

Counting Costs, Loss & Damage

Quantifying Impacts of Habitat-related Human Rights Violations amid
Environmental Hazards and Climate-change



Housing and Land Rights Network
Habitat International Coalition

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HABITAT INTERNATIONAL COALITION

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Cover photo: Flooded area after heavy monsoon rains in Charsadda district, Khyber Pakhtunkhwa province of Pakistan on 27 August 2022. Source: AFP/File.

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I. Abbreviations

₹	Indian rupee
\$	Dollar
ADB	Asian Development Bank
AFIEGO	Africa Institute for Energy Governance
AGRC	Albertine Graben Refinery Consortium
BBMP	Bruhat Bengaluru Mahanagara Palike (Bengaluru Municipal Corporation)
BCAP	Climate Action and Resilience Plan for Bengaluru
BMS	Bhusanayana Mukundadas Sreenivasaiah (Institute of Technology)
CAG	Comptroller and Auditor General
CAO	Compliance Advisor Ombudsman (IFC)
CEFROHT	Centre for Food and Adequate Living Rights
CEMADEN	Center for Monitoring of, and Alerting to Natural Disasters (Centro Nacional de Monitoramento e Alertas de Desastres Naturais)
CEPED	Centro Universitário de Estudos e Pesquisas sobre Desastres
CESCR	Committee on Economic, Social and Cultural Rights
CM	Chief Minister (India)
CNIT	Community Needs Identification Tool
CNOOC	National Offshore Oil Corporation
CO ₂	carbon dioxide
CoP	Conference of Parties (to the United Nations Framework Convention on Climate Change (UNFCCC))
CRC	Committee on the Rights of the Child
CRED	Centre for Research on the Epidemiology of Disasters
CSNR	Centre for the Sustainable use of Natural and Social Resources
DTM	Displacement Tracking Matrix
EAC	East African Community
EACJ	East African Court of Justice
EACOP	East Africa Crude Oil Pipeline
EPA	Environmental Protection Agency (US)
ESS	Earth and Space Science
EU	European Union
EvIA	eviction impact-assessment
FIDH	International Human Rights Federation (Fédération Internationale de Droits de l'Homme)
GDP	gross national product
GIDES	Integrated Natural Disaster Risk Management (Gestão Integrada de Risco de Desastres Naturais)
GIS	Geographic Information System
GoK	Government of Karnataka
HIC	Habitat International Coalition
HLRN	Housing and Land Rights Network
HRBA	human rights-based approach
ICC	International Criminal Court
ICCPR	International Covenant on Civil and Political Rights

ICESCR	International Covenant on Economic, Social and Cultural Rights
ICRC	International Committee of the Red Cross
IDI	Inclusive Development International
IFC	International Finance Corporation
INPE	National Institute for Space Research (Instituto Nacional de Pesquisa Espacial)
IOM	International Organization for Migration
IQD	Iraqi dinar
IT	information technology
IUCN	International Union for Conservation of Nature
KP	Khyber Pakhtunkhwa
KPS	Keystone Pipeline System
KSDMA	Karnataka State Disaster Management Authority
LDF	Loss and Damage Fund
m ³	square meter
NAPE	National Association of Professional Environmentalists
NAVODA	Navigators of Development Association
NDMA	National Disaster Management Authority
NGO	nongovernmental organization
ORR	Outer Ring Road
ORRCA	Outer Ring Road Companies Associations
PDNA	Post-disaster Needs Assessment
PERAC	Protection of the Environment in Relation to Armed Conflict
PKR	Pakistani rupee
PLHIS	Plano Local de Habitação de Interesse Social
R\$	Brazilian real
RADN	Rapid Assessment of Damage and Needs (Ukraine)
RRF	remedy and reparations framework (A/RES/60/147)
TDP	temporarily displaced persons
UFSC	Universidade Federal de Santa Catarina
UN	United Nations
UNDP	United Nations Development Programme
UNDRR	United Nations Office of Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund (originally, United Nations Children's Emergency Fund)
US	United States
UXO	unexploded ordnance
VDB	Violation Database
VIAT	Violation Impact-assessment Tool
WB	World Bank
WFP	World Food Programme

II. Preface

This year's report from the Violation Database (VDB) of Habitat International Coalition's Housing and Land Rights Network (HIC-HLRN) casts a timely spotlight on the consequences of environmental hazards and climate change events endured by communities and societies globally. It is especially opportune, as this report follows HIC-HLRN's development of monitoring methods for capturing cases and impacts of environmental and climate events that involve violations of human rights associated with habitat (habitat human rights), in particular, adequate housing and land rights as defined in international law.¹

A human right, in any context, is the entitlement to the fulfillment of a human need and requisite for a life with dignity. Such human needs and rights are defined in human rights law, with its corresponding obligations of the state. A "violation" refers to the deprivation of such a need, arising from acts of commission or omission inconsistent with those obligations to respect, protect and fulfill a codified human right.

This 2023 report supplements cases reported from the VDB on World Habitat Day 2022 of habitat human rights violations resulting from environmental and climate events that have caused deprivation of adequate housing and the equitable and sustainable access to, use of and control over land.² It presents available data quantifying the consequences of such violations in the context of environmental hazards and climate change reported in HLRN's 2022 Habitat Day report from the VDB. Cases of environmental hazard and/or climate-change events typically involve involuntary displacement.

The methodology applied here is grounded in criteria that govern the human rights treaty-based preventive and remedial obligations of states, with the victims and affected households and communities at the center of both prevention and remedy. It operationalizes the relevant human rights and other norms that guide remedial and reparation efforts toward restoring the human rights of victims and affected populations.

The exercise of this report pursues the specific objective of compiling case-based experiences and lessons in quantifying costs, loss and damage from such violations. It serves also as a contribution to ongoing efforts at developing institutional arrangements for remedy and reparation of climate-change impacts, especially in the form of the new global Loss and Damage

¹ The human right to adequate housing, enshrined in the Convention on the Elimination of All Forms of Racial Discrimination of 1965 (Article 5(e)(iii)) and the International Covenant on Economic, Social and Cultural Rights of 1966 (Article 11) is defined in the Committee on Economic, Social and Cultural Rights (CESCR) General Comments No. 4 (1991), <https://www.hlrn.org/img/documents/GC4.pdf> and No. 7 (1997), <https://www.hlrn.org/img/documents/GC7.pdf>. See *A Human Right to Land* (2021), https://www.hlrn.org/img/documents/Schechla_A_Human_Right_to_Land_05-02-21.pdf, referred to as "equitable and sustainable access to, use of, and control over land" in CESCR's General comment No. 26 (2022) on land and economic, social and cultural rights https://www.hlrn.org/img/documents/E_CN.12_GC_26_EN.pdf; and in UN Women, *Realizing Women's Rights to Land and Other Productive Resources*, 2013, <https://www.ohchr.org/sites/default/files/Documents/Publications/RealizingWomensRightstoLand.pdf>.

² Included here also is a new case: Russia's June 2023 bombing destruction of the Kakhovka Dam in Ukraine, which followed the analogous case of the Ukraine's Karachunivske Reservoir Dam breach reported in HLRN's 2022 report, but which did not result in impact-quantification data in the public record.

Fund (LDF), finally established at the 28th Conference of Parties (CoP 28) at Dubai in December 2023.

Developing Norms

HIC-HLRN celebrates the existing norms of modern statecraft, as well as those emerging this year. As we commemorate the 75th anniversary of states' adoption of the Universal Declaration of Human Rights of 1948, we mark the evolution of those norms in the form of successive Covenants and Conventions that further define both individual and collective human needs and necessary state actions "to ensure the continuous improvement of living conditions"³ and a sustainably developing world. We are also reminded of the long journey from popular demands toward recognition of norms, and the even-longer and more-challenging journey toward their implementation.

On the positive side, this evolution of norms augurs a new era in which a states have formally recognized an important new norm: the human right to a clean, healthy and sustainable environment.⁴ Meanwhile, the legal community and states remain pressed to define the normative content and corresponding obligations to implement that human right. The Committee on the Rights of the Child (CRC) has done its part this year with the adoption of a General Comment interpreting children's rights and the environment, with a special focus on climate change.⁵

Ecocide

The norm-setting, interpretation and implementation-monitoring processes call for the constant engagement of all stakeholders, whether bearing rights or duties, to achieve equitable and sustainable ends. Last year's reprise of 1972's first UN Conference on the Human Environment at Stockholm+50 reminded us of how arduous, protracted and persistent that engagement must be.⁶ By way of example, while "ecocide" was already a subject of discourse well over 50 years ago, the world still lacks a legal instrument that defines that crime and corresponding accountability. However, we still can mark some progress.

The International Law Commission proves a definition of 'ecocide': "extensive damage to, of or loss of ecosystems of a given territory, whether by human agency or by other causes, to such an extent that peaceful enjoyment by the inhabitants of that territory has been or will be severely diminished."⁷ "devastation and destruction of the environment to the detriment of life",⁸

³ An obligation defined in Article 11 of the International Covenant on Economic, Social and Cultural Rights (ICESCR).

⁴ Human Rights Council, The human right to a clean, healthy and sustainable environment, A/HRC/RES/48/13, 18 October 2021, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G21/289/50/PDF/G2128950.pdf?OpenElement>; UN General Assembly, The human right to a clean, healthy and sustainable environment, A/RES/76/300, 1 August 2022, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N22/442/77/PDF/N2244277.pdf?OpenElement>.

⁵ CRC, General comment No. 26 (2023) on children's rights and the environment, with a special focus on climate change, 22 August 2023, https://www.hlrn.org/img/documents/CRC_C_GC_26_environment_EN.pdf.

⁶ "Stockholm+50: How Far Have We Come?," *Land Times/أحوال الأرض*, Issue 26 (December 2022), <https://landtimes.landpedia.org/newsdes.php?id=qXBp&catid=pQ=&edition=pG8=>.

⁷ Polly Higgins, *Eradicating Ecocide: laws and governance to prevent the destruction of our planet* (London: Shephard-Walwyn (Publishers) Ltd., 2010, 2nd ed. 2015), pp. 61–92,

Countries with domestic ecocide laws include France (2021), Georgia (1999), Armenia (2003), Ukraine (2001), Belarus (1999), Ecuador (2008; 2014), Kazakhstan (1997), Kyrgyzstan (1997), Moldova (2002), Russia (1996), Tajikistan (1998), Uzbekistan (1994), and Vietnam (1990).⁹ Most recently, Belgium’s Council of Ministers has approved reform of the Criminal Code to include the crime of ecocide.¹⁰

In European law, ‘damage’ has been defined as “a measurable adverse change in a natural resource or measurable impairment of a natural resource service which may occur directly or indirectly.”¹¹

The European Union (EU) has become the first international body to criminalize wide-scale environmental damage “comparable to ecocide.”¹² On 16 November 2023, EU legislators reached an agreement on the concept of “qualified offences” for severe environmental crimes causing “destruction of an ecosystem or habitat in a protected site, or damage to air, soil, or water quality.” Once adopted by the European Parliament in February 2024, a new directive would impose jail sentences for the worst polluters and fine companies up to 5% of their total revenue. EU member states will then be required to include these provisions in national legislation. Because the EU makes up almost a quarter of states in the International Criminal Court (ICC), it would be a major step toward recognition of “ecocide” as a crime in the global sphere.

Environmental destruction is actually the fourth largest criminal activity in the world and is considered one of the main sources of income for organized crime, alongside drugs, illicit weapons trade and human trafficking.¹³ The concept of ecocide has gained traction recently also with a proposal to the states party to the Rome Statute recognizing individual responsibility for such crime not only in the context of other four categories of crime under the Statute (war crimes, crimes against humanity, genocide and crimes of aggression), but also as a distinct category.¹⁴

Already in 2016, the ICC’s chief prosecutor issued a policy paper on case selection and prioritization, identifying the possible role of the ICC in prosecuting environmental damage,

https://www.researchgate.net/publication/257552825_Protecting_the_planet_A_proposal_for_a_law_of_ecocide.

⁸ European Law Institute, undated, <https://www.europeanlawinstitute.eu/projects-publications/completed-projects/ecocide/>.

⁹ “Ecocide / serious environmental crimes in national jurisdictions,” *Ecocide Law*, <https://ecocidelaw.com/existing-ecocide-laws/>.

¹⁰ Stop Ecocide Belgium, “Belgium One Step Closer to Ecocide Law,” 21 July 2023, <https://www.stopecocide.earth/breaking-news-2023/belgium-one-step-closer-to-ecocide-law>.

¹¹ DIRECTIVE 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, *Official Journal of the European Union* L/143/56, 31 April, 2004, <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:143:0056:0075:en:PDF>.

¹² Report on the proposal for a directive of the European Parliament and of the Council on the protection of the environment through criminal law and replacing Directive 2008/99/EC, 28 March 2023, <https://ecojurisprudence.org/wp-content/uploads/2023/03/EU-Ecocide.pdf>.

¹³ European Union Agency for Criminal Justice Cooperation, *Report on Eurojust’s Casework on Environmental Crime*, 29 January 2021, <https://www.eurojust.europa.eu/publication/report-eurojusts-casework-environmental-crime>.

¹⁴ Stop Ecocide International, “Legal Definition of Ecocide,” <https://www.stopecocide.earth/legal-definition>.

illegal natural resource exploitation and land grabbing.¹⁵ The ICC Office of the Prosecutor also fully endorses the role that can be played by truth-seeking mechanisms, reparations programs, institutional reform and other transitional-justice processes as part of a broader comprehensive strategy.¹⁶

Domicide

Also related to developing norms of habitat rights, the current UN Human Rights Council's Special Rapporteur on adequate housing has reintroduced the concept of "domicide" as an international crime.¹⁷ His 2022 report to the UN General Assembly¹⁸ focused on the persistent targeting of homes as a persistent practice of conflict, occupation and war. It analyses the legal, political and practical challenges to preventing, ending and responding to systematic and deliberate mass destruction of homes during violent conflict. The Special Rapporteur has called for states to recognize such severe violations of international law as domicile, a distinct crime under international criminal law. His report concludes with a set of recommendations to prevent and eliminate the practice, as well as end impunity for such gross violations of housing rights.

This is a timely debate against the backdrop of Israel targeting homes, shelters and shelter seekers as its military doctrine.¹⁹ As the subject of recent and ongoing deliberations at the ICC and International Court of Justice, ecocide and domicile coincide with ongoing human rights violations and associated war crimes and crimes against humanity against the Palestinian people, the Rohingya and citizens in Democratic Republic of Congo.²⁰ Once again, violations vividly provide needed content and specificity to inform the codification of such human rights with emerging specificity as to their violation and adjudication as crimes.

Mindful of the norms of law and practice, prosecution of gross human rights violations and crimes forms an important part of remedy. However, while the identification of responsibility is vital to honor claims of a violation, the present exercise and the cases reported here are

¹⁵ Office of the Prosecutor (OtP), "Policy paper on case selection and prioritization," 15 September 2016, https://www.icc-cpi.int/itemsDocuments/20160915_OTP-Policy_Case-Selection_Eng.pdf.

¹⁶ *Ibid.*, p. 5; Policy Paper on the Interests of Justice, ICC-OTP 2007, p. 7, <https://www.legal-tools.org/en/doc/bb02e5/>.

¹⁷ "The Crime of 'Domicide'," *Land Times/أحوال الأرض*, Issue 26 (December 2022), <https://landtimes.landpedia.org/newsdes.php?id=qXBk&catid=pQ==&edition=pG8=>.

¹⁸ Human Rights, Council, Report of the Special Rapporteur on adequate housing as a component of the right to an adequate standard of living, and on the right to non-discrimination in this context, Balakrishnan Rajagopal: "The right to adequate housing during violent conflict," A/77/190, 19 July 2022, <http://www.undocs.org/A/77/190>.

¹⁹ HIC-HLRN, "Targeting Homes, Shelters and Shelter Seekers during Operation Cast Lead in the Context of Israeli Military Practice," HIC-HLRN Submission to the UN Fact-finding Mission on the Gaza Conflict," 29 July 2009, <https://www.hlrn.org/img/documents/Submission.pdf>.

²⁰ Application of the Convention on the Prevention and Punishment of the Crime of Genocide in the Gaza Strip (South Africa v. Israel), 2023, <https://www.icj-cij.org/case/192>; Legal Consequences arising from the Policies and Practices of Israel in the Occupied Palestinian Territory, including East Jerusalem, 2023, Application of the Convention on the Prevention and Punishment of the Crime of Genocide (The Gambia v. Myanmar), 2023, <https://www.icj-cij.org/case/178>; <https://www.icj-cij.org/case/186>; Allegations of Genocide under the Convention on the Prevention and Punishment of the Crime of Genocide (Ukraine v. Russian Federation: 32 States intervening), 2022, <https://www.icj-cij.org/case/182>; Armed Activities on the Territory of the Congo (Democratic Republic of the Congo v. Uganda), 1999–2022, <https://www.icj-cij.org/case/116>.

concerned with the supporting those claims by quantifying victims' and affected households' costs, loss and damage subject to needed remedy and reparation.

Data for remedy and reparation

Assigning responsibility for harm incurred is essential for determining a violation, generally, and for making a case entry in to the VDB, in particular. However, to support any litigious or administrative process toward remedy, HLRN has developed its monitoring methodology for including environmental and climate change events in the VDB.²¹ That forensic approach relies on the established norms of state responsibility, as well as both the already-developed and emerging norms cited above. The recent adoption of the Loss and Damage Fund (LDF) at CoP27 and its current set-up and initial financing as an outcome of CoP28 form long-awaited administrative responses to the harmful impacts of climate change.

Remedying economic and non-economic loss and damage (L&D) associated with climate change is inherent in the human right to remedy and, hence, a duty of all states.²² The human rights to life; food; water and sanitation; adequate housing; health; culture; a clean, healthy and sustainable environment; and an adequate standard of living, as well as collective rights to land and culture, are all affected by climate impacts.

Regarding the human right to adequate housing, the normative framework of this quantitative method respects the prohibition against forced evictions and the safeguards required for legal evictions, or evacuations, as the case may be.²³ These standards not only prevent a displacement from becoming a gross violation of human rights,²⁴ but also, therefore, avoid turning environmental hazard- and climate change-affected areas into zones of conflict as well.

Central to the remedies envisioned here is the UN Basic Principles and Guidelines on the Right to a Remedy and Reparation, a.k.a. the 'Remedy and Reparations Framework' (RRF).²⁵ The RRF already has served as important guidance for the VDB entries featured here, just as it should serve as guidance on matters related to the LDF's activities, content, scope, and eligibility. By virtue of their inalienable human rights, victims of harm should have remedy and reparations

²¹ HIC-HLRN, "How to consider climate change-related cases in the VDB," 7 September 2022, https://www.hlrn.org/img/documents/Climate%20change%20methodology%20challenge_final.pdf.

²² Enshrined in the International Covenant on Civil and Political Rights (1966), Article 2, <https://www.ohchr.org/sites/default/files/ccpr.pdf>.

²³ Committee on Economic, Social and Cultural Rights (CESCR), General Comment No. 7: "forced eviction," E/1998/22, 20 May 1997, https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=INT%2FCESCR%2FGEC%2F6430&Lang=en.

²⁴ UN Commission on Human Rights affirmed that "the practice of forced evictions constitutes a gross violation of human rights, in particular the right to adequate housing," in "Forced eviction," resolution 1993/77, 10 March 1993, para. 1, <http://www.hlrn.org/img/documents/ECN4199377%20en.pdf>; and reaffirmed that "the practice of forced eviction that is contrary to laws that are in conformity with international human rights standards constitutes a gross violation of a broad range of human rights, in particular the right to adequate housing," in "Prohibition of forced evictions," resolution 2004/28, 16 April 2004, para. 1, http://www.hlrn.org/img/documents/E-CN_4-RES-2004-28.pdf.

²⁵ Basic Principles and Guidelines on the Right to a Remedy and Reparation for Victims of Gross Violations of International Human Rights Law and Serious Violations of International Humanitarian Law," A/RES/60/147, 21 March 2006, <http://www.un.org/Docs/asp/ws.asp?m=A/RES/60/147>.

unconditioned to the allocation of responsibility and liability for the harm caused. Operationalizing the RRF, therefore, requires a conscientious assessment of all impacts.

The present report revisits VDB cases featured in HLRN's 2022 VDB report *Pursuit of Climate Justice*²⁶ that have undergone some form of quantification of impacts in the interim since their occurrence, including at least one VDB case to which HIC-HLRN has applied its local VIAT. The violation cases reported from the VDB last year fell into 13 distinct and sometimes coinciding context categories. Of those, this report revisits eight cases from seven of those categories selected. Most of them are cases of large-scale impacts that involve some measure of international cooperation on the part of development and/or relief agencies, or by civil human rights organizations in the pursuit of remedy through litigation or other administrative means. The exception is the Bainsiria case of Discrimination/Environmental Racism (Odisha, India), applying the VIAT, which provided the base data for local advocates of the affected community's habitat-related human rights.

Unfortunately, none of these cases has yet realized remedy and reparation for the victims, who ultimately end up so far absorbing the costs, losses and damage. Already-existing norms entitle victims to relief in the form of reparations; however, remedy is still wanting for an ever-greater population affected by environmental hazards and climate change who number total in the tens of millions.

