitments to sustainable development. In this context, the findings are consistent with the principles of Sustainable Development Theory, which emphasize the need to balance immediate human needs with the protection of environmental systems that support long-term recovery and livelihoods (World Commission on Environment and Development, 1987).

Despite these emerging initiatives, the review also demonstrates that several institutional and operational barriers continue to limit the adoption of environmentally sustainable practices in humanitarian response. One of the most significant challenges is the urgency of emergency operations, which often prioritizes speed and rapid delivery of aid over environmental considerations. Humanitarian organizations frequently operate under extreme time pressure, making it difficult to incorporate sustainability considerations into logistics planning and procurement decisions (Altay et al., 2023). These findings support insights from Humanitarian Logistics Theory, which emphasizes the importance of delivering aid quickly and efficiently during emergencies but also highlights the need to redesign humanitarian supply chains to incorporate sustainability principles without undermining operational effectiveness (Kovács&Spens, 2007).

Another important finding relates to the role of local actors and communities in promoting environmentally sustainable humanitarian interventions. The literature suggests that community-based approaches often rely on locally available resources and indigenous knowledge systems that can support more environmentally responsible disaster response strategies (Schwerdtle et al., 2024). Integrating local knowledge into humanitarian planning can reduce environmental impacts while strengthening recovery processes in disaster-affected regions. This observation aligns with insights from Resilience Theory, which emphasizes the importance of protecting ecological systems that support community recovery and adaptive capacity after disasters (Holling, 1973; Norris et al., 2008).

Taken together, the findings demonstrate that while awareness of environmental sustainability in humanitarian response is increasing, the practical implementation of green humanitarianism remains limited. Humanitarian systems continue to prioritize rapid response and operational efficiency, often leaving environmental considerations as secondary concerns.

Conclusion

Humanitarian interventions play a critical role in responding to disasters, yet the findings of this study show that such interventions can also produce unintended environmental consequences through logistics operations, temporary shelter construction, and relief supply chains. While recent initiatives indicate growing awareness of environmental sustainability within humanitarian practice, the integration of sustainable approaches into emergency response remains limited. The evidence suggests that incorporating environmentally responsible practices such as greener logistics systems, sustainable procurement, and greater engagement with local knowledge can reduce the ecological footprint of humanitarian operations without undermining the speed and effectiveness required during emergencies.



As climate-related disasters become more frequent and complex, advancing environmentally sustainable humanitarian practices will be essential for ensuring that disaster response efforts contribute not only to immediate relief but also to the long-term resilience of disaster-affected regions.

Recommendations

Based on this study's findings, targeted recommendations are proposed to strengthen the integration of environmental sustainability into humanitarian interventions.

1. **Incorporate Environmental Considerations into Humanitarian Response Frameworks:** The findings show that humanitarian operations often generate environmental impacts due to the lack of sustainability considerations during emergency planning. Humanitarian organizations should therefore integrate environmental assessments into disaster preparedness and response frameworks. Tools such as environmental impact screening and sustainability guidelines can help humanitarian actors identify and mitigate environmental risks during relief operations.

2. **Promote Green Humanitarian Logistics Systems:** The study found that humanitarian logistics operations are a major contributor to environmental impacts through transportation emissions and waste generation. Humanitarian agencies should therefore adopt greener logistics practices, including optimizing transportation routes, promoting local procurement, reducing unnecessary packaging, and increasing the use of renewable energy sources such as solar-powered systems in field operations.

3. **Improve Environmental Management in Humanitarian Camps and Settlements:** The findings highlight that temporary settlements and camps can place significant pressure on surrounding ecosystems through increased demand for natural resources such as water, firewood, and land. Humanitarian organizations should adopt environmentally responsible shelter designs, promote sustainable energy alternatives, and implement effective waste management systems within camps to reduce environmental degradation.

4. **Strengthen Community Participation in Sustainable Humanitarian Response:** The study also shows that local communities play an important role in supporting environmentally sustainable practices. Humanitarian actors should therefore involve community members in disaster response planning and implementation. Community participation can improve resource management practices and ensure that humanitarian interventions align with local environmental conditions and cultural practices.

5. **Encourage Policy Support and Sustainable Funding Mechanisms:** Finally, institutional barriers such as funding structures and operational priorities often limit the adoption of environmentally sustainable humanitarian practices. International donors and humanitarian agencies should develop policies and funding mechanisms that encourage sustainable humanitarian interventions, including investments in green technologies, environmentally friendly relief materials, and sustainable infrastructure in disaster response operations

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