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The Contribution of Environmental Diplomacy to Disaster Risk Reduction

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Abstract

This study critically examines the contribution of environmental diplomacy in disaster risk reduction (DRR), emphasizing its importance in mitigating the impacts of natural hazards exacerbated by climate change. As global environmental challenges increase, the intersection of international diplomatic efforts and DRR becomes essential for promoting resilience and reducing vulnerabilities. Through a comprehensive analysis of the UNDRR Frameworks, this research investigates how environmental diplomacy contributes to DRR by facilitating international cooperation, enhancing resource allocation, and fostering knowledge dissemination. The study employs an interpretive qualitative inductive methodology, incorporating case studies to identify best practices and challenges in aligning environmental diplomacy with DRR objectives. Findings reveal that robust environmental diplomacy significantly enhances disaster preparedness by promoting cross-border collaboration, accelerating access to climate finance, and integrating local capacities into global frameworks. However, challenges remain, particularly in terms of implementation gaps, accessibility to financial resources, and the representation of vulnerable nations in decision-making processes. Key recommendations include strengthening international diplomatic engagements, streamlining climate finance mechanisms, and promoting regional cooperation to address shared risks. Additionally, the study advocates for integrating DRR into national development policies, enhancing community-based resilience efforts, and improving monitoring and evaluation systems to track DRR progress. The research concludes that by reinforcing the synergies between environmental diplomacy and DRR, the global community can better address the increasing risks posed by climate-related disasters and build more sustainable, resilient societies..

Keywords: environmental diplomacy; disaster risk reduction; natural hazards; climate change; international agreements.

Introduction

The risk of disasters driven by natural hazards and climate change escalates, surpassing current mitigation efforts (UNDRR, 2019; IPCC, 2021). However, strategies and tools designed for disaster risk reduction (DRR) serve as valuable mechanisms for adaptation. One key approach is environmental diplomacy, which plays a pivotal role in promoting effective and accountable action at international, national, and local levels. In this study, environmental diplomacy refers specifically to diplomatic efforts focused on environmental issues related to DRR.

Environmental diplomacy, while a relatively recent phenomenon in comparison to other forms of diplomacy. It can be traced back to the 1972 United Nations Conference on the Human Environment (UNCHE) in Stockholm (UN, 1972). Since then, environmental diplomacy has led to the development of numerous treaties, each addressing a diverse range of international environmental issues (Mbengue & Cima, 2022). This conference is widely regarded as a pivotal moment in the development of international environmentalism, marking the first instance in which environmental issues were integrated into formal international cooperation (Borowy, 2019). It also initiated critical discussions between industrialized and developing countries regarding the relationship between economic activities, pollution, and public health (Kimiti & Ichani, 2024).



However, the concept of environmental diplomacy was formally introduced during the 1992 United Nations Conference on Environment and Development (UNCED), commonly referred to as the Earth Summit, held in Rio de Janeiro. This conference marked the largest gathering of delegates in history, representing the most expansive form of multilateral diplomacy. Nearly 180 nations participated, with 118 represented by their heads of state. In addition to national delegations, the United Nations and various intergovernmental organizations were also present. The Earth Summit aimed at preventive action, resulting in two main approaches: a reactive one, in which two or more countries collaborate to address specific environmental issues, and a proactive one, in which countries foster relationships through the exchange of environmental ideas and cultural practices for the advancement of environmental protection.

Environmental diplomacy has emerged as a crucial mechanism in addressing disaster risks posed by natural hazards. With the frequency and intensity of natural hazards escalating due to climate change, the need for a collaborative international approach has never been more pressing. DRR strategies, which aim to minimize vulnerabilities and enhance community resilience, are increasingly intertwined with environmental diplomacy efforts. The convergence of these two fields creates a dynamic intersection where policies, international frameworks, agreements, and diplomatic engagements are pivotal in mitigating the effects of environmental degradation and climate change-induced disasters.

Thus, international agreements such as the UNDRR Frameworks serve as critical mechanisms for promoting, understanding, and supporting DRR, owing to their universal membership and long-term scope (Kelman, 2017). However, this situation raises ongoing debates about the adequacy of existing the adequacy of current environmental diplomacy represented by international frameworks for DRR in addressing and mitigating disaster risk over both short- and long-term horizons (Raikes et al., 2022).