III. Conflict, Occupation and War

In October 2021, HIC's President issued a statement with the ambition claim "Climate Justice *IS* a Human Right," which proffered a set of desired outcomes of conscientious climate action, including climate-sensitive peacemaking, under the slogan "Make Human Rights Habitat, Not War."²⁷ This underscored the links among conflict, environment and the over-arching priorities of climate change. Many of the conflicts witnessed today are very much linked to the continuity of racist and colonial regimes, or the global corporate extraction of key resources, while both harm the environment and hasten climate change.

International humanitarian law explicitly prohibits the targeting of dams, dikes and nuclear power plants in armed conflict.²⁸ Even if these sites were used for military purposes, the principle of proportionality nonetheless would prohibit such an attack. The environment as an often-silent casualty of war is also highlighted on 6 November of each year as the International Day for Preventing the Exploitation of the Environment in War and Armed Conflict.²⁹ However,

²⁶ *In Pursuit of Climate Justice: Housing and Land Rights Violations amid Environmental Hazards and Climate Change* (Cairo: HIC-HLRN, 2022), https://hlrn.org/img/documents/In_Pursuit_of_Climate_Justice.pdf.

²⁷ "Climate Justice *IS* a human right," HIC President Declaration for World Habitat Day, 4 October 2021, https://www.hic-net.org/wp-content/uploads/2021/10/EN_HIC-President-Statement-WorldHabitatDay2021.pdf.

²⁸ Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), Article 56: *Protection of works and installations of the Additional Protocol I*, https://www.icrc.org/en/doc/assets/files/other/icrc_002_0321.pdf.

²⁹ General Assembly (GA), Observance of the International Day for Preventing the Exploitation of the Environment in War and Armed Conflict, A/RES/56/4, 5 November 2001, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N01/475/24/IMG/N0147524.pdf?OpenElement>.

this year is special. The UN General Assembly adopted the 27 principles for the Protection of the Environment in Relation to Armed Conflict (PERAC)³⁰ on 7 December 2022.³¹ An example of the lengthy process of developing needed norms, the subject has been before the General Assembly for over twenty years.³² The principles are the outcome of nearly a decade of work also by the UN International Law Commission to articulate the legal framework for better protection of the environment, “before, during or after an armed conflict, including in situations of occupation.”³³

Armed conflicts too often lead to environmental degradation or destruction, with long-lasting effects that contribute to the increased vulnerability of the affected populations. While some rules of international law provide protection to the natural environment and seek to limit the damage caused by armed conflict, it remains a prominent cause of environmental damage, leading to food and water insecurity, loss of livelihoods and biodiversity loss, which are often interdependent.

The environmental impact of Israel’s current war on Gaza will be enduring.³⁴ The occupying power has repeatedly destroyed sanitation and agricultural infrastructure, razed cultivated lands,³⁵ and used banned phosphorus weapons.³⁶ The environmental legacy of Israel’s blockade³⁷ has left extremely limited possibilities to adapt to climate change under occupation.³⁸ Observers have accused Israel of having long waged an “invisible environmental war,”³⁹ making the Gaza Strip “uninhabitable,”⁴⁰ with a “toxic ecology,” “biosphere of war,”⁴¹

³⁰ ILC, Draft principles on protection of the environment in relation to armed conflicts, 2022, https://legal.un.org/ilc/texts/instruments/english/draft_articles/8_7_2022.pdf.

³¹ General Assembly, Protection of the environment in relation to armed conflicts, A/RES/77/104, 7 December 2022, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N22/741/64/PDF/N2274164.pdf?OpenElement>.

³² General Assembly, Protection of the environment in times of armed conflict : report of the Secretary-General, A/47/328, 31 July 1992, https://digitallibrary.un.org/record/149057/files/A_47_328-EN.pdf?ln=en; ICRC, “Protection of the environment in time of armed conflict,” Report submitted by the ICRC to the 48th session of the United Nations General Assembly, 17 November 1993, <https://www.icrc.org/en/doc/resources/documents/report/5deesv.htm>.

³³ ILC, “Protection of the environment in relation to armed conflicts: Analytical Guide to the Work of the International Law Commission,” undated, https://legal.un.org/ilc/guide/8_7.shtml.

³⁴ “The long-term environmental toll of Israel's assault on Gaza Environment and Climate,” *The New Arab* (5 December 2023), <https://www.newarab.com/features/long-term-environmental-toll-israels-assault-gaza>.

³⁵ Human Rights Watch, “Israel: Starvation Used as Weapon of War in Gaza,” 18 December 2023, <https://www.hrw.org/news/2023/12/18/israel-starvation-used-weapon-war-gaza>.

³⁶ Adrian Finaghan, “How much environmental damage is Israel’s war on Gaza causing?” *Aljazeera*, “Inside Story” panel discussion (14 December 2023), <https://www.aljazeera.com/program/inside-story/2023/12/14/how-much-environmental-damage-is-israels-war-on-gaza-causing>.

³⁷ “How Israel's blockade of Gaza created an environmental catastrophe Environment and Climate,” *The New Arab* (24 October 2023), <https://www.newarab.com/features/israels-blockade-gaza-creates-environmental-crisis>.

³⁸ Kerry Boyd Anderson, “Gaza’s extremely limited ability to adapt to climate change,” *Arab News* (1 November 2022), <https://www.arabnews.com/node/2191781>.

³⁹ Sonikka Loganathan, “In Gaza, Israel is waging an invisible environmental war,” *The Hindu* (27 November 2023), <https://www.thehindu.com/sci-tech/energy-and-environment/gaza-israel-invisible-environmental-war/article67576383.ece>.

⁴⁰ United Nations Conference on Trade and Development (UNCTAD), Report on UNCTAD assistance to the Palestinian people: Developments in the economy of the Occupied Palestinian Territory, TD/B/62/3, 6 July 2015, https://unctad.org/system/files/official-document/tdb62d3_en.pdf.

⁴¹ Ghassan Abu-Sitta, cited in Andre Vltchek, “Middle Eastern Surgeon Speaks About ‘Ecology of War,’” *Counterpunch* (28 April 2017), <https://www.counterpunch.org/2017/04/28/middle-eastern-surgeon-speaks-about-ecology-of-war/>.

“environmental apartheid,”⁴² threatening human viability⁴³ of the occupied Palestinian territory.



Figure 1: Cultivated lands in the northern Gaza Strip razed by Israeli forces in 2023. Source: Planet Lab PBC via Human Rights Watch.

No party has begun to comprehensively quantify the mounting costs, losses and damage of Israel’s near century of colonizing and waging war on Palestine. However, from the repertoire of destructive impacts of war, the focus on a single incident of Russia’s aggression against Ukraine is particularly instructive.

Ukraine: Kakhovka Dam

The war in Ukraine had continued for 17 months by World Habitat Day 2023. A heavily industrialized country, Ukraine has been undergoing destruction its environment throughout. Russian forces’ bombing industrial infrastructure and chemical plants has led to toxic liquid and gas leaks. The eminently avoidable conflict has brought incalculable human suffering, including through environmental damage. Water and water infrastructure have been repeatedly targeted for their tactical value, in addition to suffering collateral damage during the fighting since 2014,⁴⁴ as the Conflict and Environment Observatory has reported.⁴⁵

⁴² Institute for Middle East Understanding, “Israel’s Environmental Apartheid in Palestine,” 3 November 2022, <https://imeu.org/article/environmental-apartheid-in-palestine>.

⁴³ UNEP, *State of Environment and Outlook Report for the occupied Palestinian territory 2020*, 2020, <https://wedocs.unep.org/bitstream/handle/20.500.11822/32268/SEORP.pdf?sequence=1&isAllowed=y>.

⁴⁴ Emily Anthes, “A ‘Silent Victim’: How Nature Becomes a Casualty of War,” *The New York Times* (22 June 2023), <https://www.nytimes.com/2022/04/13/science/war-environmental-impact-ukraine.html>.

⁴⁵ “Russia targets dams,” VDB, 26 February 2022, http://www.hlrn.org/admin/violations/article_edit.php?id=56059&back=YXJ0aWNsZV9kaXNwbGF5LnBocA==#.

A joint Government of Ukraine, European Union and World Bank Group rapid assessment of Ukraine's damage and needs (RADN1) reported the multiple impacts of a year of war.⁴⁶ The broad scope of the study covered all of: Economic and social impacts, Social sectors, Productive sectors, and Crosscutting sectors, as well as a prospective Toward Recovery and Reconstruction.⁴⁷ The RADN1 sectoral approach also produces an indispensable picture of L&D, calculating the overall EU support to Ukraine and to Ukrainians in the EU at around €67 billion (US\$71 billion).⁴⁸ The UN's humanitarian assistance was estimated worth some US\$3.4 billion (€3,105,196,200), including cash, food, medicine, generators, and winter supplies. That is in addition to the UN Development System's support to the government's emergency early recovery efforts by mobilizing US\$1 billion (€913,293,000) for technical assistance at strategic and sectoral levels and providing basic services to vulnerable people and local communities. The World Bank Group had mobilized over US\$18 billion in financial support. At the July 2022 international Ukraine Recovery Conference in Lugano, the Government of Ukraine presented a comprehensive €685 billion Recovery Plan, with targets for 2032 that focus on addressing war effects and impacts, as well as broader economic development.

These figures indicate the value of international support to Ukraine in its general war effort, recovery and development process at a given moment (i.e., the war's first anniversary). However, the methods of determining contributions do not disaggregate L&D values related to war-induced environmental degradation.

In the Ukraine War, at least five dams and reservoirs have sustained direct damage. Early military activity had destroyed the gates of Oskil Reservoir, on the Siverskyi Donets River, near Izyum, already at the end of March 2022. The reservoir, the eighth largest in Ukraine, rapidly emptied, dangerously raising downstream river levels. Attacks on the Azovstal iron and steel works in Mariupol, for example, have damaged water treatment facilities and increased environmental health hazards with untold consequences. However, only selective cases of destruction have yet been the focus of remedial efforts that have involved quantification measures.

HLRN's 2022 report *In Pursuit of Climate Justice* cited a range of environmental impacts of the war.⁴⁹ Recorded in the VDB is also the case of Karachunivske Reservoir Dam, which Russian forces targeted in September 2022.⁵⁰ The attack on the dam near the city of Kryvyi Rih flooded 112 private homes and their surroundings. As residents of Hdantsivka and Motronivka communities were evacuated, almost 5,000 people were left without tap water in the Sofiiivka *hromada*.⁵¹ The day before, Russian forces had attacked Kryvyi Rih, a city of over 600,000

⁴⁶ Anne Himmelfarb, ed., "Ukraine: Rapid Damage and Needs Assessment February 2022 – February 2023" (Washington: Government of Ukraine, European Union and World Bank Group, March 2023), (RDNA2), <https://ukraine.un.org/sites/default/files/2023-03/P1801740d1177f03c0ab180057556615497.pdf>.

⁴⁷ *Ibid.*

⁴⁸ *Ibid.*, p. 120.

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⁵⁰ Olena Roshchina, "Kryvyi Rih fights consequences of Russian missile strike on reservoir dam overnight, water level falls," *Ukrainska Pravda* (15 September 2022), <https://www.pravda.com.ua/eng/news/2022/09/15/7367521/>.

⁵¹ A *hromada* is an administrative unit designating a town, village or several villages and their adjacent territories.

inhabitants in Dnipropetrovsk Oblast, damaging hydrotechnical facilities and leaving several neighborhoods without water.

Despite the fierce reaction to that Russian attack,⁵² the Karachunivske Reservoir Dam breach case has no impact assessment in the public record. However, a subsequent and even greater disaster has elicited quantification of L&D from Russia's targeting of Ukraine's Kakhovka Dam in June 2023. Much of the damage is irreversible, with likely changes to the environment that could have enduring impacts on ecosystems and human health. The assessments so far have focused on both upstream and downstream damage, including hydrological and geomorphic impacts, chemical contamination, waste, and ecological damage, including to protected areas.

In the early hours of 6 June 2023, Russian bombs breached the Kakhovka hydroelectric dam, retaining Ukraine's biggest reservoir, on the Dnipro River in (Kherson Oblast). The destruction of the dam caused extensive flooding, with a domino effect on both humans and their environment. Its loss has cost Ukraine 41,700 cubic meters (m³) of water per day. The broken dam released 1.2–1.3 billion m³ of water, a volume equal to one-fourth of Ukraine's water supply. Even if the dam were to be restored today, an estimated 33.5 years would be required to recover the loss of water.

Already in May 2023, Ukraine had announced its investigation to bring a case of ecocide against Russia before the ICC. To build its case, Ukraine subsequently dispatched a team of hundreds of ecological investigators to the area, overseen by Ukrainian prosecutor, Vladislav Ignatenko. General Prosecutor Andrii Kostin has cited 271 war crimes currently under investigation,⁵³ including specifically mentioned particularly dangerous Russian crimes such as blowing up dams, the shelling of nuclear facilities, and the attack on nuclear waste storage facilities.

Thereafter, Ukraine's Ministry of Environment Protection and Natural Resources requested the support of UNEP to assess the environmental consequences. Through activation of its emergency response network, including through the UNEP/Office for Coordination of Humanitarian Affairs (OCHA) Joint Environment Unit (JEU), UNEP assembled a core assessment team consisting of 22 experts representing 13 institutions.

The environmental consequences have been vast. The drying of the emptied Kakhovka Reservoir has rapidly and perhaps irreversibly transformed a mature and fully functioning aquatic ecosystem of 70 years into a riverine type of ecosystem in an initial stage of development. Some of the protected areas located within the reservoir, such as the Velykyi Luh National Nature Park, were destroyed. Groundwater levels in the region have been falling with the disappearance of such a large body of water. As the burden of climate change increases, the region may be further impacted in the longer run.

⁵² Graham Russell and Oliver Holmes, "Zelenskiy condemns 'vile Russian act' after strike on dam floods his home city," *The Guardian* (15 September 2022), <https://www.theguardian.com/world/2022/sep/15/ukraine-city-of-kryvyi-rih-floods-after-russian-missile-strikes-hit-dam>.

⁵³ "Ukraine is investigating over 270 Russian war crimes against its environment," *Rubryka* (28 November 2023), <https://rubryka.com/en/2023/11/28/kostin-ukrayina-rozsliduye-ponad-270-voyennyh-zlochyniv-rf-proty-dovkillya/>.

Downstream, the immense high-velocity flood caused losses in natural habitats, 12,000 hectares of forest, plant communities and species, inundating habitats and likely leaving toxic debris and sediments behind.⁵⁴ The impact led to a release of numerous chemical pollutants, including petroleum derivatives and liquid fertilizer. Even the assessment's focus only on large structures containing significant amounts of chemicals has identified 54 pollution hotspots. The resulting exposure to chemicals is likely to affect vulnerable populations and pose additional risks to women and children, with long-term health consequences.

The destruction of the Kakhovka Dam killed dozens of people and submerged entire villages in flood water. It affected 4,377 households on the north side and 12,844 households on the south side of the dam, totaling 17,221 affected persons.⁵⁵ The breach inflicted almost €13 billion in economic L&D. The initial estimate for total recovery and reconstruction needs is \$5.04 billion, and this figure is expected to grow as more detailed assessments are carried out. In the short term, \$1.82 billion is required for recovery efforts in the 2023/2024 period.⁵⁶

Around 37,012 residential units were impacted by the flooding, and 15% were damaged beyond repair. This number includes apartment units, single-family houses, and dormitories. Single-family houses have been the most affected (97.3% of damage), which indicates the significant impact on the rural landscape of Ukraine, including peri-urban communities. The extent of housing damage is spread across only two oblasts, with Kherson (98.4% of damage) being significantly more impacted than Mykolaiv (1.6%). UNEP estimated losses in the housing sector at US\$66 million, which reflects the cost of demolition and debris removal and the Ukraine government's one-time indemnity payment. That figure does not reflect bank losses and mortgage defaults, temporary rental and shelter provision by owners, or adjusted rental income losses.⁵⁷ For the housing sector alone, total damage is estimated at US\$1.101 to US\$1.502 billion.⁵⁸

⁵⁴ UNEP, "Rapid Environmental Assessment of Kakhovka Dam Breach Ukraine," 25 October 2023, p. xiii, https://wedocs.unep.org/bitstream/handle/20.500.11822/43696/Kakhovka_Dam_Breach_Ukraine_Assessment.pdf?sequence=3&isAllowed=y.

⁵⁵ *Ibid.*, p. 46.

⁵⁶ Government of Ukraine and United Nations, *Post-disaster Needs Assessment: 2023 Kakhovka Dam Disaster, Ukraine*, October 2023), <https://ukraine.un.org/en/download/145177/248860>.

⁵⁷ *Ibid.*, p. 42.

⁵⁸ Both Mykolaiv and Kherson oblast sustained significant damage due to the conflict however overlap is minimal due to the predominance of rural and peri-urban areas affected by the flooding and the significant number of single dwelling houses impacted (97.3% of damage is in single dwelling houses). Damages due to the war have been deducted from the total flood damages.



Figure 2: Flooding of the Dnipro River after the Kakhovka Dam breach. Keystone/AP.

The UNEP assessment covered Hydrology, Erosion, Chemicals and sediments, Military waste, Disaster waste management, Mitigation of ecological impacts, Monitoring, Coordination on assessments and remediation action, Communication and advocacy, Future outlook, Funding, Stakeholders. As wide ranging as the study subjects have been, more-granular assessments of household and community L&D remain yet to be conducted.

UNEP's assessment acknowledges information gaps due to its remote method and other impediments. For example, due to the topography, more flooding was experienced on the flatter left bank of the Dnipro River. At the time of the UNEP report, information on the losses/damages of only Mykolaiv and the right bank of Kherson oblast are available. Meanwhile, the left bank, with 73% of the damage to affected rural residents and agricultural land, as well as one-third of the affected households. However, as this zone remains Russian Federation's military occupation, little information was available and the full extent of damage there is still largely unreported. The recommendations outline needed follow-up themes and activities, followed by an overview of key actors relevant for follow-up actions.

In response to the breach of Kakhovka dam, 16 Union Civil Protection Mechanism Member and Participating States made a total of over 100 separate offers to Ukraine. This offers cover multiple sectors, and include boats, shelter items, WASH equipment, water tanks, water

pumps, life vests, medical materials. In addition, three water purification units from the rescEU shelter stockpile had been also mobilized.⁵⁹

Assessments so far do not address the full impacts, however, without quantifying the L&D irrigation, drinking water, industrial water supply—including to the Zaporizhzhia Nuclear Power Plant—and associated human health impacts.

Next steps

UNEP notes that the fulfillment of housing-recovery needs requires an integrated green, resilient, and inclusive approach, focusing on returning families to their homes and restoring livelihoods and services. The human rights-based approach (HRBA), however, would require more than resilience (i.e., recovery to the previous condition), but also a building-back-better approach that ensures “progressive realization” of the human right to adequate housing and “continuous improvement of living conditions.” However, in the immediate term, the need is urgent to provide temporary housing, including rentals, for displaced households, to winterize accommodations, repair partially damaged residential buildings, and establish a housing reconstruction and recovery strategy and its implementation. The principal areas affected are low-lying and susceptible to future flooding, so reconstruction and/or resettlement must include guarantees of nonrepetition called for in the RRF by improving land-use planning, enhanced construction technology and materials (e.g., replacing clay foundations with more-flood-resistant cement ones), and green building.⁶⁰

The RDNA1 also proposed a set of complementary guiding principles that are based on international experience within post-conflict and post-disaster recovery and reconstruction efforts. Among the priorities is the continuous collection of data. It called upon all central and local authorities, as well as other relevant stakeholders, to continue to be engaged and coordinate for the purpose of continuous data collection and L&D documentation, with a focus on vulnerable groups. Those efforts should collect information on ongoing, completed and planned repairs and reconstruction to help identify needs for future years. This information is critical to inform local, national and international efforts to provide timely, continuous and local context-specific support to the affected communities.⁶¹

External financial and technical support is urgent and indispensable for further planning and implementation of remediation and restoration actions for the dam. It will take several assessments and significant funding to assess the full scale of environmental impacts within all parts of the affected territory.⁶²

⁵⁹ ECHO, “Ukraine - Destruction of Kakhovka dam, update (DG ECHO, UN OCHA),” *ECHO Daily Flash* (19 June 2023), <https://reliefweb.int/report/ukraine/ukraine-destruction-kakhovka-dam-update-dg-echo-un-ocha-echo-daily-flash-19-june-2023>.

⁶⁰ Consistent with, but additional to recommendations in UNEP, *op. cit.*, p. 42.

⁶¹ World Bank, Government of Ukraine, and European Commission, “Ukraine Rapid Damage and Needs Assessment,” 31 July 2022, <http://documents1.worldbank.org/curated/en/099445209072239810/pdf/P17884304837910630b9c6040ac12428d5c.pdf>.

⁶² UNEP, “Rapid Environmental Assessment of Kakhovka Dam Breach Ukraine,” 25 October 2023, https://wedocs.unep.org/bitstream/handle/20.500.11822/43696/Kakhovka_Dam_Breach_Ukraine_Assessment.pdf?sequence=3&isAllowed=y.

IV. Cross-border Issues

This category of environmental hazards and eventual disasters involves human activity, including governments and corporations domiciled in extraterritorial states, that affect communities in a neighboring state. As in the case of conflict, occupation and war, remedies imply activating extraterritorial obligations under international norms of law and practice, including human rights obligations. For such remedial purposes, quantification at the community and household level is essential as a basis for calculating—even if by extrapolating sample assessments—to determine the requirements of remedy and reparation according to the RRF.

