N°37 POLICY NOTES

Addressing the complexity of climate induced loss and damage: reflections on UNDP technical support to Belize, El Salvador and Mozambique

Luis Gamarra[1], Eric Loubaud[2] and Celina Kattan[3]

Summary

After more than thirty years of discussions, the Seventh Meeting of the Board of Directors of the Fund for responding to Loss and Damage (FRLD) concluded with important decisions for its implementation[4]. This fund complements a global framework on these issues, comprised of three pillars: (a) the political pillar, represented by the Warsaw International Mechanism for Loss and Damage; (b) the technical pillar, represented by the Santiago Network; and (c) the financial pillar, now represented by the FRLD.

While the Board members may welcome these results, many challenges remain in preventing, addressing, and minimizing loss and damage (L&D). These challenges include conceptual and methodological issues regarding how to measure, analyze, and project these effects and impacts, as well as the establishment and articulation of policies for effective governance of this cross-cutting thematic area.

Between 2023 and 2025, the United Nations Development Programme (UNDP) provided technical assistance to the governments of El Salvador, Belize, and Mozambique. This collaboration included adapting the Post-Disaster Needs Assessment (PDNA) methodology to measure and analyze L&D from a resilient development perspective. The approach focused on building long-term resilience through the use of climate models and development scenarios as analytical tools. Furthermore, the support aimed to strengthen related governance mechanisms and instruments.

Based on these recent examples, this paper proposes establishing avenues for reflection and solutions to address governance challenges and formulate public policies based on sound evidence. These proposals will also be fundamental in selecting beneficiary countries and ensuring the optimal use of available funds.

The emphasis should be on priority populations and critical development sectors, which, at present, are still very limited compared to the magnitude of the needs. So far, the FRLD has received pledges from contributing countries of around US$768 million, a figure far below some estimates of the impact of climate change on development, which reach US$143 billion annually.[5]

Main findings

» While it is true that the climate is dynamic and changing, the same is true of development pathways and, by extension, of conditions of exposure and vulnerability. This development-oriented approach is fundamental, as it gives governments a degree of responsibility and, above all, a tremendous opportunity to regain control over reducing these potential effects and impacts.

1 Regional Advisor/ Team Leader – Disaster Risk Reduction and Recovery. Regional Hub for Latin America and the Caribbean. UNDP

2 Programme Specialist – Disaster Risk Reduction and Recovery. Regional Hub for Latin America and the Caribbean. UNDP

3 Expert in Disaster Risk Management and Recovery. Consultant for the Regional Hub for Latin America and the Caribbean. UNDP

4 The meeting took place from October 7-9, 2025 in Manila, Philippines (www.frld.org/nodeseventh-meeting-board-frld).

5 Rebecca Newman & Ilian Noy, " The global costs of extreme weather that are attributable to climate change ", Nature Communications 14, 2023. The potential losses and damages (P&D) attributable to climate change could reach between US$1.7 and US$3.1 trillion annually worldwide by 2050, considering only extreme events. The researchers based their estimates on the Extreme Event Attribution (EEA) methodology.

» The PDNA methodology and approach selected to support Belize, El Salvador, and Mozambique have proven appropriate for L&D. Oriented toward resilient recovery, the PDNA methodology can be easily broken down by sector, considers critical issues such as gender, and offers the resilience-building and development lens that is essential for decision-makers. Furthermore, the methodology's flexibility is also relevant, as it was easily adapted to include slow-onset events and projections for analyzing future climate and development scenarios.

» It is necessary to make ambitious and firm political decisions to advance on the issue of L&D. The study on the cost of inaction in Belize and El Salvador has proven to be a critical decision-making tool for both countries. As a first step, the Government of El Salvador revised its Nationally Determined Contributions (NDCs[6]) 3.0 to make them more ambitious and address the challenges clearly outlined in the study. In Belize, a National framework on Loss and Damage is being developed to align and coordinate disaster risk reduction (DRR), climate change adaptation (CCA), and development governance mechanisms and instruments. UNDP plans to continue supporting the Government of Belize to facilitate an in-depth working session with all ministries and sectors to reflect on the issue and institutional arrangements, and to implement a coherent and integrated approach to DRR, CCA, and L&D with a sustainable development perspective.