By employing an interpretative qualitative inductive method, this research critically examines the contribution of environmental diplomacy to DRR by exploring how the UNDRR Frameworks influence disaster risk management. The paper concludes with recommendations for policymakers on developing DRR Frameworks.

Motivation

The motivation for this study stems from the growing recognition that climate change and environmental degradation are intensifying the frequency and severity of natural hazards worldwide (Kelman et al., 2015). With vulnerable communities facing heightened risks from events such as floods, hurricanes, droughts, and wildfires, it has become evident that traditional approaches to DRR alone are insufficient to address the complex, transboundary nature of these challenges (Basher, 2006; IPCC, 2012, 2014). Environmental diplomacy, through international agreements and multilateral collaborations, offers a critical role in enhancing global responses to these interconnected issues.

However, despite the potential of environmental diplomacy to contribute to DRR, there is limited understanding of how these two fields can be effectively harmonized to maximize their collective impact. International agreements, such as the UNDRR Frameworks (UNDRR, 2015), present opportunities for countries to work together in mitigating environmental risks, but practical implementation remains inconsistent across countries. Moreover, the challenges of aligning diplomatic efforts with localized DRR practices underscore the need for more research into the mechanisms by which environmental diplomacy can enhance resilience at both the global and community levels (Tozier de la Poterie & Baudoin, 2015).

Therefore, this study is motivated by the desire to fill this knowledge gap, offering an in-depth examination of how environmental diplomacy can be leveraged to reduce disaster risks and build sustainable, resilient societies. The urgency of addressing disaster risks and their cascading impacts further fuels the need for a comprehensive

exploration of this intersection, with the goal of fostering more resilient global and local strategies and frameworks through environmental diplomacy. By identifying best practices and exploring the barriers to effective integration, this research aims to contribute valuable insights that can inform future policies and initiatives, ultimately leading to stronger international cooperation in the face of escalating disaster risks.

Literature Review

Bridging Environmental Diplomacy and Disaster Risk Reduction

Environmental diplomacy and DRR share significant commonalities, as both seek to mitigate the effects of hazards by anticipating risks and addressing vulnerabilities. Natural hazards and climate change are altering the frequency and intensity of natural hazards such as heavy rainfall, droughts, rising sea levels, and potentially cyclones, all of which have direct implications on the environment.

Environmental diplomacy has gained prominence as global environmental challenges, such as disaster risks related to natural hazards and climate change, demand coordinated, multilateral responses. International agreements like the UNDRR Frameworks have been instrumental in fostering global cooperation to combat natural hazards and mitigate their impacts, including those related to increased disaster risks. The UNDRR Frameworks is a landmark diplomatic effort to limit natural hazards, directly addressing the root cause of many disaster risks.

The intersection of environmental diplomacy and DRR represents a relatively underexplored but increasingly significant area of research. Environmental diplomacy, broadly defined as the negotiation and implementation of international environmental agreements, plays a critical role in addressing transboundary environmental issues like climate change and DRR (Harris, 2019). So, environmental diplomacy refers to the established practice of international dialogue or the art of managing international relations, primarily through negotiation, on matters concerning environmental issues (Pisupati, 2015). On the other hand, disaster risk is fundamentally defined as the intersection of hazard and vulnerability (Lewis, 1999; Wisner et al. 2004, 2012; UNISDR, 2009; Kelman, 2015). Thus, DRR is "The broad development and application of policies, strategies and practices to minimise vulnerabilities and disaster risks throughout society, through prevention, mitigation and preparedness" (Twigg, 2004). Hence, DRR encompasses a range of strategies aimed at minimizing vulnerabilities and building resilience to natural hazards, which are increasingly exacerbated by climate change.

The literature on environmental diplomacy highlights the importance of multilateral agreements as platforms for countries to not only reduce disaster risks but also to support vulnerable nations in adapting to the growing threats posed by natural hazards and climate change (Averchenkova & Bassi, 2021). Through mechanisms like the UNDRR Frameworks, diplomatic efforts provide financial resources for adaptation, including disaster preparedness and resilience-building activities (UNFCCC, 2015). Scholars argue that these diplomatic frameworks are essential for distributing knowledge, resources, and technologies that support DRR, particularly in developing countries disproportionately affected by natural hazards and climate-induced disasters (Betzold, 2015).