As provided in the HLRN methodology for treating environmental and climate-change events as cases in the VDB, the legal basis for considering them as violations rests on the concept of foreseeability⁶³ and the principles of extraterritorial human rights obligations.⁶⁴

Desiccating Iraq

Iraq ranks fifth among the most climate-affected countries in the world,⁶⁵ within a region in which more than 50% of all regional water sources are shared by two or more countries. Iraqi society has become considered the most vulnerable to negative environmental components arising from serious environmental deterioration. Factors include the continuous conflicts, from the 1980s Gulf War, the invasion after Iraq's 1990 occupation of Kuwait, and the US-led invasion of 2003 and its consequences. After 2003, Iraq suffered the complete destruction of 75% of the water infrastructure of dams, irrigation canals and pumping stations.⁶⁶

In the domestic sphere, the mismanagement of water, the lack of organization and failure to uphold regulations in various works and development projects, as well as encroaching on rivers and green cover sanctuaries, have led to high levels of pollution. These human activities combine with major water infrastructure projects carried out in neighboring countries to change the environment, with recurring dry seasons and water shortages becoming a feature of climate change in Iraq.

⁶³ International Law Commission, Report of the Fifty-Third Session, Responsibility of States for Internationally Wrongful Acts, 53rd session, A/56/10 (2001), Article 23, comment 2, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N01/557/81/IMG/N0155781.pdf?OpenElement>.

⁶⁴ ETO Consortium, Maastricht Principles on the Extraterritorial Obligations of States in the Area of Economic, Social and Cultural Rights, 2011, https://www.etoconsortium.org/wp-content/uploads/2023/01/EN_MaastrichtPrinciplesETOs.pdf. See also Olivier De Schutter, Asbjørn Eide, Ashfaq Khalfan, Marcos Orellana, Margot Salomon, and Ian Seiderman "Commentary to the Maastricht Principles," *Human Rights Quarterly*, 34 (2012) pp. 1084–69, https://www.etoconsortium.org/wp-content/uploads/2023/01/EN_CommentaryMaastrichtPrinciplesETOs.pdf.

⁶⁵ Pierre Boileau, Paul Ekins and Joyeeta Gupta, eds., *Global Environment Outlook (GEO-6): Healthy Planet, Healthy People* (Cambridge University Press, 2019), https://wedocs.unep.org/bitstream/handle/20.500.11822/27539/GEO6_2019.pdf?sequence=1&isAllowed=y.

⁶⁶ Government of Iraq and World Bank Group (Gol & WBG), *Iraq Reconstruction and Investment: Part 2: Damage and Needs Assessment of Affected Governorates* (Washington: World Bank, January 2018), p. 51, <https://documents1.worldbank.org/curated/en/600181520000498420/pdf/123631-REVISED-Iraq-Reconstruction-and-Investment-Part-2-Damage-and-Needs-Assessment-of-Affected-Governorates.pdf>.

The depletion of water resources has had dire consequences for Iraqis' enjoyment of their human right to water. The water sector is a major field of activity with cross-border environmental harm affecting habitat-related human rights related to habitat.

Public works in Iran have long been engaged in diverting water courses, particularly in the country's southwest. These activities have served multiple purposes, including the dispossession and displacement of the Ahwaz region's Indigenous Arab population. The VDB profiles the Diyala Ahwar region, where Iran has dammed more than 12 major rivers that flow into the Tigris, depriving thousands of farmers of irrigation water and turning their fields into barren lands.⁶⁷

Türkiye has constructed 30 dams to store water within its territory upstream, without consulting neighboring countries that benefit from the water, which cooperation is required under international law. The Ilisu Dam, completed as part of Türkiye's Güneydoğu Anadolu Projesi (Southeastern Anatolian Development Project, or GAP) in 2019, retains much of the waters of the Tigris flowing to Iraq. At 135 meters high and with total water storage of 10.6 billion cubic meters, the Ilisu Dam is the second largest within Türkiye, after the Atatürk Dam on the Euphrates, and is the world's largest concrete-face rockfill dam, measured by filling volume.

Drought has affected northern Iraq since early 2021, while southern governorates have seen declines in water supply and quality for several years. Most of Iraq suffers from precipitation deficits.⁶⁸ Crop and livestock production has since declined, impacting vulnerable communities affected by conflict and displacement over the same period. At least seven million people in Iraq have been affected by drought recently.⁶⁹ The increasing severity of drought in Iraq has led to the displacement of some 62,000 people from all over Iraq over the past four years,⁷⁰ and years of protests in southern Iraq have blaming Turkish dams for water scarcity.⁷¹

Tigris and Euphrates River water flowing through Türkiye has dropped by 40% in the past four decades.⁷² Iraqi authorities fear that the Euphrates might dry up by 2040 due to climate change and poor water management.⁷³ The loss of agricultural land and growing desertification

⁶⁷ "Drying up rivers," VDB, 1 January 1980, <http://www.hlrn.org/violation.php?id=p25kZ6g=>.

⁶⁸ WASH Cluster, "Iraq Precipitation Change Analysis: Wet season of 2021–2022," November 2022, https://repository.impact-initiatives.org/document/reach/38c85c3a/REACH_IRQ_Factsheet_Precipitation-and-Climate-Change-Analysis_07November2022.pdf.

⁶⁹ Norwegian Refugee Council, "Water crisis and drought threaten more than 12 million in Syria and Iraq," press release, 23 August 2021. <https://www.nrc.no/news/2021/august/water-crisis-iraq-syria/>.

⁷⁰ IOM Displacement Tracking Matrix, "Drivers of Climate-induced Displacement in Iraq: Climate Vulnerability Assessment Key Findings," Data Collection Period: August–October 2022 (April 2023), https://iraqdtm.iom.int/files/Climate/202353458739_DTM_Climate_key_findings_en_v11.pdf.

⁷¹ Mustafa Kirikçioğlu, "Iraqis blame poor infrastructure, corruption in Baghdad for water crisis," *Daily Sabah* (21 August 2018), <https://www.dailysabah.com/diplomacy/2018/08/21/iraqis-blame-poor-infrastructure-corruption-in-baghdad-for-water-crisis>.

⁷² Samya Kullab, "Politics, climate conspire as Tigris and Euphrates dwindle," *AP News* (18 November 2022), <https://apnews.com/article/iran-middle-east-business-world-news-syria-3b8569a74d798b9923e2a8b812fa1fca>.

⁷³ Hélène Sallon, "Iraq's fertile valley is dying," *Le Monde* (21 August 2022), https://www.lemonde.fr/en/environment/article/2022/08/21/iraq-s-fertile-valley-is-dying_5994283_114.html#.

have [played](#) a major role, politics at national and transnational levels are at the core of the bundle of reasons that have brought about the catastrophic state of the two rivers.⁷⁴

Successfully monopolizing control over the flow of the Tigris and Euphrates since the 1980s, Türkiye has used water as a means of coercion against its co-riparian states, Iraq and Syria. In 1984, Türkiye had agreed to release 500 cubic meters of water per second to Iraq,⁷⁵ but actual water flow has fluctuated significantly. Until a decade ago, Iraq had received around 625 cubic meters of water per second from the Tigris, but, more recently, Türkiye has reduced the flow to an average rate of around 200 cubic meters per second.⁷⁶ The amount of water available to each Iraqi has reduced by half, from over 5,000m³ in 1997 to 2,400m³ in 2009.⁷⁷ Iraq's Ministry of Water Resource spokesperson reported in late April 2023 that Iraq was receiving only 313 cubic meters per second from the Tigris, and 175 cubic meters per second from the Euphrates.⁷⁸

Drying of the marshes

No greater example of the combined effects of mismanagement amid climate change and the extraterritorial deprivation of natural resource rights than the Mesopotamian Marshes, located in the vast floodplains between the Euphrates and Tigris Rivers in the lower part of the Iraq basin. The marshes lie mostly within southern Iraq, with a portion also in southwestern Iran. In Iraq, they occupy a triangular zone across the three governorates of Dhi Qar, al-Basra and Maysan, formed by the three outlying cities: Nasiriyah, Basra and al-Amarah.⁷⁹

Many factors have contributed to the destruction of the marshes, whose area ranged between 10,500 km² and 20,000 km², at 1990.⁸⁰ The most important factors have been Türkiye and Iran constructing dams upstream. The development of the Rumeila oil fields also has contributed to the drying up of 950 km²,⁸¹ in addition to damage from military operations. As an act of retaliation against the 1991 uprisings against his regime, Saddam Husain deliberately drained the wetlands to force out the local inhabitants and any rebels residing there. That vengeful operation meant that the Iraqi marshes could no longer perform their biological and

⁷⁴ Kawa Hassan, Camilla Born and Pernilla Nordqvist, "Iraq Climate-related security risk assessment" (Expert Group on Climate-related Security Risks, August 2018), <https://www.eastwest.ngo/sites/default/files/iraq-climate-related-security-risk-assessment.pdf>.

⁷⁵ John Daly, "Turkey's Water Policies Worry Downstream Neighbors," *Turkey Analyst*, Vol. 7, No. 16 (August 2014) <https://www.turkeyanalyst.org/publications/turkey-analyst-articles/item/343-turkey%E2%80%99s-water-policies-worry-downstream-neighbors.html>.

⁷⁶ Kullab, *op. cit.*

⁷⁷ UNEP, "GEO-6: Global Environment Outlook: Regional assessment for West Asia," (16 September 2017), https://wedocs.unep.org/bitstream/handle/20.500.11822/7668/GEO_West_Asia_201611.pdf?sequence=1&isAllowed=y.

⁷⁸ "العراق يستعد لإرسال وفد إلى تركيا ويكشف كميات الإطلاقات المائية الواردة،" *موازين نيوز* (29 آذار/مايو 2023)، <https://www.mawazin.net/Details.aspx?jimare=227929>

⁷⁹ "Ma'adan Arabs," VDB, 1 January 1988-present, with quantification figures for Di Qar Governorate, <https://www.hlrn.org/violation.php?id=p25mZqU=>.

⁸⁰ Oli Brown and Brian Wittbold, "Human mobility in the Anthropocene: Perspectives from UN Environment," in Robert McLeman and François Gemenne, eds., *Routledge Handbook of Environmental Displacement and Migration* (Abingdon: Routledge, March 2018), pp. 415–20, <https://www.routledgehandbooks.com/doi/10.4324/9781315638843-33>.

⁸¹ Conflict and Environment Observatory, "The past, present and future of the Mesopotamian marshes," September 2021, <https://ceobs.org/the-past-present-and-future-of-the-mesopotamian-marshes/#1>.

ecological functions, becoming barren lands scarred by years of drought. The area of Iraq's southern marshes have shrunk to 4,000 km² today.⁸²



Figure 3: Iraq's Mesopotamian marshes is better days. For 30 years, they have undergone ecocide and cultural erasure, loss and regeneration. If protected, the marshes could protect communities from the extreme temperatures associated with climate change. Source: UNDP/Flickr.

Iraq's southern marsh areas used to be lush with green grasses and pleasant weather at the end of the winter season, when buffalo breeders and hunters were active. The region also contributed 60% of the fish varieties in Iraq.⁸³ Those activities, as well as the sugar cane cultivation, have ceased during the water shortage.

In July 2023, FAO warned of the dire consequences for the marshes due to climate change and water.⁸⁴ The region has witnessed the most severe heat wave in several years, accompanied by a sudden water shortage in the Euphrates River, which forced 2,345 Marsh Arabs (*Ma'dan*) families to leave their villages and migrate to the governorates of Salah al-Din, Najaf, Karbala,

⁸² Brown and Wittbold, *op. cit.*

⁸³ Abdul-Razak M. Mohamed, Najah A. Hussain, Sajed S. Al-Noor, Falah M. Mutlak, Ibrahim M. Al-Sudani, Ahmed M. Mojer, Abas J. Toman and Mohamed A. Abdad, "Fish assemblage of restored Al-Hawizeh marsh, Southern Iraq," *Ecohydrology and Hydrobiology*, Vol. 8, Nos. 2-4 (2008), pp. 375-84, at 377, <https://faculty.uobasrah.edu.iq/uploads/publications/1609226810.pdf>.

⁸⁴ FAO, "FAO Renews its Call for Urgent Action to safeguard Iraq's Marshes and Buffalo Producers from Severe Climate Change and Water Scarcity," press release, 10 July 2023, <https://iraq.un.org/en/239237-fao-renews-its-call-urgent-action-safeguard-iraqs-marshes-and-buffalo-producers-severe>.

and Babil in central Iraq, and other areas, in search of usable water, food and fodder for their livestock, and job opportunities.⁸⁵

Loss and Damage

Although the Iraqi government has put in place a set of measures to preserve and sustain the marshes, it has not included within its policies an assessment of the damages and non-economic losses incurred by local communities from loss of livelihoods, forced migration as a result of the drought wave and the destruction of the marsh ecosystem.⁸⁶ However, lessons can be learned from assessments of other drought-affected regions of Iraq. Except for the punitive policies of Saddam Husain three decades ago, all of the other factors, especially the damning of trans-boundary watercourses upstream by Türkiye and Iran, have rendered the same desiccating consequences across the country.

Some of the environmental and climate-change impact assessments have led to emergency plans of action,⁸⁷ a proposed National Plan for Reconstruction and Development of Iraq (2018–2030)⁸⁸ and a Reform, Recovery and Reconstruction Fund.⁸⁹ The International Organization for Migration (IOM) also surveyed more than 2,800 households across farming communities in conflict-affected governorates of Dhi Qar and Basra, where the marshes are found, as well as Anbar, Duhok, Kirkuk, Ninewa and Salah al-Din governorates.⁹⁰

The cost, losses and damages to rural communities are crippling. With farmers experiencing detrimental crop losses, farming household incomes have plummeted. In Basra Governorate, more than half of households rely on agriculture as their main source of income. Their average monthly income (among surveyed households) was IQD 288,000 (€199),⁹¹ which is significantly lower than the IQD 380,000 (€306) required to meet estimated monthly minimum expenditures.⁹² As the majority of farmers lease their land from the state, they remain liable to pay rent to the government while they work without income as their crops continue to fail.⁹³

⁸⁵ الأمم المتحدة، "أزمة المناخ: الجفاف يحل مكان الماء في أهوار العراق"، 15 آب/أغسطس 2023، <https://news.un.org/ar/story/2023/08/1122767>.

⁸⁶ Ahmed Saeed, Issam Sudani and Timour Azhari, "Drought drives economic exodus from Iraq's rivers and marshlands," (5 June 2023), <https://www.reuters.com/business/environment/drought-drives-economic-exodus-iraqs-rivers-marshlands-2023-06-05/>.

⁸⁷ International Federation of Red Cross and Red Crescent Societies, "Emergency Plan of Action (EPoA), Iraq: Droughts," 31 March 2022, [MDRIQ013do \(4\).pdf](https://www.ifrc.org/~/media/2022/03/MDRIQ013do%20(4).pdf).

⁸⁸ Arab Republic of Iraq, *Iraq Reconstruction and Investment, Part 1: Reconstruction and Development Framework*, February 2018, <https://andp.unescwa.org/sites/default/files/2020-09/Iraq%20Reconstruction%20and%20Investment.pdf>.

⁸⁹ *Iraq Reform, Recovery and Reconstruction Fund I3RF : Trust Fund Annual Progress Report to Development Partners 2021* (Baghdad: World Bank Office in Iraq, 31 January 2021), <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/865941645714696327/iraq-reform-recovery-and-reconstruction-fund-i3rf-trust-fund-annual-progress-report-to-development-partners-2021>.

⁹⁰ Norwegian Refugee Council (NRC), *Iraq's drought crisis and the damaging effects on communities*, 15 December 2021, <https://www.nrc.no/globalassets/pdf/reports/iraqs-drought-crisis/iraqs-drought-crisis-and-the-damaging-effects-on-communities.pdf>.

⁹¹ *Ibid.*, p. 7.

⁹² Cash Working Group, "Cash Working Group Guidance Note," January 2020, p. 6, [file:///C:/Users/jsche/Downloads/1.cwg iraq - humanitarian response plan 2020 - guidance for mpca projects.pdf](file:///C:/Users/jsche/Downloads/1.cwg%20iraq%20-%20humanitarian%20response%20plan%2020%20-%20guidance%20for%20mpca%20projects.pdf).

⁹³ NRC, *op. cit.*, p. 7.

The drought has decreased employment opportunities for daily workers as well. Fully 80% of farmers did not have any temporary wage workers in 2020–21. An estimated further 20% decrease in Iraq’s water supply could decrease demand for agricultural labor to 11.8% and reduce Iraq’s GDP by €6.028 billion (compared to 2016 levels).⁹⁴ Notably more than a quarter of IDPs rely on daily work as their main source of income, and the inability to access income only further exacerbates existing vulnerabilities for displaced communities and contributes to more serious negative coping mechanisms or additional waves of displacement.

Additional losses include the lack of food, costs of displacement, loss of income and increasing food prices. This is particularly urgent considering dire drought forecasting and the recent Ministry of Agriculture decision to reduce the country’s annual areas for cultivation by 50% for the 2021–22 cropping season due to water scarcity.⁹⁵

A 5-year-old Government of Iraq and World Bank Group needs assessment covered loss and damage in 16 cities⁹⁶ due to conflict in seven governorates: Anbar, Diyala, Ninawa, Salah al-Din, Babel, Baghdad and Kirkuk. The data and findings are significant, but do not cover the afflicted marsh region and provide only macroeconomic data. They are instructive in projecting remedial efforts in an integrated manner, and the assessment’s broad scope assists in national-sphere planning. It also proposes a renewal of the social contract, in particular, promoting economic and business recovery and the rehabilitation of services. However, it averts the focus from communities’ and households’ specific economic and non-economic costs, losses, damages and consequent needs.⁹⁷

Non-economic losses

With respect to UNESCO’s designation of the marshes to be a World Heritage Site, the nontangible losses from destruction of the marshes are invaluable, but no such estimation of restitution costs appears in any L&D assessment so far. For example, the loss of civil peace needs to be counted also, as pointed out in HLRN’s input to the LDF Transitional Committee.⁹⁸ Notably in the Iraqi context, reduced levels of water flowing from the Tigris and Euphrates since 2004 had enabled seawater from the Persian Gulf to seep deeper and deeper into the Shatt al-Arab, eventually reaching the southern city of al-Basra for the first time in 2018.

The combination of drought and the intrusion of saltwater from the Gulf have wiped out most of the palm groves and local food producers have sold their cattle as the region’s rivers dried up and canals stagnated, clogged with rubbish. Meanwhile, corruption and mismanagement on the

⁹⁴ World Bank, *Iraq Economic Monitor: The Slippery Road to Economic Recovery, with a Special Focus on Overcoming Water Scarcity and Climate Change Impacts* (Washington: International Bank for Reconstruction and Development / The World Bank, 2021), <https://documents1.worldbank.org/curated/en/981071637593726857/pdf/Iraq-Economic-Monitor-The-Slippery-Road-to-Economic-Recovery.pdf>.

⁹⁵ NRC (2021), p. 13.

⁹⁶ Al-Jalawla, al-Sa’adiyya, al-Ba’aj, Beygee, Bakhdida, al-Falluja, al-Hatra, Heet, Mosul, al-Muqdadya (Ibid), al-Ramadi, Sinjar, al-Shirqat, Tal Afar, Tel Keppe, and Qarah Tabbah.

⁹⁷ Gol&WBG, *op. cit.*

⁹⁸ HIC-HLRN, “Assessing Loss and Damage Impacts Associated with Climate Change,” 21 November 2023, https://www.hlrn.org/img/documents/L&D_quantification_cases_final.pdf.

part of local and central government—both dominated by a kleptocracy of religious parties that have dominated governance in Iraq for more than a decade—have exacerbated a slow-onset environmental disaster. Consequently, the dire state of public services, regular power cuts and water shortages led to predictable mass unrest.⁹⁹



Figure 4: A demonstrator in al-Basra burns tyres during protests in mid-2018. Source: Muhammed Haidar Ali/AFP/Getty Images.

V. Development-induced displacement

East African Crude Oil Pipeline (EACOP)

An ongoing VDB case involves the construction of an oil pipeline that transverses Uganda and Tanzania, demolishing hundreds of houses, degrading forests and displacing inhabitants from their agricultural lands.¹⁰⁰ The current project started 15 years ago, when a UK company, Tullow Oils, began drilling in western Uganda, discovering the country's previously untapped oil reserves. Today, two other oil giants, The French oil corporation TotalEnergies and China's National Offshore Oil Corporation (CNOOC), are collaborating with East African governments in a gradual land grab to exploit them and construct the \$3.5 billion 1,445-km-long EACOP, extending from the town of Kabaale, on Uganda's Lake Albert, to Tanzania's port city, Tanga.¹⁰¹

⁹⁹ Ghaith Abdul-Ahad, "Iraq is dying': oil flows freely but corruption fuels growing anger," *The Guardian* (27 August 2018), <https://www.theguardian.com/world/2018/aug/27/iraq-is-dying-oil-corruption-protest-basra>.

¹⁰⁰ "TotalEnergies EACOP," VDB, 1 March 2021, <http://www.hlrn.org/violation.php?id=p25kaak=#.Yzx6z3ZBy70>

¹⁰¹ "Uganda: Land Grabbing Worsens Climate Change," *HLRN News*, 10 January 2019, <http://www.hlrn.org/activitydetails.php?title=Land-Grabbing-Worsens-Climate-Change&id=pmtkaQ==#.YzRLL3ZBxyw>.