» » The usual national, regional, or global lens adopted by national and international stakeholders can obscure the reality and complexity of what L&D mean for communities from a gender perspective. In Belize, the government, with UNDP support, has incorporated this complexity into the discussion, ensuring that Indigenous communities are actors in governance mechanisms, leveraging their critical knowledge of the issues they have faced for decades, and supporting the translation of the complexity of non-economic losses into policies, governance instruments, and actions. This approach promotes solutions that avoid replicating business-as-usual development approaches, ensuring that L&D responses are built in an inclusive, culturally sensitive manner and in accordance with the principles of equity, climate justice, and respect for traditional knowledge, as enshrined in the United Nations Framework Convention on Climate Change (UNFCCC).

Policy recommendations

» **Base policies on potential L&D within a logic of resilient development.** Any study, analysis, or data collection related to L&D should be geared towards informing resilient development and helping decision-makers better plan and finance sustainable development. Conceptual and methodological clarity is key. In our case, the consideration of contributing to resilient recovery and risk-informed sustainable development guided the choice of the PDNA methodology, which was then adapted and contextualized.

» **Facilitate coherence and integration between CCA, DRR, and development planning and finance through concrete entry points.** Capacity building and development should act as integrators between existing policies and institutional mechanisms in the relevant issues and sectors. A National Framework on L&D–such as the one UNDP is supporting in Belize–should promote the articulation and coherence of existing governance mechanisms and instruments and contribute to cross-government collaboration.

» **Including and articulating governance instruments to support horizontal (across sectors) and vertical (across scales) integration.** Strengthening and articulating existing governance mechanisms and instruments is necessary to address the multi-scalar challenges posed by climate change and disaster risks. Greater community inclusion and participation are key to highlighting their challenges and proposals. A first possible solution involves recognizing communities as agents of resilience, not as victims in need of assistance. Collaborative processes developed and structured by social science researchers also offer avenues for exploration and contextualization.[7]

» **Integrating the complexity of non-economic losses, inclusion, and gender.** These aspects are difficult to measure quantitatively, but they must be translated into policies and integrated into decision-making processes. This also relates to the need to better integrate Indigenous and local knowledge with a gender-inclusive approach. Here again, concrete pathways are offered in the collaborative processes proposed by Marcela Brugnach, Marc Craps, and Art Dewulf.[8] The model attempts to address the issues of scale, knowledge, and power presented earlier. The simultaneous consideration of these three dimensions is necessary to break down existing barriers.

6 Nationally Determined Contributions (NDCs).

7 Marcela Brugnach, Marc Craps, and Art Dewulf, "Including Indigenous Peoples in Climate Change Mitigation: Addressing Issues of Scale, Knowledge and Power," Climatic Change 140, no. 1 (2017): 19–32, doi.org/10.1007/s10584-014-1280-3

8 Brugnach et al., "Including Indigenous Peoples in Climate Change Mitigation."

» **Adopting strong political decision-making and investments around a shared vision.** All the points mentioned above are useless without a firm and ambitious policy decision, accompanied by solid accountability and strong commitment from developed countries. This necessitates planning and financing issues at the global, national, and local levels, which must begin directly in the country in question and unite all stakeholders around a clear and shared vision. This is precisely the main conclusion drawn from technical assistance provided to El Salvador, Belize, and Mozambique: without ambitious goals, the risk is a corrosive effect on sustainable development efforts and the entry into a cycle of perpetual response and recovery. This call is not directed solely at public actors; it also includes the private sector, whose investments are threatened.

1. Introduction

The governments of El Salvador, in 2023–2024, and of Belize and Mozambique, subsequently in 2025, requested technical assistance from UNDP for the production of robust evidence and institutional clarification on L&D. In the case of Belize, the support included the creation and establishment of the National Framework on L&D.