The literature indicates that environmental diplomacy agreements such as the UNDRR Frameworks are crucial in providing guidance and direction for disaster risk reduction efforts. These agreements can play a key role in ensuring the enforcement of disaster risk reduction measures at international, regional, national, and local levels (Llosa & Zodrow, 2011). This literature review examines key contributions, gaps, and trends in research on the role of environmental diplomacy in DRR, focusing on the UNDRR Frameworks.

The Evolution of Disaster Risk Reduction Frameworks: From Relief to Resilience

Since the 1960s, disasters have been addressed in United Nations agreements, beginning with several large-scale events that led to UN Resolutions focused on relief efforts (United Nations Office for Disaster Risk Reduction, 2017). This process of institutional development culminated in the establishment of the UN Disaster Relief Office in 1971. Multilateral responses were triggered by severe droughts in Afghanistan (UN General Assembly, 1971) and Ethiopia (UN General Assembly, 1978, 1985a, 1985b), with the 1985 Ethiopian disaster also leading to international fundraising initiatives, including the globally televised Live Aid concert, which reached an audience of approximately 1.9 billion people (Jones, 2005). These disasters extended beyond local and national concerns, highlighting their global impact.

The 1990s marked the International Decade for Natural Disaster Reduction (IDNDR), during which the Yokohama Strategy and Plan of Action for a Safer World (UN Office for Disaster Risk Reduction, 1994) emerged as the first significant global framework for DRR. This strategy explicitly linked sustainable development, environmental diplomacy, and DRR, while also incorporating Indigenous non-governmental organizations among the groups promoting hazard management and environmental issues. The IDNDR concluded with the establishment of the UN International Strategy for Disaster Reduction (UNISDR) in 1999, aimed at facilitating the implementation of the International Strategy for Disaster Reduction through interagency coordination, country-specific initiatives, and thematic discussions (United Nations Office for Disaster Risk Reduction, 2017). Now known as the UN Office for Disaster Risk Reduction (as mandated by UN General Assembly Resolution 56/195; see UN General Assembly, 2001), this office oversees the coordination of UN disaster reduction programs, integrating socio-economic and humanitarian strategies, and is led by the UN Special Representative of the Secretary-General for DRR.

The Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters. The HFA was adopted by UN member states in 2005 and served as a guiding framework for reducing losses from natural hazards over a ten-year period (UNISDR, 2005). The HFA emphasized the roles of states and international organizations while advocating for the involvement of civil society, academia, volunteer organizations, and the private sector. It also promoted the decentralization of authority and resources to enhance DRR at the local level. The key priorities of the HFA included the following:

- Strengthen institutional capacity: Ensure that DRR becomes a national and local priority with a robust institutional foundation for implementation.
- Understand risks: Identify, assess, and monitor disaster risks while improving early warning systems.
- Promote awareness and knowledge: Utilize knowledge, innovation, and education to foster a culture of safety and resilience at all societal levels.
- Mitigate risk: Address underlying risk factors through land-use planning and environmental, social, and economic measures.
- Enhance preparedness: Strengthen disaster preparedness to enable effective response at all levels.

In 2015, the Sendai Framework for Disaster Risk Reduction 2015-2030 replaced the Hyogo Framework for Action, introducing several new approaches based on extensive consultations. A key focus of the negotiations was the shift from disaster management to disaster risk management (UNISDR, 2015). This represented a significant change in the way disasters and hazards were understood, moving away from a "reactive" approach centered on disaster relief, toward a "proactive" strategy that prioritized disaster prevention and risk reduction.

The Sendai Framework for Disaster Risk Reduction significantly expanded the scope of DRR by addressing both natural and anthropogenic hazards, as well as associated environmental, technological, and biological risks. It

established seven global targets, emphasizing the reduction of disaster risk as a key outcome and prioritizing the strengthening of resilience. Additionally, the framework outlined a set of guiding principles, including the central responsibility of states to prevent and reduce disaster risk (UNISDR, 2015).

The Sendai Framework outlines four key priorities for action, operationalized through seven targets that emphasize prevention. Of these targets, four (a–d) are outcome-oriented, aiming to reduce human and material losses from disasters. The remaining three targets (e–g) are input-oriented, focusing on the establishment of nationally-led mechanisms to mitigate disaster risk. The priorities for action include a comprehensive understanding of risk in all its aspects; promoting risk governance to engage both public and private sectors in addressing disaster risk; establishing multi-hazard early warning systems; safeguarding productive assets; enhancing the safety and resilience of critical infrastructure; and strengthening preparedness for disaster response.