EACOP refers to a convergence of three interrelated projects (hereinafter “the oil projects”). They include:

- Tilenga and Kingfisher, two upstream oilfields in Uganda’s Lake Albert basin, operated by France’s TotalEnergies and CNOOC, respectively;
- The Kabaale refinery, Uganda’s first planned oil refinery, led by a consortium of companies called the Albertine Graben Refinery Consortium (AGRC); and
- The EACOP required to transport the oil out of landlocked Uganda to international markets, developed by TotalEnergies, alongside CNOOC and the national oil companies of Uganda and Tanzania.

The EACOP route traverses numerous diverse ecosystems and human settlements, with one third of the pipeline running alongside Africa’s largest lake, Lake Victoria—a primary water source for more than 40 million people, which population is growing at an annual rate of 3.5%, among the world’s highest population growth rates.¹⁰² The pipeline will pass through seven forest reserves, two game reserves, two game-controlled areas and one open area that supports wildlife management, covering a total of 295km of conserved and protected lands. Nearly 2,000 square kilometers of protected wildlife habitats will be negatively impacted by the EACOP.¹⁰³

A series of studies, local consultations and environmental- and social-impact assessments have found major shortcomings in the project-related assessments and consultation processes; improper handling of hazardous waste and oil spills; threats and retaliation against human rights and environmental defenders, and community leaders; improper land valuation, acquisition and compensation processes; and harm to protected areas and natural resources.¹⁰⁴

The EACOP construction involves the complete relocation of over 200 households in Uganda, and 391 in Tanzania. However, these numbers do not count the inevitable thousands of households to be forcibly displaced when they lose smaller portions of land, subsistence agriculture and other land-based livelihood activities on which they depend.¹⁰⁵

Each of the interrelated oil projects requires large-scale land acquisition, resulting in the physical and economic displacement of communities. Roughly 13,000 households across Uganda and Tanzania, accounting for more than 86,000 individuals, have lost or will lose land

¹⁰² Evans A.K. Miriti, “Lake Victoria,” *African Great Lakes Information Platform* (undated), <https://www.africangreatlakesinform.org/article/lake-victoria#:~:text=The%20Lake%20Victoria%20basin%20is,growth%20rates%20in%20the%20world.>

¹⁰³ “The East African Crude Oil Pipeline – EACOP a spatial risk perspective,” *mapforenvironment.org*, <https://mapforenvironment.org/story/The-East-African-Crude-Oil-Pipeline-EACOP-a-spatial-risk-perspective/111>.

¹⁰⁴ Inclusive Development International (IDI), “Assessment of East African Crude Oil Pipeline (EACOP) and Associated Facilities’ Compliance with Equator Principles and IFC Performance Standards,” July 2022, <https://www.inclusivedevelopment.net/wp-content/uploads/2022/07/EACOP-EPs-assessment.pdf>.

¹⁰⁵ Emily Jones, “Evicted Development: Moving People for Pipelines,” *The McGill International Review* (30 August 2021), reprinted in “Uganda: ‘Total’ Eviction for Pipeline,” *HLRN News*, <http://www.hlrn.org/activitydetails.php?title=Uganda:-%E2%80%9CTotal%E2%80%9D-Eviction-for-Pipeline&id=p21nbA==#.Yzx6CHZBy70>.

due to the EACOP.¹⁰⁶ A further 4,865 households, accounting for 31,716 individuals, are directly affected by the Tilenga oilfield.¹⁰⁷ The Kingfisher oilfield will impact 680 households, or roughly 2,949 individuals.¹⁰⁸ In sum, the oilfields and pipeline are expected to directly impact the land of roughly 20,750 households and some 104,000 individuals.

Legal challenges

The projects have elicited a series of legal battles in multiple jurisdictions. In the 2019 case *Friends of the Earth et al. v. Total*, six nongovernmental organizations have sued energy company Total over an oil project in Uganda and Tanzania. The plaintiffs allege that Total failed to adequately assess the project's threats to both human rights and the environment.

The case rests on the 2017 French Duty of Vigilance Law, under which French companies must develop a due-diligence plan (*plan de vigilance*) to identify and prevent serious violations of human rights and harm to the environment that could occur as a result of their business practices, including those of their foreign subsidiaries and subcontractors. In June 2019, Friends of the Earth France, Survie, AFIEGO, CRED, NAPE/Friends of the Earth Uganda and NAVODA issued a formal demand for Total to revise its vigilance plan for the Tilenga Project, along with a report detailing alleged inadequacies in the vigilance plan. These associations claimed that Total did not account for the social and environmental impacts of the oil project located on the shores of Lake Albert, in western Uganda, and the long pipeline that would convey fossil fuel across Tanzania to the Indian Ocean.

In addition to the approximately 100,000 people to be displaced, the demand cites the environmental impact of the 400 bore holes are to be drilled. A third of the drilling sites are in the Murchinson Falls National Park, which is home to a significant number of endangered species. The claimants sought an urgent court order to prevent the unlawful disturbance resulting from the company's failure to comply with its due-diligence obligations. They sought such an order, subject to fine, to establish, publish and implement a set of measures in its *plan de vigilance* to prevent (i) serious violations of human rights and fundamental freedoms, human health and safety and (ii) serious environmental damage. Although the claimants' report focuses on human rights and conventional pollution in Uganda and Tanzania, it also argues that Total's due-diligence plan does not properly account for the project's potential life cycle greenhouse gas emissions, having wider implications of environmental harm.

Total rejected the allegations and argued that the court in which the case was filed was not competent to hear it. On 30 January 2020, the Nanterre Judicial Court ruled in Total's favor and

¹⁰⁶ Les Amis de la Terre, "Number of People Affected by the EACOP Project in Uganda and Tanzania", April 2021, <https://www.amisdelaterre.org/wp-content/uploads/2021/04/20210407-numbers-of-individual-persons-affected-by-eacop.pdf>.

¹⁰⁷ Atacama Consulting, "Tilenga Project Resettlement Action Plans: Executive Summary," September 2020, Table 25, p. 138, <https://www.amisdelaterre.org/wp-content/uploads/2020/10/raps-2-5-tilenga-executive-summary-atacama-2020-sep-en.pdf>.

¹⁰⁸ CNOOC, "Environmental and Social Impact Assessment for the Kingfisher Field Development Area, Uganda," November 2019, <https://www.eia.nl/projectdocumenten/00006431.pdf>.

that the case must be brought before a commercial court. On 10 December 2020, the Versailles Court of Appeal decided that the case should be brought before the Nanterre Commercial Court, because the due diligence plan should be qualified as an “act of management of a commercial company.”

On 15 December 2021, the Court of Cassation overturned the judgment of the Versailles Court of Appeal and recognized the competence of the judicial court to judge the complaint of the associations. The case, therefore, was to be decided by the Nanterre Judicial Court, and not by the Commercial Court as Total had claimed. The Court of Cassation recalled that (i) companies’ due-diligence duties do not constitute a commercial act and, rather, (ii) a natural person plaintiff could bring a claim against a legal entity before either the judicial court or the commercial court. While this decision is favorable to the claimants, Friends of the Earth France claimed that over 100,000 people remained totally or partially deprived of their land and means of subsistence in Uganda and Tanzania.¹⁰⁹

In 2022, five additional activist groups (Darwin Climax Coalitions, Sea Shepherd France, Wild Legal and Stop EACOP-Stop Total in Uganda) have sued TotalEnergies for a second time over the projects in a Paris civil court, they said on Tuesday, after an earlier fast-track attempt was dismissed in February.¹¹⁰ The French and Ugandan groups, led by Friends of the Earth France, accused the energy company of failing to protect people and the environment.¹¹¹ The judgment added that only a detailed investigation in a standard-speed trial could examine whether the company's actions on the ground were in line with its duty to prevent identifiable harms.

This latest legal attempt instead seeks *reparations* for those who claim they have already been harmed by project construction. Allegations range from lack of timely and adequate payment for land on which the pipeline will be built, to damage to houses from flooding during construction of oil processing facilities. The object of the ongoing claim is the cessation of the practices and reparation for damage to collective interests¹¹²; however, quantification of L&D remains a future challenge.

Meanwhile, in the jurisdiction of the East African Court of Justice (EACJ), Natural Justice, Centre for Strategic Litigation, the Centre for Food and Adequate Living Rights (CEFROHT) Limited, and (AFIEGO) had filed a case on 6 November 2020 against the governments of Uganda and Tanzania and the Secretary General of the East African Community (EAC), calling for an injunction to stop the EACOP’s construction until the questions of environmental, social justice,

¹⁰⁹ *Friends of the Earth et al. v. Total*, Climate Change Litigation, climatecasechart.com, <https://climatecasechart.com/non-us-case/friends-of-the-earth-et-al-v-total/>.

¹¹⁰ America Hernandez, “French court dismisses Uganda lawsuit against TotalEnergies,” *Reuters* (1 March 2023), <https://www.reuters.com/business/energy/french-court-rejects-lawsuit-brought-against-totalenergies-uganda-pipeline-2023-02-28/>.

¹¹¹ America Hernandez, “TotalEnergies faces second lawsuit over Uganda oil projects,” *Reuters* (27 June 2023), <https://www.reuters.com/business/energy/totalenergies-faces-second-lawsuit-over-uganda-oil-projects-2023-06-27/>.

¹¹² « Le prejudice aux interets collectifs defendus par les demanderesses et les demandes d’injonction. » Assignation Devant le Tribunal Judiciaire de Paris (Petition), para. 321, https://climatecasechart.com/wp-content/uploads/non-us-case-documents/2022/20220302_15967_petition.pdf.

and climate justice concerns raised in the case are heard and determined. On 5 April 2023, the EAC Secretary General, the Republic of Tanzania and Republic of Uganda objected to the petitioners' claims.

The applicants' ongoing case is premised on grounds that the EACOP project contravenes various provisions of the East African Community Treaty, the Protocol for the Sustainable Management of the Lake Victoria Basin, the African Charter on Human and People's Rights, the African Convention on Conservation of Natural Resources, the post-2020 Convention on Biological Diversity and the Paris Climate Accords. Moreover, the applicants contend that the project proponents, including TotalEnergies, CNOOC and the states of Uganda and Tanzania did not conduct effective and meaningful public participation and consultation, nor did they conduct both human rights and climate impact assessments in advance of the projects.

However, on 29 November 2023, EACJ ruled that the preliminary objection on jurisdiction raised by the Tanzanian and Ugandan governments, regarding the date when the case was filed, was out of the required timeframe and, thus, time barred. EACJ found that the applicants should have filed the case as early as 2017, rather than in 2020. Consequently, the court does not have jurisdiction to hear the matter or the merits of the case. The applicants will appeal that decision as they believe that the judgment failed to take into consideration pertinent facts that would have allowed the applicants to have the merits heard before the EACJ.¹¹³

Responsibility of International Organizations

Another case challenging the projects relates to the responsibilities of international organizations,¹¹⁴ a set of norms grounding the HIC-HLRN methodology for documenting cases in the VDB.¹¹⁵ The human rights-based development law organization Inclusive Development International (IDI) has issued a complain to the International Finance Corporation (IFC), which is exposed to the upstream oil projects through its equity investment in the Kenya-based insurance firm Britam Holdings Limited. In May 2021, Britam publicly expressed its intention to provide crucial insurance-underwriting support to the oil refinery and EACOP at Lake Albert, while formal commitments to underwrite the projects may have already been made.

They claim that, given the unmitigable social and environmental risks of the projects that Britam is supporting, the complainants and their communities charge the IFC with failure to conduct adequate due diligence and supervision of its client.¹¹⁶ Much of the ID complaint rests

¹¹³ Natural Justice, AFIEGO, CEFROHT, CSL, "East Africa Court of Justice hands down judgment frustrating civil society's pursuit of justice in EACOP case," *Natural Justice* (29 November 2023), <https://naturaljustice.org/east-africa-court-of-justice-hands-down-judgment-frustrating-civil-societys-pursuit-of-justice-in-eacop-case/>.

¹¹⁴ ILC, Draft articles on the responsibility of international organizations 2011, adopted by the International Law Commission at its sixty-third session, in 2011, and submitted to the General Assembly as a part of the Commission's report covering the work of that session, *Yearbook of the International Law Commission*, Vol. II, Part Two (2011), https://legal.un.org/ilc/texts/instruments/english/draft_articles/9_11_2011.pdf.

¹¹⁵ HIC-HLRN, "How to consider climate change-related cases in the VDB," *op. cit.*

¹¹⁶ IDI, "Tilenga and EACOP land acquisition processes," Complaint concerning IFC investment Britam Holding Plc, Project No 37294, 13 October 2021, pp. 22–28, [EACOP-Complaint-October-2021-redacted.pdf \(inclusivedevelopment.net\)](https://www.inclusivedevelopment.net/wp-content/uploads/2021/10/EACOP-Complaint-October-2021-redacted.pdf), <https://www.inclusivedevelopment.net/wp-content/uploads/2021/10/EACOP-Complaint-October-2021-redacted.pdf>.

on alleged failure to ensure that IFC clients and sub-clients “anticipate, avoid and/or minimize adverse social and economic impacts resulting from land acquisition or restrictions on land use by, *inter alia*, (i) providing replacements or replacement cost compensation for loss of assets, and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of affected communities.”¹¹⁷

Displacement

Many of the refinery-affected households are still suffering the impacts arising from their displacement. According to data gathered by local organizations through interviews with project-affected people, 39.3% of the displaced persons reported a decline in income. Further, many households who received cash compensation were prevented from purchasing land of an equivalent size or quality. Nearly seven years after their displacement, 13.43% of the refinery-affected people who received cash compensation have failed to replace any of the land they lost, while 19.4% have been unable to replace all their land. Reportedly, this was due to under-compensation and the lengthy delay in compensation, during which land values changed. Because households faced land-use restrictions since 2012, preventing them from growing perennial food and cash crops, many households were forced to use the eventual cash compensation to purchase food.¹¹⁸

Deprivation of land

The land acquisition process for the oil refinery is the projects’ only resettlement process that has been fully implemented to date. IDI, among other NGOs, find the projects’ corresponding compensation to be procedurally and materially inadequate. According to International Human Rights Federation (FIDH), “The process of relocation was long and difficult,” and community members “faced infringements on their rights to education, property, land, cultural development, and an adequate standard of living.”¹¹⁹ The vast majority of the 1,220 displaced households in Uganda (about 7,118 individuals)¹²⁰ were compelled to accept cash compensation due to an “intense fear” and skepticism of the resettlement process.¹²¹ Those who selected in-kind compensation reportedly have faced nearly six years of delay, during which they suffered restricted land access. When resettled into new housing, the families had no security of tenure; several of the relocated families now face additional risk of displacement by the feeder pipeline connecting the Tilenga oil field to the refinery.¹²² Moreover, the

¹¹⁷ IFC, “Performance Standards on Environmental and Social Sustainability” (Performance Standard 5), 2012, https://www.ifc.org/wps/wcm/connect/24e6bfc3-5de3-444d-be9b-226188c95454/PS_English_2012_Full-Document.pdf?MOD=AJPERES&CVID=jkV-X6h.

¹¹⁸ *Ibid.*, p. 28, <https://www.afiego.org/download/afiego-research-report-impacts-of-oil-refinery-project-on-the-affected-people/?wpdmdl=2051&refresh=61519e44955381632738884>.

¹¹⁹ FIDH, “New Oil, Same Business? At a Crossroads to Avert Catastrophe in Uganda”, pp. 57–58, https://www.fidh.org/IMG/pdf/fidh_fhri_report_uganda_oil_extraction-comprese.pdf; “Empty Promises Down the Line?” p. 33, <https://oxfamilibrary.openrepository.com/bitstream/handle/10546/621045/rr-empty-promises-down-line-101020-en.pdf?sequence=1&isAllowed=y>.

¹²⁰ Uganda Petroleum Exploration and Development Department, “Resettlement Action Plan,” October 2012, <https://www.afiego.org/download/resettlement-action-plan-for-the-oil-refinery-land-acquisition-project/?wpdmdl=1819&refresh=6151a2e0803381632740064>.

¹²¹ FIDH, *op. cit.*

¹²² *Ibid.*, p. 58.

physically relocated communities report inadequate conditions at the resettlement site, which they describe as “being confined in a squeezed, camp-like setting.”¹²³

The ongoing land acquisition processes for the projects have followed a similar course. Today, tens of thousands of oil-affected people in the Albertine region remain without access to significant portions of their land, unable to grow food for survival or income generation, and prevented from burying their deceased, while awaiting delayed compensation more than two years overdue.¹²⁴

The affected population has been subject also to improper land valuation, acquisition and compensation processes and significant land-use restrictions. According to TotalEnergies, the Tilenga and EACOP projects will require the acquisition of 6,400 hectares of land, upon which the primary residences of 723 households are located.¹⁴⁸ This number significantly downplays the scale of land loss resulting from the interrelated oil projects, including the economic displacement of farming communities. However, roughly 13,000 households across Uganda and Tanzania, accounting for more than 86,000 individuals, have lost or will lose land as a result of the EACOP.

A further 4,865 households, accounting for 31,716 individuals, are directly affected by the Tilenga oilfield. The Kingfisher oilfield will impact 680 households, or roughly 2,949 individuals. In sum, the oilfields and pipeline are expected to directly impact the land of roughly 120,000 individuals.¹²⁵ The land valuation, acquisition, and compensation processes for the oilfields, pipeline and refinery projects have been carried out in a way that has exacerbated, rather than mitigated, negative impacts.

As a result, community members have faced and are currently facing increased impoverishment, livelihood disruption, economic hardship, food insecurity, and other cumulative impacts.¹²⁶ Project-affected people who have sought to challenge insufficient asset valuations have reported ongoing harassment and intimidation from security agents and

¹²³ Interview with complainants in *Ibid.*; AFIEGO, “Assessing the Impacts of the Oil Refinery Land Acquisition and Resettlement Project on the Affected People (2012–2020),” October 2020, <https://www.afiego.org/download/afiego-research-report-impacts-of-oil-refinery-project-on-the-affected-people/?wpdmdl=2051&refresh=61519e44955381632738884>.

¹²⁴ Les Amis de la Terre, “A Nightmare Named Total: An Alarming Rise in Human rights Violations in Uganda and Tanzania” <https://www.amisdelaterre.org/wp-content/uploads/2020/11/a-nightmare-named-total-oct2020-foe-france-survie.pdf>; Tom Ogwang, Frank Vanclay, “Cut-off and forgotten?: Livelihood disruption, social impacts and food insecurity arising from the East African Crude Oil Pipeline”, April 2021, <https://doi.org/10.1016/j.erss.2021.101970>.

¹²⁵ Les Amis de la Terre, “Number of People Affected by the EACOP Project in Uganda and Tanzania”, April 2021, <https://www.amisdelaterre.org/wp-content/uploads/2021/04/20210407-numbers-of-individual-persons-affected-by-eacop.pdf>; Cousins Consulting, “Review of the Current Livelihood Restoration Plan, Final Assessment and Recommendations Report,” Rev4, 27 May 2020, Table 25: Percentage of population impacted per RAP, p. 138, https://totalenergies.com/sites/g/files/nytnzq121/files/documents/2021-03/Tilenga_RAP1_Review_current_livelihood_restoration_plan.pdf; Atacama Consulting, “Resettlement Action Plans (RAPs 2, 3a, 3b, 4 & 5),” September 2020, <https://s3-eu-west-1.amazonaws.com/s3.sourceafrica.net/documents/120861/Tilenga-Oil-Project-RESETTLEMENT-ACTION-PLANS.pdf>; CNOOC, “Environmental and Social Impact Assessment for the Kingfisher Field Development Area, Uganda”, November 2019, <https://www.eia.nl/projectdocuments/00006431.pdf>.

¹²⁶ IDI, Complaint concerning IFC investment Britam Holding Plc, Project No 37294, 13 October 2021, “Tilenga and EACOP land acquisition processes,” pp. 22–28, [EACOP-Complaint-October-2021-redacted.pdf](https://www.inclusivedevelopment.net/wp-content/uploads/2021/10/EACOP-Complaint-October-2021-redacted.pdf) (inclusivedevelopment.net), <https://www.inclusivedevelopment.net/wp-content/uploads/2021/10/EACOP-Complaint-October-2021-redacted.pdf>.

individuals associated with the EACOP and Tilenga projects, including the Resident District Commissioners and District Police Commanders.¹²⁷

Civil and political process rights

Moreover, these serious economic and non-economic impacts on affected people and communities are occurring in an increasingly dangerous environment for human rights defenders. Community and civil society advocates brave enough to speak out, or even conduct research, have faced threats and attacks, including harassment and arbitrary detention for their efforts to challenge oil development in Uganda. Security forces have arrested and detained investigators without charge while conducting interviews with oil-affected communities in Uganda's Buliisa district.¹²⁸ Civil society organizations and journalists working with oil-affected communities have also been subject to harassment and retaliation. The Ugandan government has attempted to close the operations of over 50 environmental and human rights organizations, including those active in challenging the oil and gas projects.¹²⁹

In Tanzania, the security hazard to human rights defenders is so severe that expressing dissent, or indeed filing a complaint to the IFC's Compliance Advisor Ombudsman (CAO), is far too risky.¹³⁰ Affected communities' free and open participation in decision making about the project, informed consent and the avoidance and/or mitigation of its impacts are impossible in this environment. This constitutes a cost that renders both material and intangible losses that elude compensatory-damage calculations.