The UNDP Regional Hub for Latin America and the Caribbean and the respective UNDP Country Offices provided technical assistance, in close coordination with the Ministries of Environment. Key public entities participated in data collection, consultations, and the validation of key findings and recommendations. In Belize, the process included community-level consultations, as well as the integration of climate change adaptation and disaster risk reduction into development planning.

This policy note summarizes the conceptual and methodological framework, the implementation process, the main outputs and results, as well as reflections on governance mechanisms, the complexity of addressing non-economic losses, and recommendations for further studies and training and development processes. The intervention in L&D contributes to the achievement of Sustainable Development Goals (SDGs) 1 and 13.

2. Conceptual and methodological framework

There is no official definition of the terms “loss” and “damage” in the context of climate change. However, Decision 2/CP.19 (FCCC/CP/2007/6/Add.1), which established the Warsaw International Mechanism, clarifies that the term encompasses—and in some cases exceeds—what can be addressed through adaptation measures. Based on this broad definition, various interpretations have developed, due, in particular, to the wide range of disciplines involved.

In some of these approaches, “loss and damage” is considered a single concept, with very little distinction between the two terms. In others, “damage” refers to climate impacts for which restoration of the affected systems is possible, while “loss” refers to climate effects for which restoration is not feasible. Several publications offer a more extensive analysis of loss and damage and their practical implications[9, 10 & 11].

Different methodological approaches have been developed or evolved to meet the growing expectations on the subject, such as Extreme Event Impact Attribution (EEIA). Regarding the EEIA and its application, see in particular the publications in the footnotes[12 & 13].

In UNDP studies, the conceptual framework is directly related to the methodological proposal, which emphasizes the links between climate change adaptation (CCA), disaster risk reduction (DRR), and development.

In the cases of El Salvador, Belize, and Mozambique, the PDNA approach was adapted for application in studies on L&D, based on two reasons:

» The PDNA provides an understanding of L&D, which allows for the analysis of the complexity of disaster risks under a climate change and development perspective.

» It is a widely tested, multi-sectoral methodology for assessing recovery needs, using a resilience-building, vulnerability-reducing, and "building back better" approach. In this sense, although primarily used for extreme events, it establishes the link between recovery and L&D, and between risk reduction and climate change adaptation, within a resilient development framework.

9 Laura Schäfer y Sönke Kreft, Loss and Damage: Roadmap to Relevance for the Warsaw International Mechanism. Bonn (Germanwatch e.V., 2014).

10 Liselotte Jensen and Paulina Jabcznska, Understanding loss and damage. Addressing the unavoidable impacts of climate change (Brussels: European Parliamentary Research Service (EPRS), July 2022).

11 Temitope Tunbi Omifade, Callum Hill y Alexia Kaplan, “Loss and damage justice.” McGill Journal of Sustainable Development Law, aceptado/en prensa, 2025.

12 Ian Noy, Dáthí Stone and Tomás Uher, “Extreme Event Impact Attribution,” Cell Reports Sustainability, 2024.

13 Vikrant Panwar, Ilan Noy y Emily Wilkinson, “Calculating loss and damage from extreme weather events in Small Island Developing States,” *Regional Environmental Change*, May 2025.

The PDNA methodology was developed in 2008 and has since been jointly applied by the United Nations system, the European Union, and the World Bank.[14] PDNA makes a clear distinction between damage, understood as the partial or total destruction of infrastructure and assets, and losses, which encompass the economic flows affected by the disaster—such as decreased income, reduced production, and increased costs–as well as changes in governance and increased risks and vulnerabilities. These losses can be economic, as indicated, or non-economic, such as the disappearance of cultural or religious heritage and the psychological impacts of displacement, among others.

The PDNA can be seen as a conceptual and methodological framework for estimating the effects and impacts of disasters–and, therefore, L&D–across all sectors and social groups. It includes five stages of analysis (see Figure 1):

1. the context and the reference situation;
2. the effects (L&D);
3. the impacts (economic and human);
4. recovery needs; and
5. the recovery strategy.