After adopting this ambitious agenda, the United Nations General Assembly established the Open-ended Intergovernmental Expert Working Group (OIEWG) in June 2015 to reach a consensus on indicators and terminology for disaster risk reduction. Following a rigorous consultation process, the OIEWG developed 38 indicators to assess progress toward the seven targets of the Sendai Framework (United Nations General Assembly, 2016). To support global reporting on the seven targets using the 38 indicators, UNDRR introduced the online Sendai Framework Monitor system on March 1, 2018, in all six official UN languages, accompanied by a series of technical guidance notes for member states.

Methodology

This study adopts a qualitative, interpretative, and inductive approach to investigate the contribution of environmental diplomacy to DRR. Given the complex and multi-faceted nature of the relationship between international diplomacy and DRR efforts, a qualitative methodology is the most suitable to capture the nuances and dynamics. The research is conducted through an in-depth analysis of the UNDRR Frameworks. The methodology is structured into several key stages, each designed to address the research objectives and questions systematically. This section outlines the research design, data collection methods, analysis techniques, and rationale.

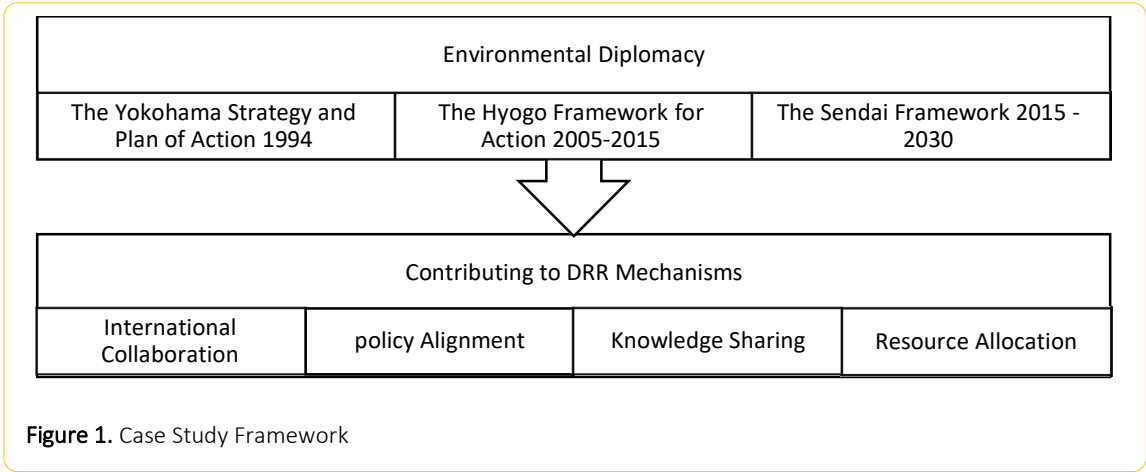
Research Design

The research design is exploratory and interpretative, focusing on understanding how environmental diplomacy contributes to DRR at both global and local levels and aimed at understanding the intricate relationship between environmental diplomacy and DRR. The qualitative inductive approach allows the study to draw general conclusions from specific observations, especially from case studies and the analysis of the UNDRR Frameworks. This approach enables flexibility in discovering themes and patterns that emerge from the data, helping to address the research questions comprehensively (Creswell & Poth, 2018). Thus, the following methods are employed:

- **Document Analysis:** A comprehensive content analysis of key international environmental and disaster agreements forms the foundation of the study's data. This involves a detailed examination of international environmental agreements, such as The Yokohama Strategy and Plan of Action (1994) for a Safer World emerged as the first significant global framework for DRR, the Hyogo Framework for Action (2005-2015), and the Sendai Framework for Disaster Risk Reduction (2015-2030) to understand their provisions and commitments related to disaster risk management and environmental diplomacy. Additionally, reports from international organizations such as the United Nations Office for Disaster Risk Reduction (UNDRR) are scrutinized to examine the roles of diplomatic engagements in enhancing global disaster resilience. The document analysis focuses on key themes such as international cooperation, resource allocation, knowledge

- sharing, and policy harmonization, which are central to understanding the contribution of environmental diplomacy to DRR (Bowen, 2009).
- Case Studies:** The study analyzes case studies of environmental diplomacy engagements that have successfully contributed to DRR. So, a multiple case study approach is used to provide an in-depth examination of how environmental diplomacy has influenced DRR outcomes in specific contexts. These cases help identify best practices and challenges in the alignment of environmental diplomacy with DRR objectives (Yin, 2014). The selected case studies include:
 - The Yokohama Strategy and Plan of Action 1994 for a Safer World emerged as the first significant global framework for DRR.
 - The Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters.
 - The Sendai Framework for Disaster Risk Reduction 2015-2030, which outlines global strategies for reducing disaster risks and how diplomatic engagements have supported its implementation.