An Oxfam community-based human rights impact assessment of the EACOP refers to a "generalized concern about the lack of information around issues that really matter to the communities," including in regards to the destruction of graves, cemeteries and other sacred sites.¹³¹ While project sponsors argue that they have developed and publicly disclosed Tilenga, Kingfisher and EACOP Environmental Impact Assessments, Human Rights Impact Assessments,

¹²⁷ "The East African Crude Oil Pipeline: New Risk Developments," *BankTrack* (August 2021), p. 3, <https://www.banktrack.org/download/the-east-african-crude-oil-pipeline-new-risk-developments/210809-risksbanksinvestoreseastafrican-crude-oil-pipeline.pdf>; "CSOs Decry Intimidation of EACOP Affected Persons in Masaka," *Uganda Radio Network* (10 April 2021), <https://ugandaradionetwork.net/story/csos-decry-intimidation-of-eacop-affected-persons-in-masaka>.

¹²⁸ "Uganda: Human Rights Defender Maxwell Atuhura Released on Police Bond But Faces Prosecution for 'Unlawful Assembly'," *Business & Human Rights Resource Center* (27 May 2021), <https://www.business-humanrights.org/en/latest-news/uganda-human-rights-defender-maxwell-atuhura-released-on-police-bond-but-faces-prosecution-for-unlawful-assembly/>.

¹²⁹ AFIEGO, "AFIEGO and partners' response to NGO Bureau Suspension: Gov't is Targeting Critical CSOs", 20 August, 2021, cited in Human Rights Watch, « Travailler sur les questions de pétrole, c'est interdit » https://www.hrw.org/fr/report/2023/11/02/travailler-sur-les-questions-de-petrole-cest-interdit/repression-contre-les#_ftn27; Human Rights Watch, "Ouganda : Répression de voix critiquant le projet d'oléoduc," press release, 2 November 2023, <https://www.hrw.org/fr/news/2023/11/02/ouganda-repression-de-voix-critiquant-le-projet-doleoduc>.

¹³⁰ IDI, *op. cit.*; Frontline Defenders, "Tanzania," undated, <https://www.frontlinedefenders.org/en/location/tanzania>.

¹³¹ "Crude risk: Risks to banks and investors from the East African Crude Oil Pipeline", p. 4, https://www.banktrack.org/download/crude-risk/cruderisk_eacop_briefing_nov2020_1.pdf. "Empty Promises Down the Line?: A Human Rights Impact Assessment of the East African Crude Oil Pipeline," p. 56, <https://oxfamilibrary.openrepository.com/bitstream/handle/10546/621045/rr-empty-promises-down-line-101020-en.pdf?sequence=1&isAllowed=y>.

and Resettlement Action Plans, with strategies to mitigate such risks, petitioners confirm that this information is inaccessible to, or poorly understood by project-affected people. For instance, on 8 March 2021, after significant pressure from local and international civil society, TotalEnergies published a range of assessments and reviews related to the Tilenga and EACOP projects.¹³² However, the corporation kept the documents confidential for years following their completion, and only disclosed them long after key project-related agreements had been signed and sealed. Draft versions of the reports and prompt disclosure of independent assessments were not provided for public comment, nor disclosed for the purposes of community consultation.¹³³

Right to environment

With regard to violations of the human right to a clean, healthy and sustainable environment, poor oil waste disposal and management in Uganda's Albertine Graben has already led to the contamination of soil and two water bodies, impacting agricultural livelihoods.¹³⁴

The IFC's Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing natural resources are fundamental to promoting sustainable development.¹³⁵ The standard applies to critical habitats of high biodiversity value, including those of significant importance to endangered species.¹³⁶

The projects pose immense environmental risks and impacts, including both direct impacts to biodiversity as a result of the project placement and design, as well as indirect risks posed by the threat of oil spills in protected and sensitive areas.¹³⁷ The inherent design and location of the Tilenga, Kingfisher and EACOP projects mean that they will have extensive and irreversible adverse impacts upon critical habitats and protected ecosystems. The projects entail drilling over 130 oil wells into Uganda's largest national park and constructing the world's longest heated crude oil pipeline through numerous protected ecosystems critical to the preservation of endangered species. In the opinion of experts, and the Complainants, the significant biodiversity risks are so inherent to the project designs that they are impossible to adequately mitigate.

The Tilenga and Kingfisher oilfields are located in the Albertine Graben, one of the richest natural habitats in the world. According to the Sensitivity Atlas for the Albertine Graben that

¹³² "Tilenga & EACOP: Two projects rigorously researched and assessed", 8 March 2021, <https://oilinuganda.org/features/environment/tilenga-esia-certificate-csos-want-court-to-strike-out-nemas-evidence/>.

¹³³ World Wildlife Fund, "Tilenga Oil Project: CSOs raise concerns at public hearing organised by NEMA," 27 November 2018, https://wwf.panda.org/wwf_news/?339210/Tilenga-Oil-Project-CSOs-raise-concerns-at-public-hearing-organised-by-NEMA.

¹³⁴ Aaron Gad Orena, "Report pins oil activities for hurting agricultural sector," *The Observer* (20 June 2021), <https://twitter.com/AfiegoUg/status/1406922283554377728/photo/1>; Tom Ogwang, Frank Vanclay, Arjan van den Assem, "Impacts of the oil boom on the lives of people living in the Albertine Graben region of Uganda," *The Extractive Industries and Society*, 5 (2018), pp. 98–103, https://pure.rug.nl/ws/files/59782362/Impacts_of_the_oil_boom_on_the_lives_of_people_living.pdf.

¹³⁵ IFC, *op. cit.*, "Performance Standards on Environmental and Social Sustainability" (Performance Standard 6), para. 1.

¹³⁶ *Ibid.*, paras. 5 and 16.

¹³⁷ MapforEnvironment, "EACOP a spatial risk perspective," 7 April 2021, <https://mapforenvironment.org/story/The-East-African-Crude-Oil-Pipeline-EACOP-a-spatial-risk-perspective/111>.

was produced by Uganda’s National Environment Management Authority, “species biodiversity of the Albertine rift is unparalleled on the African continent.”¹³⁸

At least 13 species “of conservation importance” inhabit the EACOP’s area of influence, including at least 10 plants of conservation importance at risk.¹³⁹ Six of these are on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.¹⁴⁰

In total, nearly 2,000 square kilometers of protected wildlife habitats, including 500 square kilometers of wildlife corridors for the Eastern Chimpanzee and African Elephant—species considered endangered by IUCN, and which have already disappeared in several African countries—are expected to be severely degraded by the construction of the pipeline.¹⁴¹ In Tanzania alone, the pipeline corridor will traverse seven forest reserves, two game reserves, two gamecontrolled areas and one open area that supports wildlife management. The pipeline will impact at least four forest reserves in Uganda, as well as several sacred natural sites, and will cross 32 kilometers of the Wembere Steppe in Tanzania, a Key Biodiversity Area.¹⁴²

Furthermore, the destruction of the few remaining high tropical rainforests such as Bugoma in the Albertine Graben has been linked to oil exploitation efforts in the area. Since oil exploitation efforts commenced, instances of land grabbing have increased, including the seizure of Bugoma forest land to benefit the local sugar industry.¹⁴³ District leaders, local communities and civil society, including the Complainants, attribute the land grabbing and subsequent destruction of Bugoma forest to the land pressures created by oil activities in the region. Moreover, biodiverse forests such as Budongo¹⁴⁴ and Wambabya¹⁴⁵ are also at risk of degradation from the oil projects’ road infrastructure and from the EACOP itself.

The fear associated with the oil project’s negative impact on the tourism, agriculture, fisheries, clean energy and other industries that are the biggest employers of Ugandans has challenged the narrative that the oil sector offers the country important economic and developmental benefits, and instead advocates a cleaner, more inclusive, and more sustainable economic future and development path that does not contribute to climate change.

¹³⁸ The Republic of Uganda, National Environmental Management Authority (NEMA), “Environmental Sensitivity Atlas for the Albertine Graben” (Kampala: NEMA, second edition 2010), https://ug-chein.geo4dev.org/?wpfb_dl=45.

¹³⁹ Total, “Uganda ESIA: EACOP Project Executive Summary,” February 2020, p. 8, https://totalenergies.com/sites/g/files/nytnzq121/files/documents/2021-03/Eacop_esia_executive-summary-Uganda.pdf.

¹⁴⁰ *Ibid.*

¹⁴¹ World Wildlife Fund (WWF) and Civil Society Coalition of Oil and Gas in Uganda (CSCO), “Safeguarding People & Nature in the East African Crude Oil (EACOP) Pipeline Project,” (2017), p. 1, https://media.wwf.no/assets/attachments/99-safeguarding_nature_and_people_oil_and_gas_pipeline_factsheet.pdf.

¹⁴² *Ibid.*, p. 7.

¹⁴³ “A shame for the world’: Uganda’s fragile forest ecosystem destroyed for sugar,” *The Guardian* (18 June 2020), <https://witnessradio.org/a-shame-for-the-world-ugandas-fragile-forest-ecosystem-destroyed-for-sugar-2/>.

¹⁴⁴ NTV Uganda, “UNRA to be conscious of environment, wildlife during construction of oil roads,” 9 May 2021, cited in IDI, *op. cit.*

¹⁴⁵ Netherlands Commission for Environmental Assessment, “Advisory Review of the Environmental and Social Impact Assessment for the East African Crude Oil Pipeline (EACOP),” 27 June 2019, https://www.eia.nl/docs/os/i72/i7228/7228_advisory_report_eacop_uganda_27_june_2019.pdf.

IV. Discrimination/environmental racism

Material discrimination takes many forms. In the context of environmental hazards and climate change, marginalized communities are often forced to live in the most precarious urban habitats available. The VDB and applications of HLRN's Violation Impact-assessment Tool (VIAT) contain numerous cases in which communities subject to discrimination have had no choice but to build their habitats in polluted zones, near toxic industry and waste contamination, or in areas prone to environmental hazards. A case from the VDB in which the VIAT has been applied to quantify impacts is profiled here.

Bainsiria village

Bainsiria village is situated in Bari Block of Jajpur District, 100 kilometers from Bhubaneswar, the capital of the eastern Indian state of Odisha. Of a total population of 4,500 in Bainsiria, 2,500 people belong to scheduled castes (groups subject to social and economic discrimination) who mostly depend on agriculture and daily wage work for their livelihood.

In September 2011, the State of Odisha was badly affected by floods that submerged about 2,600 villages in 19 districts, impacting over 1.1 million people. According to government data, the flooding caused 61,000 people to be evacuated and relocated, more than 10,565 houses were damaged, and 19 people lost their lives. The floods also resulted in the contamination of drinking water sources and destruction of crops and food supplies, which caused hunger and starvation in several districts.

Given the widespread devastation and the absence of a comprehensive human rights impact assessments to adequately assess losses, including of household goods, houses, livestock, crops, and livelihoods, organizations working in Odisha, HLRN felt that its VIAT could be used to assess losses caused by disasters, as well using the method as an eviction impact-assessment (EvIA) tool.

HLRN's India office responded with an intervention that sought to determine the true costs, losses and damage incurred by impoverished victims of the Odisha floods. In the process, the field survey sought ascertain to what extent an *ex gratia* compensation scheme for disaster victims related to the values at stake, given the abysmally low compensation provided by the Government of Odisha to survivors (₹1500, or about €17 to each family). The HLRN intervention also attempted to offer a duly tested assessment methodology and tool to be left behind for use in post-disaster contexts, and to introduce it in policy documents and valuation processes in future.

The survey followed a methodology of purposefully sampling 25 Kandara (scheduled caste) families of a total of 115 Kandara families living in Bainsiria village. That community was selected for the impact-assessment survey, because it was one of the worst affected, given the location of their homes close to the Brahmani River, and because of the community's socially and economically disadvantaged status among the most-marginalized in the state.

HLRN worked with the Centre for the Sustainable use of Natural and Social Resources (CSNR) to adapt the VIAT tool by developing a questionnaire suited for the local context. Three CSNR experts with knowledge of, and access to the village conducted interviews with affected families to help locally adapt the questionnaire, which also consisted of an extensive list of personal and household items that could have been destroyed or lost during the flood. The local experts underwent a detailed orientation and training exercise before they carried out the household surveys. HLRN organized two village meetings before and after the household surveys to explain the purpose and limitations of the study to the affected families.

The questionnaire contained 265 questions that took an average of two hours per household to administer. The entire survey process for 25 families took three days to complete. In order to verify the accuracy of data provided by families during the interviews, the investigators used a time period of three years to check the status of all property and items lost, and also recorded statements of neighbors. They collected and analyzed secondary information from government reports, and other documents on the loss of property during the flood. After the desk study and field survey were complete, the team compiled and analyzed the data to generate the findings.

Findings

Most of the 25 families covered in the survey had thatched houses with mud walls, which were damaged or destroyed by the flood water. Apart from the homes and other elements of habitat built by the community's social production, the survey revealed that families lost over 265 household articles, including gold jewelry; clothing; electrical equipment; agricultural implements; crops; children's educational material; and vital documents such as birth certificates, caste certificates, ration cards, voter-registration cards and other important civic documentation. In the aftermath of the flood, affected families also lost access to subsidized food (ration) under the government's Public Distribution System. Recovery of these documents required further expenditures of cash out of pocket and considerable time.

The HLRN and CSNR study thus revealed that the 25 families lost personal goods and property worth ₹2,278,554 (€34,683) with the average loss per family amounting to ₹91,142 (€1,388). However, the study did not quantify losses such as the housing itself, which constituted a major loss. It also did not factor other non-monetary losses, including loss of workdays, livelihoods, health and education, and psychological trauma. Nonetheless, the total value computed represents an underestimation of the total loss suffered by each flood-affected family.

The compensation paid by the Government of Odisha, to each family was only ₹1,500 (€17); i.e., 0.82% of the average value of household items lost by the families. This calculation does not begin to estimate the loss of housing damaged and destroyed in the disaster. The vast discrepancy shows how inadequate are the state's assessment methodologies, with their false assumptions, and the underscores the need still to develop, adopt and implement a realistic and human rights-based assessment framework for adequate post-disaster response and determining remedies, applying the RRF.

Estimated Costs of Household Items Lost						
No.	Category of items lost	Number of families that lost this item	Highest single family loss for this item (Rs)	Lowest single family loss for this item (Rs)	Total loss of 25 families (Rs)	Average loss per family (Rs)
1.	Agricultural implements	25	37,735	255	105,875	4,235
2.	Livelihood-linked infrastructure	23	52,200	6,500	310,800	13,513
3.	Utility/services	23	49,200	300	277,100	12,048
4.	Utensils/kitchen appliances	24	10,460	585	88,395	3,683
5.	Clothes	25	68,560	1,600	607,700	24,308
6.	Household articles	14	8,280	70	29,650	2,118
7.	Livestock	18	12,500	1,200	118,200	6,567
8.	Food subsidy /ration	23	1,050	18	12,207	531
9.	Crops in field	15	6,868	60	25,859	1,724
10.	Crops after harvest	17	10,739	36	43,762	2,574
11.	Vital documents	11	1,625	25	4,970	452
12.	Educational material	23	6,571	156	60,939	2,650
13.	Electrical equipment	25	20,804	80	204,997	8,200
14.	Jewelry	16	97,200	3,600	388,100	24,256
TOTAL					2,278,554	

In an attempt to be exhaustive, administering the quantification questionnaire took a long time. Some respondents were impatient with the process. As a partial result, the study did not account for non-material losses and long-term impacts. Therefore, the valuation reflects an underestimation. In order to be proportionate to actual costs, losses and damage, compensations should have been much higher, if factors such as immediate and anticipated loss of housing, livelihoods, education, healthcare, psychological trauma and mental anguish were counted.

HLRN and CSNR sent the report of their impact-assessment study to the Odisha Special Relief Commissioner's office. Unfortunately, the authorities offered no visible response, except the usual bureaucratic response: "Thanks. We'll look into the matter."¹⁴⁶

Longer-term impacts and remedies

After being displaced for a month after the flood, all the affected families returned to their original place of habitation. Initially they created temporary make-shift houses, but, with the passage of time, they have rebuilt their houses with the support of the Indira Awas Yojana government housing scheme for rural families below the poverty line and the families' own resources.

Most families have had to struggle hard to repurchase their household articles. The condition of their livelihoods, however, has deteriorated also, as they are dependent on land-based labor;

¹⁴⁶ HLRN-India, "Use of the HLRN "Eviction Impact Assessment" Tool in a Post-disaster Situation," 2012, https://www.hlrn.org/img/documents/Bainsiria%20Flood%20Survey_report_shivani.pdf.

few families are engaged in sharecropping. Unfortunately, they also had to suffer another incident of floods in 2013, and Odisha has suffered severe floods every year since.¹⁴⁷

Since the Bainsiria floods and their quantification efforts, HLRN and CSNR have issued a set of recommendations for the Government of Odisha to:

- Accept the findings of the HLRN and CSNR study assessing the losses of flood-affected families in Odisha, and revisit the compensation provided to them;
- Develop, adopt and apply a human rights-based assessment framework to address post-disaster response and to determine adequate compensation by adopting and adapting the RRF-based VIAT and its quantification methodology;
- Incorporate a human rights approach to post-disaster response and commit to protecting the human rights of all disaster-affected persons, groups and communities.¹⁴⁸

Of course, these remedial dimensions of human rights norms apply in addition to the preventive obligations of the state and its organs, including sub-national governments, to combat discrimination in planning and housing, thus avoiding the spatial segregation and material deprivation of communities such as those marginalized under the enduring—if unconstitutional—caste system. All government spheres need to remedy these underlying root causes of deprivation.

Among the HLRN and CSNR recommendations to civil society are to:

- Lobby all spheres of government to adopt a human rights-based RRF for assessing of losses resulting from natural and human-induced disasters;
- Share the VIAT with government partners and disseminate it widely to the media, CBOs, academic institutions and others interested in developing human rights-based impact assessment tools.¹⁴⁹

V. Governance

The disasters covered here and in the VDB are not wholly natural. Each case, having negative impacts on people and property, results from human factors either bringing it about, or exacerbating effects arising from environmental and climate change-associated hazards and risks. In some cases, both the hazard¹⁵⁰ and the disaster¹⁵¹ are human made. The two cases in this section, from Pakistan and Brazil, involved both natural phenomena (rain) and the disaster (loss and damage to persons and property) that resulted—either directly or indirectly—from

¹⁴⁷ Floodlist, “Odisha,” undated, <https://floodlist.com/tag/odisha>.

¹⁴⁸ See, *Protecting Human Rights in Disaster Response: Guidelines for States and Non-state Actors* (Delhi: Housing and Land Rights Network, 2014), https://www.hlrn.org.in/documents/Protecting_Human_Rights_in_Disaster_Response_HLRN.pdf.

¹⁴⁹ HLRN-India, *op. cit.*

¹⁵⁰ See “Human-made hazard,” in “Terminology Corner,” *Land Times/أحوال الأرض*, Issue 27 (December 2022), <https://landtimes.landpedia.org/termpage.php?newsid=pXFj>.

¹⁵¹ See “Human-made disaster,” in “Terminology Corner,” *Land Times/أحوال الأرض*, Issue 27 (December 2022), <https://landtimes.landpedia.org/termpage.php?newsid=pXFm>.

human action. Hence, the costs, losses and damages found here constitute violations by commission or omission.

Pakistan's superfloods

Pakistan accounts for 0.7% of global carbon emissions,¹⁵² but it is consistently ranked among the top 10 countries most vulnerable to the impacts of resulting climate change.¹⁵³ The country has observed changing weather patterns, including variations in precipitation and temperatures, increased frequency and severity of tropical storms and coastal rains, glacial melt, glacial lake outburst flooding, sea level rise, loss of biodiversity, desertification, and droughts.¹⁵⁴

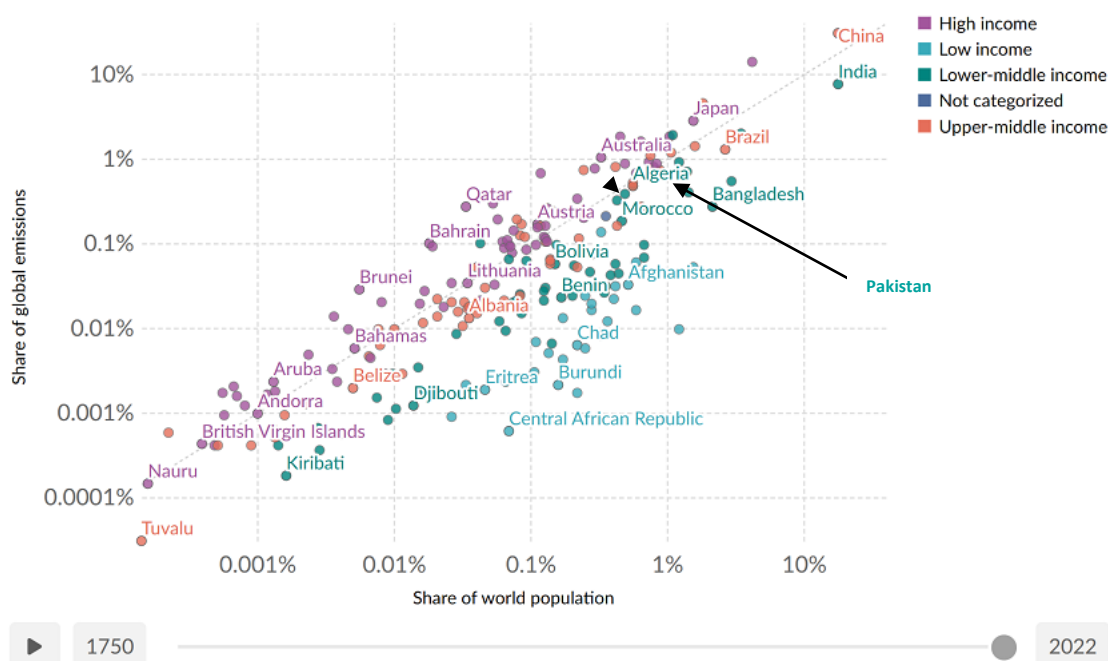


Figure 5: Share of global CO₂ emissions vs. share of population, 2022. This depicts emissions from fossil fuel and industry emissions, but excludes land-use changes contributing the climate change. Source: Our World in Data.