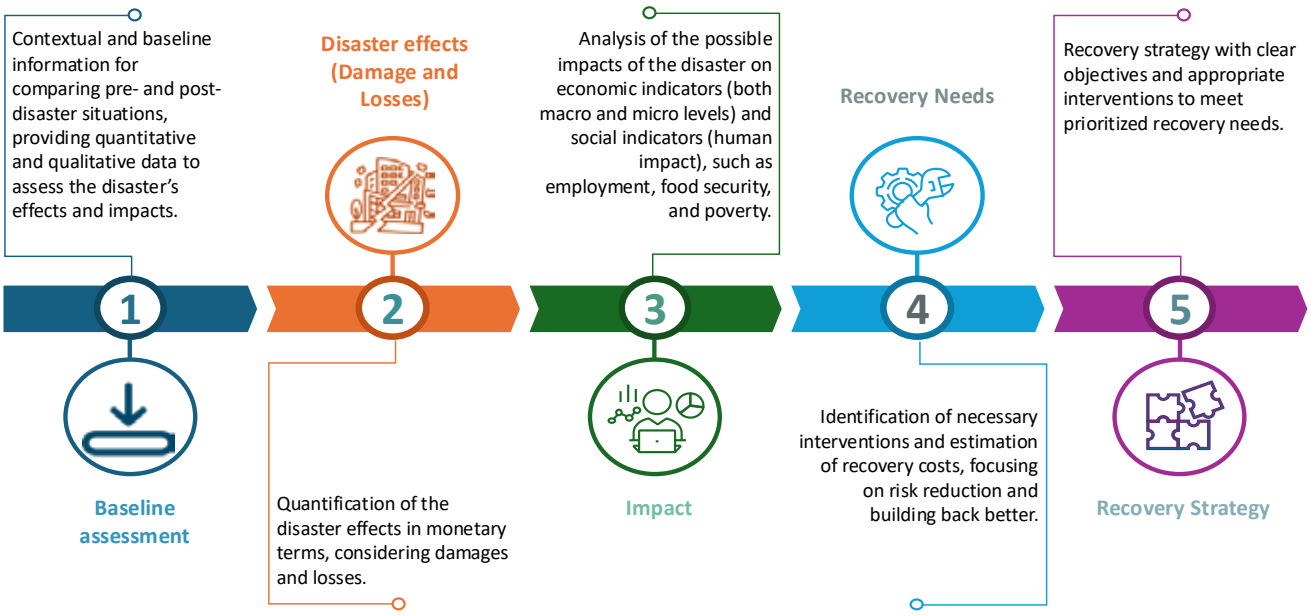
3. Framework, objectives and results of support to El Salvador, Belize and Mozambique

The governments of El Salvador, in 2023–2024, and of Belize and Mozambique, subsequently in 2025, requested technical assistance from UNDP for the production of robust evidence and institutional clarification on L&D. In the case of Belize, the support included the creation and establishment of a National Framework on L&D. These processes are linked to the preparation of Nationally Determined Contributions (NDCs) and climate change adaptation planning exercises.

Although the objectives differ slightly from country to country, depending on the specific contexts and needs, they can be summarized as follows for El Salvador and Belize:

» **Study on the Cost of Inaction.** To assess and quantify the economic, social, and environmental costs of delayed climate action, focusing on five key sectors: (a) infrastructure, (b) housing, and (c) agriculture, for El Salvador, Belize, and Mozambique; and (d) environment and (e) tourism, for Belize. The objective is to provide objective and robust information on potential economic and non-economic effects and impacts, from a long-term perspective based on future scenarios, using climate models and development trends.

Figure 1.
Methodology PDNA



Source: PDNA | United Nations Development Programme

14 For more information on the PDNA and access to its guidelines, see PDNA | United Nations Development Programme

» **Governance.** Assisting in the clarification and articulation of governance mechanisms for El Salvador and Mozambique. In the case of Belize, support also included the development and implementation of a robust national framework on L&D. Estimating current and projected economic and non-economic effects and impacts facilitates the planning of interventions to prevent, address, and minimize L&D related to climate change.

» **Capacity building and ownership.** Raising awareness and developing the capacity of institutions to own, manage and, in the case of Belize, operationalize the framework on L&D.