Figure 1 (below) illustrates the case study framework and how each case contributes to the overall analysis. The research design is exploratory and interpretative, focusing on understanding how environmental diplomacy contributes to DRR at both global and local levels and aimed at understanding the intricate relationship between environmental diplomacy and DRR.

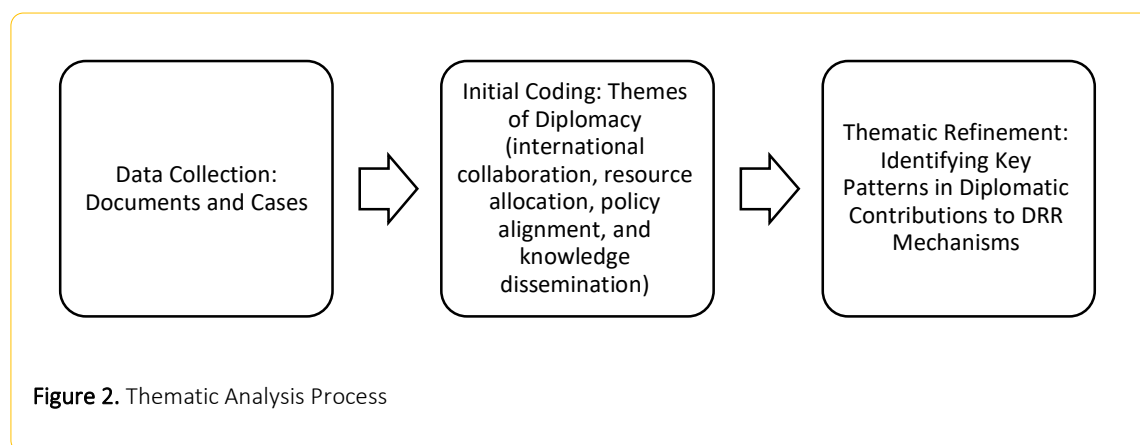


Data Analysis

The data collected from documents and case studies are analyzed using thematic analysis, which allows for the identification of recurring themes and patterns in the intersection of environmental diplomacy and DRR (Braun & Clarke, 2006). This method involves identifying recurring themes, patterns, and relationships that emerge from the data. The analysis follows an inductive process, where specific observations lead to the development of broader generalizations and insights related to the research questions. Thematic analysis is particularly suited to the inductive nature of this research, as it helps to identify key mechanisms through which environmental diplomacy contributes to resilience building and DRR.

Step 1: Coding Process

The first stage of data analysis involves open coding, where the research material—documents and case studies—is carefully reviewed to identify initial codes. Thematic coding is employed to categorize the data into meaningful themes. Codes are developed based on recurring concepts such as international collaboration, resource allocation, policy alignment, and knowledge dissemination for DRR (Clarke & Braun, 2014). The coding process is iterative, meaning that themes are continually refined as new data are analyzed.



Step 2: Axial Coding

Axial coding is then applied to group these initial codes into broader categories and relationships. For example, codes related to "knowledge sharing" and "capacity building" are grouped under the broader theme of "enhancing community resilience."

Step 3: Selective Coding

In the final stage, selective coding is used to refine and integrate the themes, drawing out key findings related to the contribution of environmental diplomacy to DRR. This stage focuses on identifying mechanisms that support disaster resilience, such as diplomatic negotiation outcomes, policy harmonization, and cross-border disaster preparedness.

Results

The analysis of the role of environmental diplomacy in advancing DRR efforts, based on literature and document analysis and case studies, reveals several key findings. These results are organized into four thematic areas: the effectiveness of international agreements in addressing disaster risks, the mechanisms through which environmental diplomacy enhances DRR, the challenges faced in harmonizing global and local DRR efforts through diplomacy, and the identification of best practices.