In the southern Baluchistan and Sindh coastal belts, climate impacts have increased in frequency and severity in the form of tropical storms, coastal rains and seawater intrusion. The plains of the northern Punjab and southern Sindh have experience extended and frequent riverine floods and heatwaves, negatively affecting economic and human development.¹⁵⁵

¹⁵² Our World in Data, "Share of global CO₂ emissions," <https://ourworldindata.org/grapher/annual-share-of-co2-emissions?country=~PAK>.

¹⁵³ David Eckstein, Vera Künzel, Laura Schäfer, "Global Climate Risk Index 2021," GermanWatch (2021), https://reliefweb.int/attachments/b6a6928e-214a-3398-bc01-1460f32bb3ad/Global%20Climate%20Risk%20Index%202021_1.pdf (data unavailable for 2002 and 2023).

¹⁵⁴ Government of Pakistan, "Updated Nationally Determined Contributions 2021," (2021), <https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf>.

¹⁵⁵ World Weather Attribution, "Climate Change Likely Increased Extreme Monsoon Rainfall, Flooding Highly Vulnerable Communities in Pakistan," 2022, <https://www.worldweatherattribution.org/wp-content/uploads/Pakistan-floods-scientific-report.pdf>.

The devastating 2010 monsoon floods in Pakistan, affecting some 20 million people, left 1,985 dead and another 2,964 injured.¹⁵⁶ Those floods were an augury of what was surely to come again, and the dire predictions following the devastating 2010 floods came to pass in 2022.

The seasonal monsoon from mid-June till late August had been causing the super floods in Pakistan, which had become more extreme due to climate change. Pakistan had endured a four-fold increase in rainfall over the average monsoon rainfall over the decades. Country wide, the country received more than three times its usual August rainfall in 2022, making it the wettest August in 60 years. The two southern provinces, Sindh and Baluchistan, each experienced their wettest August ever recorded, receiving seven and eight times their usual monthly rainfall, respectively.¹⁵⁷

Most flood-preparedness advice primarily focuses on riverine floods. However, in Pakistan's case, the origins of 2022 flooding included also glacial melting, first in Khyber Pakhtunkhwa (KP), which flowed to the Arabian Sea via the Indus River. The severe flooding in Baluchistan, Sindh and southern Punjab was due to the excess of climate-change-induced rainfall.

Human factors and duty holders

Government critics blame officials for economic mismanagement, overt cronyism and other forms of entrenched corruption, inadequate policies and wrongheaded priorities, all of which exacerbated the losses and suffering of flood-affected citizens. The 2022 floods exposed these endemic shortcomings to further domestic and international scrutiny.

Some inappropriate policy choices are attributable to a long history of poor governance with environmental consequences. For example, the rate of Pakistan's deforestation is the second highest in Asia. The country had 33% forest cover at the time of Partition, in 1947, but deforestation has left only about 4% of the land covered in trees.¹⁵⁸ Within the related commitments of the 2030 Agenda,¹⁵⁹ Pakistan has mounted some efforts at afforestation, while deferring much of that responsibility to the private sector.¹⁶⁰

¹⁵⁶ Oxfam, "Ready or Not: Pakistan's resilience to disasters one year on from the floods," 150 Oxfam Briefing Paper, 26 July 2011, <https://reliefweb.int/attachments/6217edd4-9a4a-3a85-9a91-15d077f4779e/pakistan-ready-or-not.pdf>.

¹⁵⁷ J. S. Nanditha, Anuj P. Kushwaha, Rajesh Singh, Iqura Malik, Hiren Solanki, Dipesh Singh Chupal, Swarup Dangar, Shanti Shwarup Mahto, Vimal Mishra and Urmin Vegad, "The Pakistan flood of August 2022: causes and implications," *Earth and Space Science (ESS) Open Archive, Authorea*, (November 2022), https://d197for5662m48.cloudfront.net/documents/publicationstatus/108422/preprint_pdf/4c7601e73db18783bbc321a47b5b17f3.pdf.

¹⁵⁸ Saman Rizwan, "Problems of Urban Planning in Pakistan," *Center for Strategic and Contemporary Research* (24 August 2021), <https://cscr.pk/explore/themes/politics-governance/problems-of-urban-planning-in-pakistan/>.

¹⁵⁹ Under Sustainable Development Goal (SDG) 15, the Target 1 commitment is "By 2020, [to] ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements. Target 2 commits Pakistan "By 2020, [to] promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally." A/RES/70/1. *op. cit.*

¹⁶⁰ Government of Pakistan, *Pakistan's Implementation of the 2030 Agenda for Sustainable Development Voluntary National Review*, 2019, pp. 48–49, https://hlpf.un.org/sites/default/files/vnrs/2021/233812019_06_15_VNR_2019_Pakistan_latest_version.pdf;

Foreseeability is a major factor in the assignment of responsibility to the state and its organs. The mega-floods of 2010 would be enough to challenge any government and call for emergency preparedness. However, the slow pace of recovery and reconstruction left millions of people unnecessarily exposed to another disaster. Despite ample warnings and disaster-management advice from the UN, World Bank, Asia Development Bank and scientists, Pakistan's institutions such as the National Disaster Management Authority (NDMA) seemed nonetheless to be caught off guard.¹⁶¹

Decades of political instability in Pakistan also have contributed to disaster. A successful April 2022 no-confidence vote in Parliament against former Prime Minister Imran Khan ousted the Pakistan Tehreek-e-Insaf Party, ushering the newly ruling Pakistan Democratic Movement into office only two months before the monsoon hit. The transition may have been a factor in the central government responding only at the end of August, when one-third of the country was already under water¹⁶²

In the subnational sphere, some authorities performed their preventive and mitigation roles better than others.¹⁶³ For example, Pakistan's various spheres of government had been sufficiently advised of the need to stop illegal construction of buildings over any watercourse, riverbed, or ravine (*nullah*) and to regulate the elite Defence Housing Authority settlements within relevant laws, as well as to prevent real estate development on natural drainage channels. Nonetheless, local officials continued to grant building permits for structures in violation of these norms.¹⁶⁴

Before the 2010 floods, housing authorities and slum dwellers alike had built over storm drains, and anti-encroachment measures were initiated in some cities.¹⁶⁵ However, as common across the developing world, the proliferation of slums and informal settlements reflect the level of the housing crisis in the country, as the inaccessible land market left lower-income residents with no other choice but to build outside planning criteria. Authorities and developers encroach

Government of Pakistan, Voluntary National Review: Implementing Best Practices to Build forward better in the Decade of Action, 2022, pp. 51–53, <https://hlpf.un.org/sites/default/files/vnrs/2022/VNR%202022%20Pakistan%20Report.pdf>.

¹⁶¹ "One year on Pakistan still unprepared for monsoon floods," *Oxfam International* (26 July 2011), <https://www.oxfam.org/en/press-releases/one-year-pakistan-still-unprepared-monsoon-floods>; *Ready or Not: Pakistan's resilience to disasters one year on from the floods* (London: Oxfam International, 2011), <https://www.oxfam.org/en/policy/ready-or-not>; *Pakistan Shelter Guide: Design for improved flood resilience in Sindh* (London: Defid, UK Aid, IOM, NDMA, October 2017), <https://www.arup.com/-/media/arup/files/publications/p/pakistan-shelter-guide.pdf>; Maheen Ghous, "Ignoring the advice of urban planners," *Dawn* (16 July 2022), <https://www.dawn.com/news/1699832/ignoring-the-advice-of-urban-planners>.

¹⁶² The Atlantic Council's South Asia Center Pakistan Initiative Director Uzar Younus and economist Ammar Habib Khan put the figure between \$15–20 billion, but expect that figure to rise further as information slowly becomes known. "Floods and Economic Crisis: A saga of Pakistan's insensitivity," *The Siyasat Daily* (12 September 2022), <https://www.siyasat.com/floods-and-economic-crisis-a-saga-of-pakistans-insensitivity-2411234/#:~:text=of%20Pakistan%E2%80%99s%20insensitivity,-Floods%20and%20economic%20crisis%3A%20A%20saga%20of%20Pakistan%E2%80%99s%20insensitivity,-Indo%2DAsian%20News>.

¹⁶³ "Pakistan: Mixed Mitigation Governance Record," in *HLRN News* (27 August 2022), <http://www.hlrn.org/activitydetails.php?title=Pakistan:-Mixed-Mitigation-Governance-Record&id=p21mZQ==#.Y0FJYXZBy70>.

¹⁶⁴ Ghous, *op. cit.*

¹⁶⁵ "Plots for evictees," *Dawn* (4 July 2021), <https://www.dawn.com/news/1633111>.

on those planned common areas for purposes of revenue and resale profit or rental gain. The consequent blocking of storm drains has emerged as a common cause of flooding disaster. Meanwhile, governance systems operate outside preventive norms, remain exclusionary and estranged from the citizen, and the poor make do with available resources.¹⁶⁶

Even when the flooding was imminent, many authorities took no action. For example, the floods started on 23 July 2022, but did not reach Punjab Province until 1 August. That eight-day period would have been time to intervene to minimize the loss of human life. However, the Punjab government is now criticized for ignoring the warnings as the water rushed toward them.¹⁶⁷

Reportedly, the first action of Punjab's chief minister and members of his cabinet was to mount an aerial reconnaissance mission around the eventual disaster zone and convene photo sessions with the affected people.¹⁶⁸ Similar reports from other provinces corroborated this delinquent behavior of regional government officials in Sindh and Baluchistan.¹⁶⁹

Since 2010, the central government reportedly has ignored numerous recommendations from international agencies to invest in flood-resistant housing and construct barriers to contain floodwaters. Local residents across Sindh have blamed government incompetence for breaches in the Left Bank Outfall Drain and other saline water drains.¹⁷⁰ Moreover, \$56.8 million from 2010 relief funds remained unutilized a year later, with aid agencies citing the government's mismanagement of funds as one of the reasons for further fundraising difficulties.

What further distinguishes the 2022 floods from 2010, earning this case a VDB entry, is the neglect of preventive measures in the aftermath of 2010. In the 2010 event, more than 1,600 people died the flood waters that swept away over 400,000 houses throughout the country; some 5,000 villages were inundated and thousands of people stranded, thus, with no hope of relief.¹⁷¹ Authorities' disregard for some 100,00 flood victims in Gilgit Balistan, Aqat Valley, Muzaffargarh, Rajanpur and some parts of the Multan districts in Pakhtoon Kha Province, Indus River plains, KP, Sindh, lower Punjab and parts of Baluchistan subjected them to further peril. At the time of the 2010 disaster, the Asian Human Rights Commission ominously predicted: "The new phase of devastation is waiting to come."¹⁷²

Responsibility runs deep and wide across multiple duty holders. However, any perception of liability for the losses and damage as diffuse or ambiguous does not preclude the inventory of lessons to be learnt.¹⁷³ That debate may continue for some time, whereas millions of victims

¹⁶⁶ Rizwan, *op. cit.*

¹⁶⁷ "Pakistan Floods – Jul 2010" briefing kit, *ReliefWeb* (18 August 2010), http://hln.org/img/violation/Pakistan_Floods_Jul_2010-OCHA-88FJ4Q.pdf.

¹⁶⁸ AHRC, *op. cit.*

¹⁶⁹ Sampath Perera, "Neglected Pakistan flood victims left to survive on their own," *WSWS* (19 October 2011), <https://www.wsws.org/en/articles/2011/10/paki-o19.html>.

¹⁷⁰ *Ibid.*

¹⁷¹ "Neglected Flood Victims," *VDB*, 27 August 2010, <http://hln.org/violation.php?id=p25kZqw=>.

¹⁷² Asian Human Rights Commission, "PAKISTAN: Negligence of the authorities exposes the lives of millions to peril," 11 August 2010, <http://www.humanrights.asia/news/ahrc-news/AHRC-STM-169-2010/>.

¹⁷³ "Floods, govt. inaction," *VDB*, 27 August 2022, <http://hln.org/violation.php?id=p25kZ6U=>.

endure the denial of basic human needs and violations of multiple human rights in the meantime.

Calculating loss & damage

Preceding 2022 was a severe heatwave that was considered a 1-in-1,000-year event, with temperatures continuously above 45°C, resulting in crop losses, power outages, and forest fires.¹⁷⁴ The subsequent monsoon flooding affected 33 million citizens directly, leaving more than 1,300 people dead and washing away 43–45% of cultivated lands, as well as killing 750,000 livestock, among the other untold losses. Punjab alone lost 171,010 houses, 1,480 villages and standing crops of cotton, rice, sugarcane, fodder and various types of grains over two million acres.¹⁷⁵

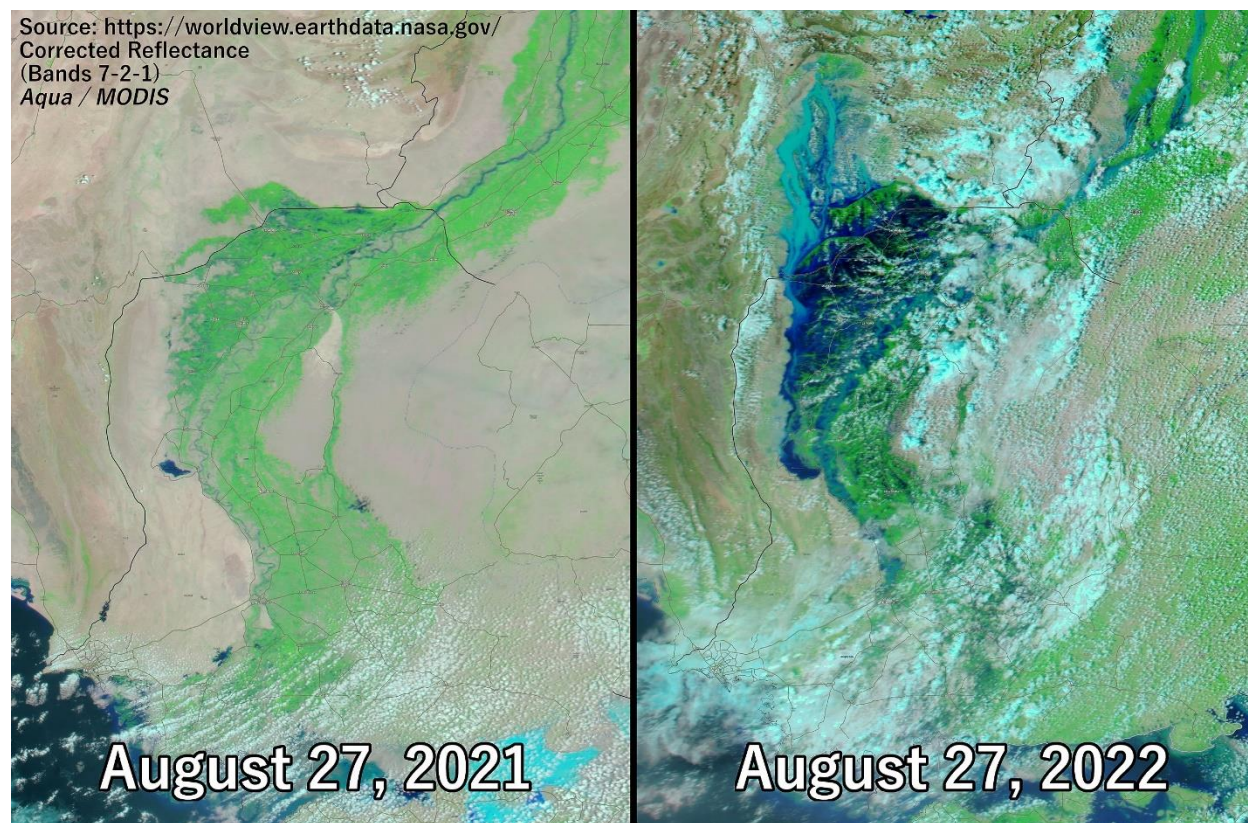


Figure 6: Satellite imagery showing a side-by-side comparison of southern Pakistan on 27 August 2021 (one year before the floods) and 27 August 2022 in Sindh Province. Source: <https://worldview.earthdata.nasa.gov/>.

Flood waters damaged or washed away a total of about two million homes. Flood-related fatalities included 345 women and 641 children, while flood-damaged crops, left seven million women and children without food.¹⁷⁶ Preliminary estimates suggested that the national poverty rate would increase by 3.7–4.0% as a direct consequence of the floods, pushing an additional 8.4–9.1 million

¹⁷⁴ Government of Pakistan, Pakistan Meteorological Department. 2022, "Pakistan's Monthly Climate Summary: August 2022," http://www.pmd.gov.pk/cdpc/Pakistan_Monthly_Climate_Summary_August_2022.pdf.

¹⁷⁵ "Pakistan Floods – Jul 2010" briefing kit, *ReliefWeb* (18 August 2010), http://hlrn.org/img/violation/Pakistan_Floods_Jul_2010-OCHA-88FJ4Q.pdf.

¹⁷⁶ Government of Pakistan, Pakistan Meteorological Department. 2022, "Pakistan's Monthly Climate Summary: August 2022," http://www.pmd.gov.pk/cdpc/Pakistan_Monthly_Climate_Summary_August_2022.pdf.

people into poverty. By October 2022, 94 districts—half of all districts in the country—were declared as ‘calamity stricken.’ The majority were in the provinces of Baluchistan, Sindh, and KP. Out of the 25 poorest districts in the country, 19 were flood stricken.¹⁷⁷

The short-term, immediate relief response targeted 20.6 million people requiring humanitarian assistance of which:

- 14.6 million required emergency food assistance,
- 7 million children required nutrition services,
- 4 million children lacked access to health services,
- 5.5 million people lacked access to safe drinking water,
- 11.5 million people are projected to face crisis and emergency levels of food insecurity by January 2024.¹⁷⁸

Initial cost estimates put the cost of reconstruction and rehabilitation at a range of €20–40 billion.¹⁷⁹ Aid agencies and lending institutions, including the World Bank, each issued its own cost estimates. Those estimates vary, owing to the particular scope and funding needs expressed by each agency. For present purposes, this report relies on the joint estimates of the Government of Pakistan, Asian Development Bank (ADB), European Union (EU), United Nations Development Programme (UNDP) and the World Bank presented in their Main Report of October 2022¹⁸⁰ and a Supplemental Report, in December 2022.¹⁸¹

The Main Report presents the sector-specific findings of the joint Post-Disaster Needs Assessment, based on data collected between September and mid-October 2022. The authors caution that, although all efforts have been made to improve the accuracy of the information collected and analyzed, the assessment was produced in a short timeframe to ensure the relevance of the estimations. Given the ongoing nature of the disaster and lack of access to inundated areas at the time of publication, remotely sourced data was triangulated and validated where possible against ground-based information obtained from the Government of Pakistan, local agencies, and international partners.

¹⁷⁷ Supplemental Report, *op. cit.*, pp. 18–19.

¹⁷⁸ WFP, “Pakistan Floods Situation Report,” September 2023, https://reliefweb.int/attachments/662c1eee-ec03-40b8-8fee-2fc2370af8de/PAK%20External%20Sitrep_Sept%202023_FINAL.pdf.

¹⁷⁹ The Atlantic Council’s South Asia Center Pakistan Initiative Director Uzar Younus and economist Ammar Habib Khan put the figure between \$15–20 billion, but expect that figure to rise further as information slowly becomes known. “Floods and Economic Crisis: A saga of Pakistan’s insensitivity: *The Siyasat Daily* (12 September 2022), <https://www.siyasat.com/floods-and-economic-crisis-a-saga-of-pakistans-insensitivity-2411234/#:~:text=of%20Pakistan%E2%80%99s%20insensitivity,-Floods%20and%20economic%20crisis%3A%20A%20saga%20of%20Pakistan%E2%80%99s%20insensitivity,-Indo%2DAsian%20News>.

¹⁸⁰ Government of Pakistan, Asian Development Bank, European Union, United Nations Development Programme, World Bank, *Pakistan Floods 2022: Post-Disaster Needs Assessment* (Main Report), 28 October 2022, <https://thedocs.worldbank.org/en/doc/4a0114eb7d1cecbbf2f65c5ce0789db-0310012022/original/Pakistan-Floods-2022-PDNA-Main-Report.pdf>.

¹⁸¹ The Government of Pakistan, Asian Development Bank, European Union, United Nations Development Programme, World Bank, “Pakistan Floods 2022: Post-Disaster Needs Assessment - Supplemental Report,” 1 December 2022, <http://documents1.worldbank.org/curated/en/099910001032330716/pdf/P17999109c267907f0aaa70f55da13e2371.pdf>.