The case of Mozambique is different. The objective was to support the government in preparing its NDC 3.0 by including a specific chapter on L&D. From this perspective, the study was limited to quantifying historical L&D, applying the same methodology (PDNA) and analyzing its impact on the country's development. The report is accompanied by an analysis of current institutional arrangements and offers recommendations for better preventing, addressing, and minimizing these issues.

Cost-of-inaction studies involve analyzing potential effects and impacts under different scenarios. These climate change and public policy scenarios in the studies for El Salvador and Belize are as follows:

» Reference scenario: current climate, exposure, and vulnerability (current conditions).

» Climate change scenario: future climate conditions with current exposure and vulnerability.

» Business as usual scenario: projected climate change combined with current development trends.

» Improved action scenario: climate change with strengthened climate policies, aligned with current national or sectoral commitments.

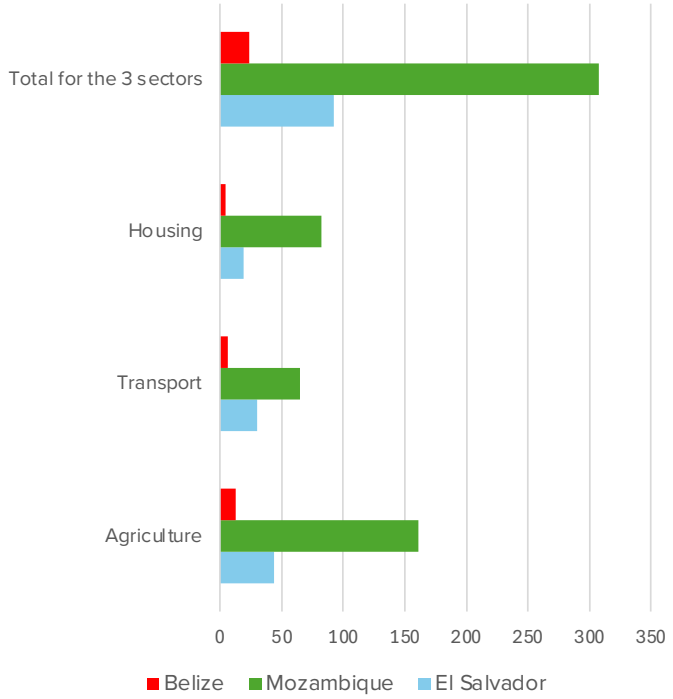
Regarding the results, the following elements should be highlighted:

» In all countries, projections clearly show that climate change will significantly affect L&D and, indeed, the economic and social development of the countries.

» The current impact is already particularly significant. In Mozambique, for example, the agricultural sector has been profoundly affected by the impacts of climate change and natural-hazard induced disasters over the past 25 years: 53 moderate to severe hydrometeorological events have affected more than 14 million people. These events resulted in the deaths of 2,700 people and left 4,381 injured. Estimated financial losses for the agricultural sector amount to US$4.76 billion (adjusted to 2023).

» Figure 2 provides further details on the average annual value of L&D, expressed in millions of US dollars, over the past 30 years for each country, in the three most affected sectors: agriculture, transportation, and housing. More than just the amount—which is already quite high (US$307.6 million annually for Mozambique, US$23.7 million for Belize, and US$92.3 million for El Salvador)—these figures also represent 2.69% of Mozambique's GDP, 1.35% of Belize's, and 0.5% of El Salvador's each year for three decades[15]. Such average estimates for only three sectors should not, however, obscure the significance of the impact of specific disasters. For example, in 2011, Tropical Depression 12E broke rainfall records in El Salvador and caused economic losses of nearly 4% of the national GDP.

Figure 2.
Average L&D per year in Belize, Mozambique, and El Salvador in millions of US$ (1995-2025)



Source: UNDP expert calculations based on PDNA, PDA and R-PDNA[16] carried out by governments between 1995 and 2025.