Effectiveness of International Agreements in Addressing Disaster Risks

The study's first major finding centers on the critical role of international agreements—such as the Yokohama Strategy and Plan of Action (1994), the Hyogo Framework for Action (2005-2015), and the Sendai Framework for Disaster Risk Reduction (2015-2030) in fostering cooperation and shared responsibility for reducing disaster risks, particularly those exacerbated by climate change. The UNDRR frameworks were highlighted in the findings as a vital diplomatic tool in the international DRR landscape. The frameworks emphasize risk-informed development, promoting disaster prevention and mitigation strategies that align with broader sustainable development goals

(UNDRR, 2015). It is evident that the UNDRR frameworks facilitates international cooperation, particularly in knowledge sharing, capacity building, and aligning DRR policies with climate adaptation. However, it is apparent that the implementation gap persists, where countries, especially in the Global South, struggle to translate global commitments into practical, localized DRR actions due to limited financial and technical resources.

Mechanisms through Which Environmental Diplomacy Enhances DRR

The research identified several mechanisms through which environmental diplomacy supports DRR efforts. These mechanisms are critical for fostering collaboration, ensuring the distribution of resources, and disseminating knowledge across borders.

One of the most significant contributions of environmental diplomacy is its role in mobilizing financial and technical resources for DRR efforts. The Paris Agreement's Green Climate Fund, in particular, was identified as an important mechanism for channeling resources to vulnerable countries, enabling them to invest in disaster risk reduction measures. Case studies from small island developing states and least developed countries demonstrated that Green Climate Fund funding has been instrumental in building infrastructure that enhances resilience to natural hazards such as hurricanes and floods. However, a recurring theme was the underutilization or delayed disbursement of funds, particularly due to bureaucratic processes and the complex requirements for accessing international funding. These delays undermine the timely implementation of DRR measures, particularly in regions facing immediate disaster risks.

Environmental diplomacy also facilitates the exchange of scientific knowledge and best practices across borders, which is crucial for effective DRR. Through platforms such as the Global Platform for Disaster Risk Reduction and UN Climate Change Conferences (COP), countries can share their experiences in integrating climate adaptation with disaster risk management. The study found that such platforms play a crucial role in improving national-level disaster preparedness, particularly by helping countries adopt advanced technologies for early warning systems and risk assessment. However, the analysis revealed disparities in the level of technical expertise and capacity across different regions. While developed countries have made significant strides in integrating environmental diplomacy and DRR, many developing nations still face challenges in accessing and implementing cutting-edge DRR technologies due to a lack of technical know-how.

Challenges in Harmonizing Global and Local DRR Efforts through Diplomacy

While environmental diplomacy through UNDRR frameworks have made notable contributions to DRR, several challenges remain in harmonizing global policies with local realities.

One of the most significant challenges identified is the implementation gap between international agreements and local DRR practices. While agreements like the UNDRR frameworks emphasize the importance of integrating climate change adaptation and DRR, translating these commitments into actionable policies at the national and local levels is difficult. Document analysis and case studies revealed that national governments, particularly in low-income countries, often lack the capacity to implement these global agreements effectively, resulting in insufficient DRR measures on the ground.

The study also found that political constraints and economic priorities often conflict with DRR goals. In many developing countries, economic development priorities tend to override long-term disaster preparedness, particularly when these countries are struggling with immediate socio-economic challenges. Document analysis and case studies showed that in such contexts, international diplomatic efforts often fail to incentivize meaningful local DRR action because economic pressures discourage the implementation of expensive or politically contentious resilience-building measures.

Best Practices in Environmental Diplomacy and DRR

Despite the challenges, several best practices have emerged from the analysis of successful environmental diplomacy efforts that have enhanced DRR in different countries.

Regional cooperation emerged as a best practice in linking environmental diplomacy with DRR. Regional forums organized by the UNDRR through its regional offices, for example, have been particularly effective in integrating diplomacy with disaster risk management, leveraging international funding and knowledge-sharing mechanisms to support resilience-building projects across the region. This approach demonstrates the value of regional diplomacy in addressing the unique vulnerabilities of geographically similar countries and fostering coordinated responses to shared disaster risks.

Another best practice identified in the study is the integration of DRR into broader environmental policies. The European Union's Climate Adaptation Strategy, which promotes cross-border cooperation and the exchange of best practices among EU member states, was highlighted as a model for how environmental diplomacy can be aligned with disaster risk reduction objectives. The study found that this kind of policy integration helps ensure that DRR is not treated as a separate or secondary concern but is embedded within overarching climate policies.