This Supplemental Report provides further analysis of the human impact assessment and the full 17-sector assessment reports. The geographic coverage of the assessments was limited to the 94 most calamity-stricken districts as of 11 October 2022 across four provinces (Baluchistan, KP, Punjab and Sindh), in addition to some estimates for special regions and at a cross-provincial level.¹⁸² The data were collected from September to mid-October 2022. The Post-disaster Needs Assessment (PDNA) analysis and recommendations focus on the impact and recovery and reconstruction needs relative to a pre-flood baseline.¹⁸³

However, it must be noted that subsequent valuations will likely follow, as longer-term impacts manifest. As mentioned above, the national and sectoral approaches of most impact assessments identify large-scale costs, losses, damage and related needs without the granular detail necessary to determine impacts in the household and community context. Notably, some assessments admit that further verification is needed at village level, as assessment has been done from a broader Union Council perspective.¹⁸⁴

Longer-term costs, losses and damage

Certain costs, losses and damage could only be determined as they manifest over time. Such would be the case with threatened waterborne diseases such as malaria and dengue fever, especially among the vast number of displaced persons living with poor hygiene and sanitation in temporary accommodation.¹⁸⁵ Notably, Sindh and Baluchistan witnessed an outbreak of diarrhea and cholera, as well as skin and eye infections.¹⁸⁶ Meanwhile, the loss of food crops, estimated at 2.3–3 billion,¹⁸⁷ also compounded the ongoing food shortages due to the war in Ukraine and summer heatwaves in the South Asia region.

Housing losses

Prior to the disaster, typical houses in the rural affected districts consist of one or two rooms, with animal sheds, storage areas, silos for grain, space for cooking, and a latrine and washing area (which are generally without roof), with 1.2192–1.524-meter-high walls. Individual houses or groups of houses were enclosed by boundary walls in many areas for security and privacy.

¹⁸² Supplemental Report, *op. cit.*, p. 3.

¹⁸³ The Government of Pakistan, Asian Development Bank, European Union, United Nations Development Programme, World Bank, “Pakistan Floods 2022: Post-Disaster Needs Assessment - Supplemental Report,” 1 December 2022, <http://documents1.worldbank.org/curated/en/099910001032330716/pdf/P17999109c267907f0aaa70f55da13e2371.pdf>.

¹⁸⁴ IOM and Government of Sindh, “Pakistan Flood Response Baseline Assessment - Sindh Province,” October 2022, p. 2, https://pakistan.iom.int/sites/g/files/tmzbdl1121/files/documents/Baseline%20Assessment%20Flood%20Response_Sindh.pdf.

¹⁸⁵ Sonia Sarkar, “Pakistan floods pose serious health challenges,” *BMJ* (2 September 2022), <https://www.bmj.com/content/bmj/378/bmj.o2141.full.pdf>.

¹⁸⁶ As reported by International Rescue Committee (IRC), Sukaar Foundation and Research and Development Foundation (RDF) in four districts; i.e., Sanghar, Mirpur Khas, Khairpur, and Dadu of Sindh province. IRC, “Early Needs Identification Flood Disaster Sindh, Pakistan,” 6 September 2022, <https://reliefweb.int/report/pakistan/early-needs-identification-flood-disaster-sindh-pakistan>.

¹⁸⁷ Figures provided by Ismail Dilawar and Faseeh Mangi, “Deadly Floods Inundate Farms in Pakistan, Flushing Away Crops,” *Bloomberg* (31 August 2022), <https://www.bloomberg.com/news/articles/2022-08-31/deadly-floods-inundate-farms-in-pakistan-flushing-away-crops?sref=8HTMF4ka>; and Khurshid Ahmed, “Pakistan faces food security threat after floods damage crops worth around \$3 billion,” *Arab News - Pakistan* (3 September 2022), <https://www.arabnews.pk/node/2155431/pakistan>, respectively.

The average size of a housing unit would vary across the country—between an average of 1.5 rooms in rural Sindh and 3.2 rooms in urban KP. The average household size ranges from 5.6 persons in Sindh to 7.8 in KP.

In affected districts, 57% of houses are categorized as *katcha* (non-/semi-permanent, covering a wide range of local or traditional materials such as stone with mud mortar, adobe brick, mud, wood/bamboo framed, and other construction materials); and 43% of homes were categorized as *pucca* houses (conventional permanent construction using burnt brick or concrete block and sand-cement mortar). *Katcha* houses are more prevalent in rural areas, *pucca* houses are more common in urban areas. That proportion varies significantly across and within provinces, from 88% *katcha* prevalence, in affected districts of Baluchistan, to 17%, in affected districts of Punjab.

The number of pre-flood baseline housing stock in the 94 flood-affected districts had approximately 10.3 million housing units. (Of these, 4.5 million units are *pucca* and 5.8 million units are *katcha*.) The numbers have been estimated by applying district-wise inter-censal (1998–2017) housing-growth rates to the housing stock as reported in the 2017 census data.

Some 87–91% of the households in the flood-affected rural areas are owner occupied. Urban areas have a higher share of tenants (18–31%). Urban households have greater access to electricity, piped water and sanitation services, while facilities in rural areas are less developed and less serviced.

Formal housing finance for house purchase or construction accounts for only 5.4% of the private-sector commercial and microfinance banks. Housing finance is found mostly in urban areas and among relatively wealthy households. In the affected districts, houses mostly have been built incrementally, as personal resources allow and through informal savings schemes and loans. Most of the flood-impacted households fit that profile.

Female-headed households are a small share of the owned units in affected provinces, ranging between 4%, in rural Baluchistan, to 11%, in urban Sindh. While house ownership is higher in rural areas, housing with unclear ownership status is also proportionately higher.¹⁸⁸ Many with insecure tenure status experience complex socioeconomic disadvantages and housing vulnerabilities.

Of more than 2 million flood-affected housing units across the country, 780,000 were completely destroyed, and more than 1.2 million were partially damaged, predominantly in rural areas. While only accounting for 57% of the pre-flood housing stock, *katcha* houses made up 78% of the estimated units damaged fully or partially (663,000 and 931,000, respectively). Among the affected provinces, the housing stock in Sindh was the worst affected, with about 1.7 million housing units completely destroyed or partially damaged, forming 28% of the total housing stock in the affected Sindh districts. By contrast, only 10% of the total *pucca* housing

¹⁸⁸ These statistics are based on the 2017 Population Census.

stock (460,000 housing units) suffered flood damage, with about 118,000 being completely destroyed and 342,000 partially damaged.

The direct damage to housing is estimated to total € 5,101,654,698.¹⁸⁹ Indirect losses, including the cost of demolition, salvage and debris management, cost of providing temporary shelter support to affected households, and temporary rental loss (rental of six months) are estimated to be € 580,854,348.¹⁹⁰

Other related costs totaling € 475,825,653 cover: (1) fees for demolition, salvage and debris management, estimated at € 174,438,963; (2) cost of provision of temporary shelter estimated at € 391,802,697; and (3) temporary rental losses, estimated at € 1,004,622,300.

The geographic and sectoral distribution of costs, losses and damage in the housing sector were selected in coordination with the Government of Pakistan and international partners based on areas and sectors that were most impacted. This selective process does not suggest that other areas or sectors were unaffected by the flooding.¹⁹¹

Non-economic and non-material losses

In addition to the health issues mentioned above, many intangible losses and costs also figure in the longer-term impacts, including restitution costs. The valuations of damage to culture and heritage include: PKR 1.3 billion (€5,571,087) to PKR 1.4 billion (€6,119,063). Early estimates focused on at least 149 sites, including two World Heritage Sites in Sindh that underwent partial-but-considerable damage across the assessed regions. These comprised numerous Buddhist stupas, Hindu temples, and tombs of pre- and post-Islamic dynasties, including religious sites in active use, including mosques, shrines, and mausoleums (*dargahs*).

While the estimates focus on built heritage, those are in danger of further deterioration as stagnant floodwater in some areas is affecting foundational stability and structural integrity. These values have long-term implications, due to cumulative effects over time, deterioration and damage to the sites would negatively affect visitor numbers and revenue from ticket sales, and indirect earnings for the food, hospitality, and tourism sectors, which would be subject to additional calculations.

Cultural sites are almost always accompanied by intangible heritage and inestimable value in the communities that live around them. They form not only the foundation of social systems, but also support livelihoods. Recovery and reconstruction needs have been assessed at PKR 1.8 billion (€7,762,991).¹⁹²

¹⁸⁹ The Supplemental Report produced a slightly revised estimate of total direct housing damage at US\$5,454 million, with values disaggregated as completely destroyed houses estimated at US\$3,052 million, partially damaged houses at US\$1,490 million, and household assets, appliances, and fixtures at US\$912 million.

¹⁹⁰ US\$1 = PKR 214.8.

¹⁹¹ Such as health, education, industry, environmental assets.

¹⁹² Main report, p. 53.

However, damaged heritage sites, loss of income, displacement, and possible migration to urban centers will continue to result in heavy, often irreparable losses to the tangible and intangible cultural heritage, including indigenous lands, whose loss affects such intangible values as identity, cultural endowment and deprivation of the human right to participate in culture.

Given the concentration of all impact assessments on material and economic costs, losses and damage, a significant portion of values at stake, or the topics of general qualitative descriptions, not subject to quantification with a view to restitution within the RRF remain overlooked.

The Petrópolis example

Disasters related to landslides are not a recent phenomenon in Brazil.¹⁹³ In recent years, landslides have increased significantly in magnitude, frequency and extent,¹⁹⁴ creating ever-greater impacts on communities.¹⁹⁵

Illustrating the frequency of such events in Brazil, official records from 1991 to 2012 indicate that 699 landslide disasters occurred in 388 municipalities, causing 535 deaths and affecting approximately five million people. However, those figures are grossly understated, as many such disasters have been incorrectly attributed instead to flood, flash flood or other events.

One example of this inconsistency is the January 2011 disaster in the mountain region of Rio de Janeiro State, which involved several types of mass movements of rocks and soil that left 912 people dead and more than 45,000 displaced and homeless,¹⁹⁶ none of which were documented in official landslide statistics. Even with these inconsistencies, however, landslide disasters remain the deadliest socio-environmental disasters in Brazil.¹⁹⁷

Almost 3,000 feet above sea level, Brazil's historic capital city Petrópolis now has a population of around 300,000. It is an important tourist destination in the region, although never having recovered its industrial status lost in the 1980s economic crisis. In February 2022, a rain-fed

¹⁹³ The Emergency Events Database - Centre for Research on the Epidemiology of Disasters (CRED), (2017)

¹⁹⁴ Universidade Federal de Santa Catarina (UFSC), Centro Universitário de Estudos e Pesquisas sobre Desastres (CEPED), *Atlas Brasileiro de Desastres Naturais– 1991 a 2012* (Florianópolis: CEPED, UFSC, 2013), <https://sosgisbr.files.wordpress.com/2018/02/brasil.pdf>.

¹⁹⁵ Marcos Barreto de Mendonca, Fernanda Teles Gullo, "Landslide risk perception survey in Angra dos Reis (Rio de Janeiro, southeastern Brazil: A contribution to support planning of non structural measures," *Land Use Policy*, Vol. 91 (February 2020), <https://www.sciencedirect.com/science/article/abs/pii/S0264837719301978>; Fuchu Dai, C.F Lee b, Y.Y Ngai, "Landslide risk assessment and management: an overview," *Engineering Geology*, Vol. 64, Issue 1 (April 2002), pp. 65–87, <https://www.sciencedirect.com/science/article/abs/pii/S001379520100093X>.

¹⁹⁶ Ana Luiza Coelho Netto, André de Souza Avelar, Anderson Mululo Sato, Manoel do Couto Fernandes, Rogério Ribeiro de Oliveira, Rodrigo Vinagre, Leonardo Barbosa, Pedro Henrique Lima and Rodrigo Vinagre, Leonardo Barbosa, Pedro Henrique Lima and Willy Alvarenga Lacerda, "Landslide susceptibility and risk zoning at Angra dos Reis, Rio de Janeiro State, Southeast Brazil: a qualitative approach at 1:5000 scale," in Willy Alvarenga Lacerda, Ennio Marques Palmeira, Ana Luiza Coelho Netto, Mauricio Ehrlich, eds., *Extreme rainfall induced landslides: an international perspective*, Vol. 2 (São Paulo: Oficina de Textos, 2014), p. 262–96, https://www.researchgate.net/publication/265905984_Extreme_Rainfall_Induced_Landslides_an_International_Perspective_National_Science_and_Technology_Institute_for_Hillslope_and_Plain_System_Rehabilitation_International_Workshop_on_Extreme_Rainfall_Indu.

¹⁹⁷ Barreto and Geles, *op. cit.*, p. 65.

flooding disaster echoed the events 11 years before, when a similar downpour triggered massive landslides, killing almost 1,000 people in the region.

On 15 February, an entire month of expected rain fell in just three hours, and the deluge hit a very specific part of town: The precarious Alto da Serra community. Massive mudslides cascaded down the steep slopes, quickly destroying over 100 homes and overflowing the city's historical center. Many in its path were trapped; 300 persons lost their lives.¹⁹⁸

On that day, 259 mm of accumulated rain were recorded in a mere six-hour interval, causing widespread landslides and flooding in the affected neighborhoods (Figure 6). According to information obtained from a rain gauge located in the São Sebastião neighborhood, the rain reached a maximum intensity of 103.4 mm/h. The most representative and destructive mass movement occurred in Alto da Serra, more specifically in the location popularly known as Morro da Oficina. The slide began in the upper third of the slope, where a shallow layer of residual soil on the bedrock slid to inundate some 90 residences in Servidão Frei Leão and Rua dos Ferroviários.

The community known as Vila Felipe is located in the Chácara Flora neighborhood. That community was one of the hardest hit by the rains. Especially on Rua Jacinto Rabello and in the easements João Rodrigues Batista, Giovanni dos Santos and João Bonifácio Pacheco, where several large landslides converged on a thalweg and hit the streets Paulino Guimarães and Peroni Américo.

¹⁹⁸ "Petrópolis Landslide," VDB, 18 February 2022, [http://hlrn.org/violation.php?id=p21taa0=.](http://hlrn.org/violation.php?id=p21taa0=)

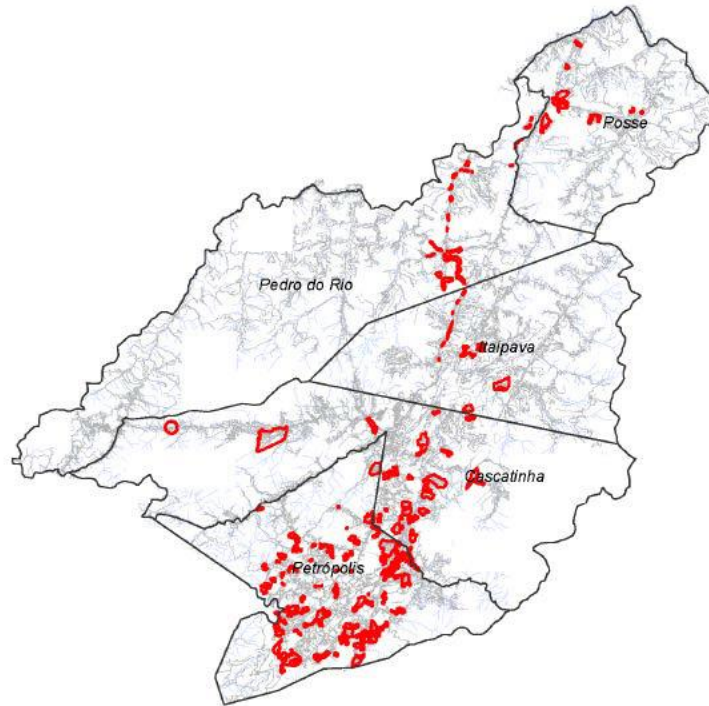


Figure 7: Location of precarious settlements surveyed by Plano Local de Habitação de Interesse Social (PLHIS) in the municipality of Petrópolis. Source: Report of the Local Social Housing Plan.

In the region, 575 incidents were recorded, culminating in a total of 517 closures. The Secretariat of the Municipality of Petrópolis estimated that around 80 properties have been partially or completely destroyed in Chácara Flora community, and that another 100 properties were affected by landslides.

Human factors and duty holders

However, the material and human toll of the disaster could have been smaller, were it not for human factors. The people paying the heaviest price of inadequate governance were—and remain—among the poorest and most-vulnerable populations, which makes their recovery even more difficult.

At its base, the city's historical formation was problematic. During the colonial period, settlers built on the banks of the rivers, maintaining the European pattern of spanning water courses with bridges. With time, the growing population began to occupy the slopes, and the population tripled from the 1950s to 2010.

More recently, disaster-prevention measures included laws amended to establish proactive—not just reactive—environmental management systems. This preventive governance made Petrópolis a model city of preventive action against just such tragedies. The Strengthening National Strategy of Integrated Natural Disaster Risk Management (GIDES) project there

involved intense training of local civil defenses by Japanese technicians specializing in disasters, and even earned Petrópolis a UN prize for disaster reduction in 2017.¹⁹⁹

However, the project was terminated in 2018 due to lack of interest on the part of Brazil's new Jair Bolsonaro government to renew it when coming to office in 2019. Also, the same administration's dismantling of the Ministry of Cities, which centralized prevention measures, had diminished cooperation between and among local governments. Petrópolis was left to its own devices.



Figure 8: Landslide in Alto da Serra, Petrópolis, where 300 died. Source: National Geographic.

Among the main actions of the Brazilian Civil Defense System has been to map the risks related to landslides and implement nonstructural measures and early warning systems. However, civil-defense services deteriorated also amid Bolsonaro-era underfunding.

Nonetheless, largely because of information from academia, public bodies have had the scientific information to make preventive decisions, such as removing people from risk areas during the rains. Citizens have learned, however, that this information is useless, if not heeded

¹⁹⁹ United Nations Office of Disaster Risk Reduction (UNDRR), "UN Sasakawa Award honours efforts to curb disaster deaths," 25 May 2017, <https://www.undrr.org/news/un-sasakawa-award-honours-efforts-curb-disaster-deaths>.

by public managers. Ultimately, firefighters and the State of Rio de Janeiro and Petrópolis city Civil Defense performed heroically to help the victims, while administrators continued to blame the rain and the victims of precarious housing.²⁰⁰

Between 1991 and 2021, Petrópolis endured 32 environmental tragedies and suffered almost R\$1 billion (€188 million) in damage. The most severe rains were in January 2011, causing 68 deaths; in December 2011, floods took 38 victims and, in April 2013, 34 died. Those disaster displaced or left homeless 20,661 persons. During that 30-year period, around half a million people were affected in some way, with 187 deaths.²⁰¹ The early 2022 landslide killed 242 citizens, surpassing the total of the past three decades.



Figure 9: CEMADEN monitoring center at INPE. Source: Movimento dos Atingidos por Barragens.

Loss and damages

In recent decades, Brazil has greatly improved its technological monitoring and response to natural hazards. Brazil's Center for Monitoring of, and Alerting to Natural Disasters (CEMADEN) (Centro Nacional de Monitoramento e Alertas de Desastres Naturais) has operated uninterruptedly, 24 hours a day, since 2011, at the National Institute for Space Research (INPE) to issue alerts of natural disasters. The data made available by Centro Universitário de Estudos e Pesquisas sobre Desastres (CEPED) show the brutal impact that the lack of preventive actions

²⁰⁰ Eliane Da Fonseca Daré, "Petrópolis: não foi um desastre natural!," *Jornal de Unicampo* (22 February 2022), <https://www.unicamp.br/unicamp/ju/noticias/2022/02/22/petropolis-nao-foi-um-desastre-natural>.

²⁰¹ Universidade Federal de Santa Catarina (UFSC), Centro Universitário de Estudos e Pesquisas sobre Desastres (CEPED), *Atlas Brasileiro de Desastres Naturais— 1991 a 2012* (Florianópolis: CEPED, UFSC, 2013), <https://sosgisbr.files.wordpress.com/2018/02/brasil.pdf>.

has wrought. The material damage caused by the rain totaled R\$ 985,475,748.64 (€138,555,698).²⁰² After gathering all records, a data processing process was developed, divided into three main stages: (1) checking repeated occurrences, (2) calculating extreme values and (3) analysis grouped by mesoregion.²⁰³

Most of this damage was to housing. According to the CEPED, 1,642 houses were destroyed during the period and 3,724 damaged. Altogether, these 5,366 housing units represent a loss of R\$653 million (€121,628,433) in the municipality.²⁰⁴

Public costs form another category of loss. In the 1991–2021 period, the city also had 161 public infrastructure works destroyed or damaged, at a loss of R\$292.6 million (€54.5 million); 210 public community facilities (R\$32.9 million); 21 teaching units totaling R\$2.7 million (€6.128 million); and 10 health facilities worth R\$4 million (€745,044). The losses to the public-private enterprises totaled R\$ 715,706,362.61 (€133,308,183).

The agricultural sector suffered losses of R\$35.5 million (€6,612,266), livestock of R\$4.1 million (€763,670), industry of R\$17.4 million (€3,240,941), with services losing R\$498.8 million (€92,906,987), and a total of almost R\$556 million (€103,561,116) in the private sector.

In the public service sector, losses amounted to R\$3.8 million (€707,792) in medical assistance and health care, R\$6 million (€1,117,566) in water supply, R\$2.7 million (€502,905) to sanitation systems, and costing R\$ 10.8 million (€2,011,619) for urban cleaning and garbage collection. Loss and damage to electricity distribution totaled R\$5.7 million (€1,061,688), telecommunication losing R\$3.2 million (€596,035), R\$120 million (€22,351,320) in transport, and R\$7.3 (€1,359,705) to education, totaling around R\$160 million (€29,801,760).