15 The calculation was based on 2010 GDP to obtain a representative average value for the period considered (1995–2025): Mozambique (US$11.41 billion), Belize (US$1.75 billion), and El Salvador (US$18.45 billion). The sources used for the L&D estimates were the PDNA , the Rapid PDNA, and the Post Disaster Assessment (PDA); for GDP data, Macrotrends.net was used.

16 R-PDNA: Rapid Post Disaster Needs Assessment; PDA: Post Disaster Assessment.

Projections and estimates in El Salvador[17]:

» Regarding the projection, in the case of the floods analyzed for El Salvador, it is estimated that, by 2050, L&D in the three sectors evaluated – agriculture, transportation, and housing–could increase by 36% due to the effects of climate change. An additional 18% is projected as a result of planned sector expansion (greater exposure) without the implementation of appropriate policies. However, suitable climate policies could reduce these effects by 20%.

» For El Salvador, in terms of extreme hazards, the exceedance probability curves for the agricultural sector show that the return period for severe events, such as Tropical Depression 12E and Hurricane Mitch, which resulted in losses of approximately US$180 million, would decrease from 25 years to 10 years. Losses associated with 50-year return periods would increase from US$230 million to over US$310 million. The losses associated with the 50-year recovery periods would increase from US$230 million to more than US$310 million.

» These losses imply a significant erosion of the State's resources and capabilities, which will have to face constant demands for recovery.

In the following sections, we will discuss issues related to governance and ownership to focus on the study's findings on the cost of inaction.

4. Reflections on governance mechanisms and political decisions

The key findings summarized in the previous section clearly demonstrate, through concrete examples, the urgency and necessity of making clear and decisive decisions to adapt to climate change, the effects of which are already being felt. However, beyond these general—and ultimately relatively consensual–considerations, the study results highlight that L&D are not only a problem related to climate change, but also to development conditions, as they can influence the level of impact of both extreme and slow-onset events.

These considerations also confirm the relevance of the methodological approach adopted. While it is true that climate is dynamic and changing, the same is true of development pathways and, by extension, of conditions of exposure and vulnerability. This development-oriented approach is fundamental, as it assigns a degree of responsibility to governments and, above all, a tremendous opportunity to regain control over reducing potential effects and impacts.

However, this requires strong coherence within government and among development actors. In particular, it is necessary to begin with climate change adaptation and disaster risk reduction, and how these two key considerations are integrated into development planning and financing.

These three examples have only served to confirm the need for coherence and integration. They also demonstrate that L&D can be a powerful and concrete entry point for (a) strengthening coherence and coordination between CCA and DRR, (b) bringing the ministries responsible for development planning and financing to the table, and (c) raising the ambition of NDCs, disaster risk management, and development plans, in order to reduce the gap created by the cost of inaction.

However, many common challenges still exist:

» A multitude of overlapping policies, laws, mechanisms, and institutional arrangements often bring together the same institutions and focal points. In most countries, the government already has separate frameworks, mechanisms, and institutional arrangements for disaster risk management, climate change, and development.

» The lack of a common understanding of the conceptual and methodological approaches that would guide stakeholders toward a shared vision and purpose is evident in the field of L&D, where each institution and sector has addressed the problem, but in a way that is still too fragmented.

» A succession of parallel reports and plans form part of international frameworks, such as the Sendai Framework, the Paris Agreement, or the Sustainable Development Agenda. Countries find themselves trapped in a perpetual cycle of submitting reports or formulating and updating strategies, frameworks, or plans, often within different committees, working groups, or mechanisms.

» Different strategic, political, and economic interests and priorities exist. Most governments have a general understanding of the need for greater coherence regarding climate change and disaster risk. However, this understanding is not yet sufficiently reflected in action.

17 The Belize study was in the final stages with the government when the policy note was prepared, so it was not possible to include its results.

5. The complexity of non-economic losses for communities and their consideration in public policies and government action

Global, regional, and national models and projections, however useful, do not allow us to measure the true extent of the losses for communities. This is largely due to the difficulty of quantifying non-economic losses.