Discussion

The findings of this study revealed the significant role environmental diplomacy plays in enhancing disaster risk reduction (DRR), especially within the context of climate change-induced natural hazards. This section discusses the results in the context of existing literature, with critical reflections on their implications for policy, practice, and future research.

Environmental Diplomacy as a Catalyst for DRR

One of the central findings of this research is that environmental diplomacy has been instrumental in driving forward DRR initiatives. The analysis of the UNDRR Frameworks highlights how international cooperation has facilitated the development of common goals for addressing natural hazards related to climate that exacerbate disaster risks. This aligns with previous research by Kelman (2017), who emphasized the growing recognition of climate change adaptation as a critical component of DRR within the global policy framework.

The integration of climate adaptation within international DRR efforts is particularly important in addressing the increasing frequency and severity of climate-related hazards, such as floods, hurricanes, and droughts (IPCC, 2018). By framing climate change mitigation and adaptation as diplomatic issues, international agreements have encouraged countries to develop more holistic approaches to disaster risk management. This finding supports the work of Beck (2011), who argued that global risks, such as climate change, necessitate transnational solutions and robust diplomatic engagements, however, the challenge remains in effectively translating these frameworks across different levels of governance and various local or regional contexts (Nightingale et al., 2020).

As the study results also point out, the implementation gap remains a significant challenge, particularly for developing countries that often lack the institutional capacity to translate international commitments into local actions. While the UNDRR financial mechanisms provide critical resources, the complexities involved in accessing these funds often delay their impact on the ground. This observation echoes concerns raised by Raikes et al. (2022), who noted that many developing nations struggle with the bureaucratic requirements of international funding mechanisms, limiting their ability to enhance disaster resilience in a timely manner.

Mechanisms of Environmental Diplomacy and DRR

The study identifies several mechanisms through which environmental diplomacy supports DRR, including resource mobilization, knowledge sharing, and capacity building. These mechanisms are critical for ensuring that

countries, particularly those most vulnerable to natural hazards, can access the necessary financial and technical resources to improve their disaster preparedness and resilience.

In 2023, UNDRR received financial contributions totaling USD 53.55 million. The Work Programme for the 2022-2023 biennium had a funding requirement of USD 110 million, with USD 50.37 million allocated for 2023. USD 45.59 million was mobilized to cover the 2023 cost plan. Flexible core funding plays a crucial role for UNDRR, allowing the organization to deliver its Work Programme more efficiently, adapt to changing conditions, and support strategic planning. Since 99.9% of UNDRR's funding relies on extrabudgetary resources, unearmarked core support is particularly valuable. In 2023, ten donors—China, Finland, France, Japan, Luxembourg, Norway, the Philippines, the Republic of Korea, Sweden, and Switzerland—contributed full or partial unearmarked core support, totalling USD 13.1 million, which accounted for 24% of all funding received (<https://www.undrr.org/about-undrr/funding>).

As the results indicate, the UNDRR has enabled countries in the Global South, such as small island developing states and least developed countries, to invest in critical infrastructure and systems to mitigate disaster risks. This finding is supported by Lewis (2021), who emphasized that financial support is crucial for enhancing resilience in low-income regions disproportionately affected by climate-related disasters.

However, as previously mentioned, the underutilization and delayed disbursement of funds present significant barriers to the timely implementation of DRR measures. This issue has been discussed extensively in the literature, with scholars such as (Khan et al., 2019;) highlighting the power imbalances and bureaucratic hurdles that developing countries face in accessing DRR finance. The delays in resource mobilization can be detrimental in regions already facing imminent disaster risks, as timely action is crucial for preventing the escalation of hazards into full-blown disasters.

Another critical mechanism of environmental diplomacy is the facilitation of knowledge sharing and capacity building across borders. Over the years, UNDRR has fostered peer-to-peer exchange and knowledge sharing by engaging in regular consultations and dialogues with UN Member States through the UNDRR Support Group in Geneva, the Group of Friends in New York, along with hosting donor meetings and virtual thematic briefings on Early Warnings for All. also, platforms such as the Global Platform for Disaster Risk Reduction and the United Nations Climate Change Conferences have provided countries with opportunities to exchange best practices and innovations in disaster risk management. The importance of knowledge sharing in DRR has been emphasized by (Raikes et al., 2022), who argued that the transfer of technical expertise and local knowledge is essential for building resilience at the community level.