As part of technical assistance to the Government of Belize, a team comprised of government representatives–both national and local–and UNDP conducted an intensive consultation mission with communities across the country. While it is difficult to fully capture the wealth of lessons learned and ideas provided by the communities, some key elements emerge. First, authorities struggle to understand the strong connection these communities have with their immediate environment and to address it from a short-term political perspective, whether from an economic or non-economic standpoint.

The example of the copal tree is particularly revealing in more ways than one. This species, which grows wild in the forests surrounding Mayan communities, has always been sustainably harvested by these same peoples. Therefore, it represents an important source of income, especially for the women who collect its resin, which is then sold in the neighboring market of Guatemala. But the tree and its resin also have cultural and ritual value for the Maya, as they use it as incense in many of their purification ceremonies.

Therefore, the loss of these trees in the 2024 wildfire, whose unprecedented magnitude may be partly attributed to climate change[18], has caused profound social, cultural, and economic disruption in the communities, from which recovery will take decades. In this context, the impact of the L&D will be far greater than just the economic cost of the lost number of trees and their production over a period of time, until the trees become productive again.

Despite widespread recognition of the importance of integrating communities and their knowledge into analysis, reflection, and decision-making processes, this integration continues to face many challenges. This problem extends beyond just the issues of L&D. It becomes more visible here as we address the direct and indirect effects and impacts of these phenomena.

Consequently, there are problems of (a) scale: the confrontation between the scales at which climate change and its effects and impacts are assessed, and the governance mechanisms that are too often helpless and ill-suited to these multi-scalar challenges; (b) knowledge: despite the recognition of the importance of indigenous and local knowledge, it is still difficult to include it in broader knowledge systems due to its very nature; and (c) power: indigenous communities have become mere recipients of solutions defined by an international or, at best, national "power[19] & [20]. In this sense, the way communities are conceived is extremely important. They are central actors in L&D, as well as in CCA, DRR, and development. They should not be seen only as victims in need of assistance or as beneficiaries of projects.

However, to end this section on a more positive note, these disasters can also represent an opportunity for communities and the country as a whole. This is the essence of resilient recovery and building back better: disaster, despite its dramatic impact, becomes an opportunity to learn, adapt, and transform societies to make them more resilient and reduce disaster risks through short-, medium-, and long-term recovery measures and actions[21].

18 The 2024 wildfires severely impacted Mayan communities in southern Belize, burning 43,987 hectares (108,695 acres), equivalent to 10.2% of the region's forests and farmland.

19 Brugnach et al., "Including Indigenous Peoples in Climate Change Mitigation."

20 Walter Leal Filho, Johannes M. Lütz, Edmond Totin, Desalegn Ayal, and Edward Mendy, "Obstacles to implementing indigenous knowledge in climate change adaptation in Africa," Journal of Environmental Management 373 (2025).

21 On this topic, and specifically on the forest fire in Belize, see news.mongabay.com/2025/06/fire-is-both-destruction-and-rebirth-for-maya-communities-of-belize. More generally, on resilient recovery, see Ronald Jackson, From recovery to resilience: rethinking how we invest in disaster risk reduction (New York: United Nations Development Programme , October 2025).

6, Conclusion

The examples of El Salvador, Belize, and Mozambique illustrate the complexity of climate change-related L&D and the challenges faced and to be faced by a diverse range of actors (public and private). The implementation of the FRLD is an important step in the right direction, but recipient countries must clarify their planning and financing instruments, as well as their horizontal and vertical coordination mechanisms, and their institutional arrangements in this area. It is also important to implement evidence-based interventions to guide decisions for resilient development. All of this must be framed within an inclusive approach that engages communities to achieve results that take into account diverse and complex realities.

The efforts of each of the three countries considered in this note exemplify the clear commitment to preventing, addressing, and minimizing L&D currently observed worldwide. These initiatives, aimed at strengthening the clarity, integration, and coherence of governance mechanisms and instruments, are based on solid evidence and consider the complexity of L&D for communities–including non-economic losses–in order to incorporate them into public policies and concrete actions. The UNDP, for its part, will continue to provide technical assistance, given that these processes require continuity on the ground and an approach from different entry points, in coordination with partners.

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