The study found that while knowledge sharing has been effective at the international level, there are still significant disparities in technical expertise and capacity across different regions. Developed countries, with their access to advanced technologies and extensive DRR frameworks, have made substantial progress in integrating disaster preparedness with climate adaptation. In contrast, many developing nations continue to face challenges in adopting and implementing such technologies due to financial and technical constraints (Djalante & Lassa, 2019). This disparity highlights the need for more equitable resource distribution and support for capacity building in less developed regions.

Challenges in Harmonizing Global and Local DRR Efforts

One of the key challenges identified in this study is the discrepancy between global diplomatic commitments and local implementation. The implementation gap, as highlighted by the research, is a persistent issue in the DRR landscape, particularly in countries with limited governance and institutional capacities. While international agreements such as the UNDRR Frameworks advocate for integrating climate adaptation and disaster risk

management, translating these goals into local policies remains a complex task for many nations. This finding aligns with the conclusions of (Raikes et al., 2022), who pointed out that global frameworks often fail to account for the local social, economic, and political realities that shape DRR efforts.

Furthermore, the study highlights that political constraints and economic pressures often hinder the adoption of long-term DRR measures in developing countries. As noted by UNDRR (2019), many governments prioritize short-term economic growth over investments in disaster preparedness, particularly in regions where economic development is a more immediate concern (Roelfsema et al., 2020). This tension between economic development and DRR efforts underscores the need for stronger diplomatic engagements that emphasize the long-term benefits of resilience building.

Best Practices in Linking Environmental Diplomacy with DRR

Despite the challenges, the study identifies several best practices that have emerged from successful environmental diplomacy efforts. One of the most effective strategies has been regional cooperation, as noticed in the case of the Pacific Islands Forum and Association of Southeast Asian Nations. By fostering regional diplomatic ties, countries with similar vulnerabilities have been able to coordinate their DRR efforts more effectively and share resources (Kelman, 2017). This practice highlights the importance of tailoring diplomatic engagements to regional contexts, where shared vulnerabilities can drive collective action.

Furthermore, disaster risks extend beyond national borders, making intergovernmental collaboration essential for effective disaster risk reduction at the regional level. UNDRR's regional offices act as the supporting secretariat for regional platforms, which offer a forum for all disaster risk reduction stakeholders to share practical solutions, exchange experiences, and develop joint information, strategies, and action plans (Eakin et al., 2017). These outputs serve as valuable guidance for decision-makers and practitioners.

Additionally, the study finds that the integration of DRR into broader environmental policies is an effective way of ensuring that disaster risk reduction is not treated as an isolated issue. Countries can create more comprehensive and resilient policy frameworks by embedding DRR within broader climate and sustainability goals. This finding supports Jayasinghe et al. (2024), who argued that DRR should be mainstreamed into development policies to enhance its long-term sustainability.

Implications for Policy and Practice

The results of this study have several important implications for both policy and practice. First, environmental diplomacy must be strengthened to ensure that international agreements translate into actionable, localized DRR efforts. This will require capacity-building initiatives, particularly in developing countries, to bridge the implementation gap and enable the effective adoption of global DRR frameworks at the national and local levels.

Second, financial mechanisms, such as the UNDRR Fund, need to be more accessible and responsive to the urgent needs of vulnerable countries. Reducing bureaucratic hurdles and ensuring timely disbursement of funds will be crucial for enhancing resilience in regions facing imminent disaster risks.

Third, regional cooperation should be further promoted as a best practice in environmental diplomacy. Regional platforms that bring together countries with shared vulnerabilities can foster stronger diplomatic ties and enable coordinated DRR strategies that are tailored to local contexts.

Conclusions

This study provided new insights into the intersection of environmental diplomacy and disaster risk reduction, emphasizing the vital role that environmental diplomacy through international agreements such as UNDRR Frameworks play in mitigating the risks posed by climate change-related disasters. While significant progress has been made in integrating climate adaptation into global DRR efforts, challenges remain in ensuring that these

commitments are effectively implemented at the local level. By addressing the implementation gaps, improving financial access, and promoting regional cooperation, environmental diplomacy can be further optimized to reduce disaster risks and build resilience in an increasingly hazardous world.

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Disclosure

This is an unfunded paper. The author declares there is no grant for this study from any funding agency in the public, commercial, or not-for-profit sectors. In addition, the author declares that there are no conflicts of interest, financial or otherwise, that could have influenced the outcomes or interpretations presented.

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