One estimate of R\$665 million (€123,863,565) of loss from direct impacts alone is equivalent to 2% of the municipality's Gross Domestic Product (GDP) for 2022.²⁰⁵ However, no assessment has quantified the loss in the considerable Petrópolis historical patrimony.²⁰⁶

²⁰² The CEPED Brazilian Disaster Atlas figures are from the year 1995, corrected to 2021 values. The euro equivalents are calculated at the rate of €0.18626 for R\$1, provided by Oanda (30 December 2023).

²⁰³ Rômulo Barroso, "Petrópolis teve quase R\$ 1 bilhão de danos com tragédias naturais em 30 anos," *O Diário de Petrópolis*, with information from Agência Brasil (5 April 2023), <https://www.diariodepetropolis.com.br/integra/petropolis-teve-quase-r-1-bilhao-de-danos-com-tragedias-naturais-em-30-anos-235082>. The data analysis process is complex and its methodology demonstrates how laborious it is to consolidate the data into a single format for processing. These challenges are exacerbated by registration protocols that have changed over time, variation in the disaster classification system, and repetition of occurrences such as drought and drought, among others.

²⁰⁴ CEPED, *op. cit.*

²⁰⁵ Stéfano Salles, "Petrópolis perdeu pelo menos R\$ 665 milhões no PIB com tragédia, diz Firjan," *CNN Brasil* (21 February 2022), <https://www.cnnbrasil.com.br/economia/petropolis-perdeu-pelo-menos-r-665-milhoes-no-pib-com-tragedia-diz-firjan/>.

²⁰⁶ "Patrimônio histórico sofre danos em Petrópolis," *DW* (18 February 2022) <https://www.dw.com/pt-br/patrim%C3%B4nio-hist%C3%B3rico-sofre-danos-em-petr%C3%B3polis/a-60831829>.

Preventive measures

Across the state, there were 1,342 disasters from 1991 to 2021, almost causing 1,426 deaths, affecting 5.84 million people, leaving more than 530 thousand homeless/homeless and causing material damage of R\$15.47 billion (€2,881,458) and losses of R\$7.49 billion (€1,395,095).

Across Brazil, during the 1991–2021 period, 57,581 disasters took place, with 4,584 deaths, and more than 225.34 million people affected in some way, 8.31 million of whom were rendered homeless. Material damage amounted to R\$ 114.21 billion (€21,272,868,810), with losses totaling R\$ 423 .05 billion (€78,797,716,050).

Despite these available data on the pattern and consequences of environmental hazards in the era of climate change, few preventive measures were taken. A year after the disaster, no housing units were provided to the victim families in the community where four thousand families survive on social assistance, and the reconstruction and prevention works in the major areas affected have not yet started and remain at risk. What is missing also is greater integration among the municipality, state government and federal government, which deteriorated under the Bolsonaro Administration.

What has progressed has been the consolidation of community civil defense centers. These serve in responding to any heavy rain or other calamity that may arise, but do not solve the lack of adequate housing and thousands of families living at risk.

After Cláudio Castro was sworn in as Acting Governor of Rio de Janeiro State, his government cut off some 400 families from social assistance. Although the Public Defender's Office, Public Prosecutor's Office and Petrópolis Municipal Assistance Secretariat worked hard to reverse this negligence by proving that most of these families were entitled, 106 families were still left behind. Moreover, families of civil servants, who may earn up to five minimum wages, are typically burdened by debt. Many lost everything in the tragedy and still need to service their debts while rebuilding their lives and housing, but the state government treats them as if committing fraud simply for claiming their entitlement, despite complying with federal criteria. The municipality of Petrópolis went to court to reverse the Castro policy, but the federal state is not fulfilling its obligation to the citizens in Petrópolis.²⁰⁷

A comparison with past disasters, especially the one that occurred in 1988, previously considered the most devastating, reveals that, despite attempts to resolve the housing problem, the destructive effects resulting from extreme weather events show an evident upward trend. The growth of the city and the evolution of irregular occupation, reaching areas of talus deposits, thalwegs and very steep slopes, amplifies the damage and losses associated

²⁰⁷ João Pedro Soares do Rio, "Um ano após tragédia de Petrópolis, risco continua," *Deutsche Welle* (15 February 2023), <https://www.dw.com/pt-br/um-ano-ap%C3%B3s-trag%C3%A9dia-de-petr%C3%B3polis-risco-continua/a-64708203>; "Um ano depois, Petrópolis ainda se recupera da maior tragédia da cidade," *GZH Geral* (15 February 2023), <https://gauchazh.clicrbs.com.br/geral/noticia/2023/02/um-ano-depois-petropolis-ainda-se-recupera-da-maior-tragedia-da-cidade-cle5ptv7q003z013qwa17sit3.html>.

with disasters. More than a decade after the disastrous landslide of 2011, Petrópolis still does not have a Natural Disaster Plan.²⁰⁸ At this writing, a new plan remains under debate.²⁰⁹

It is concluded, therefore, that there is no way to dissociate the discussion on disaster prevention from the city's housing policy. Even though risk mapping has evolved in recent decades in the city, it is observed that the process is still far from being efficient and resulting in effective disaster reduction measures. These are urgent and necessary to improve governance and the city's housing and urbanization policies, aiming to reduce not only the susceptibility to the occurrence of mass movements but also the vulnerability of the population at risk.²¹⁰

VI. Extractivism / Megaprojects

Keystone spills

This combination of categories finds extraction above and below ground, primarily to extract fossil fuels and exploitation of lands and other resources. In addition, the extensive network of pipelines across the North American Continent constitutes a series of megaprojects to provide the petroleum distribution infrastructure. The multiple consequences for the environment combine with associated effects of human rights to adequate housing and land, water and a clean, healthy and sustainable environment. In 2019, the Keystone Pipeline leaked 2,214,465



Figure 10: (L) The Keystone XL oil pipeline crossing North Dakota. Source: oilprice.com; (R): Keystone XL route of heavy crude oil piped from the Canada's tar sands region to Nebraska, whence it is to reach Illinois and Gulf Coast refineries. Source: TC Energy.

liters of shale oil extracted from Alberta, Canada onto 19,426 m² of the plains in northeastern North Dakota, USA, destroying lands and water resources. (The pipeline owners originally had underestimated the spill at about 795,000 liters).²¹¹

²⁰⁸ "Mais de uma década após catástrofe de 2011 Petrópolis não criou um plano de emergência para desastres naturais," (28 April 2022), <https://mab.org.br/2022/04/28/mais-de-uma-decada-apos-catastrofe-de-2011-petropolis-nao-criou-um-plano-de-emergencia-para-desastres-naturais/>.

²⁰⁹ Patricia Lima, "Autoridades debatem medidas de prevenção contra desastres envolvendo o Rio Quitandinha, em Petrópolis," *Diário do Rio* (9 December 2023), https://diariodorio.com/autoridades-debates-medidas-de-prevencao-contra-desastres-envolvendo-o-rio-quitandinha-em-petropolis/#google_vignette.

²¹⁰ Larissa Mozer Blaudt, Thomas Wünsch Alvarenga, Yuri Garin, "Desastre o corrido em Petrópolis No Verão de 2022: Aspectos Gerais e Dados da Defesa Civil," *Revista Geociências*, Vol. 41, No. 4, (2023), pp. 59–71, <https://www.periodicos.rc.biblioteca.unesp.br/index.php/geociencias/article/download/17210/12759/>.

²¹¹ "Keystone Leak," *VDB*, 30 October 2019, <http://hlrn.org/violation.php?id=p21pa6o=#.Yz7SR3ZBy70>.

The responsible parties are Keystone Pipeline System, commissioned in 2010 and owned by TC Energy and, as of 31 March 2020, the Government of Alberta. Because of its real and potential harm to the environment and Indigenous People, the US Barack Obama Administration rejected the pipeline project in 2015,²¹² but President Donald Trump issued a federal permit for the project's expansion in 2017.²¹³

In that very year, the pipeline leaked an estimated 1.5 million liters of oil onto northeastern South Dakota farmland. That leak was the seventh-largest onshore oil or petroleum product spill since 2010.

North Dakota's biggest spill, and one of the largest onshore spills in U.S. history, came in 2013, when the Tesoro Pipeline dumped 3.1 million liters in the northwestern part of the state. In that case, the company spent five years and nearly € 91,329,300 cleaning it up.

Despite a history of regulator warnings to prevent corrosion, the Keystone Pipeline failed in December 2022, near Washington, Kansas, not far from the Nebraska border. It was the largest spill since the pipeline began operations about ten years before. In its history, the pipeline has spilled more than 26,000 barrels of oil (4,133,669.7 liters), including the 2022 spill, which was larger than all its others combined. Oil gushing onto farmland flowed into Mill Creek, turning the water black.

After more than 20 spills, the crude oil pipeline's Canadian owner, TC Energy, has paid just over \$300,000 in fines, which amounts to only 0.2% of the more than € 101,375,523 in property damage it has caused. That doesn't include the damage from its latest spill, which has yet to be totaled.²¹⁴

The section of the Keystone pipeline running from Steele City, Nebraska, to Patoka, Illinois, began operations in the summer of 2010, but it did not install corrosion protection for more than two years. And what was installed was not properly designed. In 2012, the pipeline's operator conducted an inspection and found that four spots along the pipeline had experienced 61%–97% metal loss. One area had a wall thickness of less than 1.6256 cm.

At the same time, Keyston Pipeline System (KPS) failed to correct deficiencies in its corrosion control for years, including 56 deficiencies along the pipeline from Nebraska to Illinois and six between Nebraska and Oklahoma. The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration levied a fine of \$135,400 (€123,660).

²¹² Larisa Epatko, "President Obama rejects Keystone XL pipeline project," *PBS Newshour* (8 November 2015), <https://www.pbs.org/newshour/world/president-obama-statement-at-white-house>.

²¹³ Courtney Norris, "Trump signs order to advance Keystone XL and Dakota pipelines," *PBS Newshour* (24 January 2017), <https://www.pbs.org/newshour/politics/trump-signs-order-advance-keystone-xl-dakota-pipelines>.

²¹⁴ Allison Kite, "Keystone Pipeline has history of spills, warnings and fines. Kansas spill is largest yet," *Kansas Reflector* (13 December 2022), <https://kansasreflector.com/2022/12/13/keystone-pipeline-has-history-of-spills-warnings-and-fines-kansas-spill-is-largest-yet/>.

In 2016, KPS failed to coat the pipeline to prevent atmospheric corrosion, which was a violation of its own procedures. Earlier this year, the federal government warned that shutdown devices along the Keystone pipeline aren't properly labeled, and an employee couldn't identify the device during an inspection. Some of the federal government's warnings predicted later spills.

A 2019 spill in Niagara, North Dakota, was attributed to a manufacturing problem that eventually led the joint to crack. As a result, 4,500 barrels of oil (715,442.8 liters) caused property damage totaling more than \$39 million (€35,618,427). Another material failure caused by construction or installation led to a spill of almost 6,600 barrels in South Dakota in 2017, causing \$44.8 million (€41 million) in damage.

It's unclear the total damage caused by Keystone's spill in Kansas, but farmers have lost pasture temporarily to the oil spill. Their losses remain to be calculated and remedied.

Kansas State Rep. Lisa Moser said on Facebook that five landowners were directly affected and nine more have staging areas on their properties. She said all 14 landowners are being paid as they are directly or indirectly being affected by the spill.²¹⁵

Corrosion caused the Keystone pipeline to spill 442 barrels of crude oil at a facility in Beaumont, Texas, in 2020. TC Energy explained to the federal government that it had been focused on mitigating corrosion along the main pipeline, not the delivery facility in Beaumont.

While most of Keystone's spills have been attributed to mechanical or equipment failures, climate changes having an increasingly adverse impact on the health and well-being of people, particularly populations that are already vulnerable. Climate change exposes more people in more places to extreme weather-related events like heat waves, floods, droughts, wildfires and heavy rainfalls. These events cause economic and personal stress to victims, in addition to the financial costs to repair any damages, and the resulting forced relocations of households and disruptions to businesses. Increased stress may exacerbate underlying medical conditions and lead to adverse mental health effects.²¹⁶

While several different sources of pipeline accident data support the pipeline incident analysis, each accident reported to the US Pipeline and Hazardous Materials Safety Administration, as required by regulations,²¹⁷ includes events involving a pipeline that result in any of:

- Explosion or fire not intentionally set by operator;
- Release of five gallons or more;
- Death of any person;

²¹⁵ Celia Llopis-Jepsen, "The Keystone operator must repay some — not all — of the tax dollars spent on its Kansas oil spill," Kansas Reflector (13 December 2022), <https://kansasreflector.com/2022/12/13/keystone-pipeline-has-history-of-spills-warnings-and-fines-kansas-spill-is-largest-yet/>.

²¹⁶ John M. Balbus, George Luber and Kristie L. Ebi, *Fourth National Climate Assessment*, Chapter 14: Human Health (Washington: U.S. Global Change Research Program (USGCRP), 2018), <https://nca2018.globalchange.gov/chapter/14/>.

²¹⁷ United States Government, Code of Federal Regulation, Part 195—Transportation of Hazardous Liquids by Pipeline, 27 July 1981, <https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-D/part-195>.

- Personal injury necessitating hospitalization; and/or
- Estimated property damage, including cost of cleanup, the value of lost product and damage to property of the operator or others, or both, exceeding \$50,000.²¹⁸

However, the quantification of resulting impacts for remedy and reparation to affected parties, including human rights violations, is not required under the current regulations. In the case of the Keystone Pipeline’s December 2022 spill at Mill Creek, Kansas, The US Environmental Protection Agency (EPA) found that the Kansas Department of Health and Environment may require TC Energy to perform work, but “that is beyond EPA’s Clean Water Act authority.”²¹⁹ The composite costs, losses and damage from such environmental hazards and human-caused disasters remain to be quantified.



Figure 11: Crude oil cleanup of Mill Creek currently overseen by EPA. Source: EPA.

VII. Urbanization

All stages of urbanization, including housing construction, have environmental impacts. These processes consume resources (land, water, energy and building materials) and produce greenhouse gas

²¹⁸ US Department of State, “Draft Supplemental Environmental Impact Statement for the Keystone XL Project,” October 2019, p. 5-5, https://www.state.gov/wp-content/uploads/2019/10/KeystoneXL-Draft-SEIS_Oct-2019.pdf.

²¹⁹ Celia Llopis-Jepsen, “The Keystone operator must repay some — not all — of the tax dollars spent on its Kansas oil spill,” *KCUR* (13 January 2023), <https://www.kcur.org/news/2023-01-13/the-keystone-operator-must-repay-some-not-all-of-the-tax-dollars-spent-on-its-kansas-oil-spill>.

emissions.²²⁰ In 2020, the use and construction of buildings accounted for at least 37% of energy-related carbon dioxide emissions.²²¹ In the same year, construction emissions were responsible for 10% of total global energy-related carbon dioxide emissions.⁷⁹ Materials such as steel, cement bricks and non-certified wood have a large carbon footprint. Cement production is responsible for approximately 7% of global greenhouse gas emissions and steel is responsible for approximately 7–9% cent of such emissions.²²²

These figures are distinct from the effects from *how* urbanization is carried out across the planet. The lessons and costs arising from these human activities point to the need for fundamental change in the means and materials used to adequately house people in a human rights habitat. Some of these lessons are highlighted in the following example.

Bengaluru Flooding

Bengaluru (formerly, city of Bangalore) also underwent devastating floods under exceptionally heavy rains at the end of the monsoon season in August 2022.²²³ The city received rain over 1,450 mm that year, compared to the annual average of 986 mm. Scheduled to receive 3cm of rainfall between 1 and 6 September 2022, Bengaluru received 13cm, drowning parts of the city and submerging some 75 localities. Ramanagara town, southwest of Bengaluru, was partially submerged after Bakshi Lake in Maruti Layout breached. That released a torrent of water into the Chikkahole, a stream that flows toward Arkavathi River, overflowing nearby Tittamaranahalli and Kudur lakes and Kanva Dam reservoir. The flooded localities included Tipu Nagar, Kolur, Gandhi Grama, Balageri and Arkeshwara Colony in Ramanagara town, as well as multiple villages in Channapatna and Magadi *taluks*.²²⁴

The subsequent loss and damage were not the result of heavy rain alone. Poor infrastructural design, including roads and the stormwater network, were major factors, certainly in the severity of the impacts.²²⁵ Lakes and channels did not connect to the drainage, nor were these water bodies and courses properly cleaned, silted, weeded or otherwise maintained. Illegal construction, solid waste and raw sewage in the drainage paths also contributed to the intensity of the flooding. The municipality relies on British-era maps for identifying

²²⁰ Human Rights Council, “Towards a just transformation: climate crisis and the right to housing – Report of the Special Rapporteur on the right to adequate housing, Balakrishnan Rajagopal,” A/HRC/52/28, 23 December 20122, <https://documents.un.org/doc/undoc/gen/g22/612/32/pdf/g2261232.pdf?token=dyFxyZ1VV4EbU4p4zz&fe=true>.

²²¹ UNEP, *2021 Global Status Report for Buildings and Construction*, p. 15, https://globalabc.org/sites/default/files/2021-10/GABC_Buildings-GSR-2021_BOOK.pdf.

²²² Global Alliance for Buildings and Construction, UNEP and International Energy Agency, *GlobalABC Roadmap for Buildings and Construction 2020–2050* (Paris, 2020), p. 68, https://globalabc.org/sites/default/files/inline-files/GlobalABC_Roadmap_for_Buildings_and_Construction_2020-2050_3.pdf.

²²³ “Inevitable Bengaluru Flood,” VDB, 22 August 2022, <http://hlrn.org/violation.php?id=p25kaKg=#.Y0LlenZBy70>.

²²⁴ In South Asia, a taluk is an administrative district for taxation purposes, typically comprising several villages.

²²⁵ Binu Paul, “Evacuation, traffic snarls, no electricity: Bangaloreans blame poor urban planning for floods,” *BusinessToday.in* (7 September 2022), <https://www.businesstoday.in/latest/trends/story/evacuation-traffic-snarls-no-electricity-bangaloreans-blame-poor-urban-planning-for-floods-346618-2022-09-07>; Aishwarya Iyer, “Bengaluru’s flood devastation is the tyranny of small decisions’: Water expert Vishwanath S.” *Scroll.in* (6 September 2022), <https://scroll.in/article/1032209/bengalurus-flood-devastation-is-the-tyranny-of-small-decisions-water-expert-vishwanath-s>.

encroachments²²⁶ Local experts also have charged a lack of vision in imagining the city: incompetent planning and poor governance, encouraging haphazard growth, installing infrastructure without regard to natural systems, rampant construction on wetlands.²²⁷

The low-lying and relatively flat southeast part of Bengaluru was worst hit. That area also had undergone burgeoning development with the growth of the information-technology (IT) sector since the 1970s. The associated urbanization beyond the Outer Ring Road (ORR), now incorporated in Greater Bangalore, had not accompanied sufficient investment in much-needed infrastructure.

As the economic engine of the region, generating around ₹22 billion in revenue per annum, or 32% of Bengaluru's total revenue, the IT sector around the ORR is the highest tax contributor. However, the lack of attention to infrastructure development ultimately imperiled the sector and put public safety and wellbeing at risk.²²⁸ The disconnect between IT and governance is found also in the lack of a proper database of the storm water drain network in Bengaluru.²²⁹

The Bangalore Master Plan 2015 acknowledged the importance of stormwater drains and recommended action. The Bruhat Bengaluru Mahanagara Palike (BBMP), the municipal corporation, did prepare a Stormwater Drain Master Plan, but the Comptroller and Auditor General (CAG) found it was of poor quality and that many of the detailed reports were missing.²³⁰ Critics charged that the city did not even follow its own guidelines.²³¹

Warnings unheeded

Well before the floods, Bengaluru was in the national spotlight. Scientists tracking rainfall patterns had advised the government to accelerate mitigation efforts. In 2020, the Karnataka State Natural Disaster Monitoring Centre, in collaboration with Indian Institute of Science, launched two dedicated mobile apps ("Bengaluru Megha Sandesha" and "Varunamitra") for real-time alerts on weather and urban flooding.

²²⁶ M. Akshatha, "BBMP uses 50-year-old maps to identify encroachments. Here's why," *Citizen Matters* (22 August 2016), <https://bengaluru.citizenmatters.in/bbmp-uses-british-era-maps-to-identify-encroachments-here-s-why-8599>.

²²⁷ Times News Network (TNN), "7,700 homes flooded, Bruhat Bengaluru Mahanagara Palike puts overall loss at Rs 340 crore," *The Times of India* (26 September 2022), <https://timesofindia.indiatimes.com/city/bengaluru/7700-homes-flooded-bruhath-bengaluru-mahanagara-palike-puts-overall-loss-at-rs-340-crore/articleshow/94441510.cms>.

²²⁸ Paul, *op. cit.*

²²⁹ P.K. Navya, "50% stormwater drains lost: Bengaluru's flooding is no surprise," *Citizen Matters* (1 December 2021), <https://bengaluru.citizenmatters.in/cag-report-stormwater-drains-master-plan-encroachment-70359>.

²³⁰ Government of Karnataka (GoK), "Report of the Comptroller and Auditor General of India Performance audit of Management of storm water in Bengaluru Urban area," Report no. 2 (2021), https://cag.gov.in/uploads/download_audit_report/2021/10.%20Full%20Report-061430461ae16f4.22975494.pdf; Navya, *op. cit.*

²³¹ R. Vaidya, "Managing drains: How BBMP ignores its own guidelines," *Citizen Matters* (20 June 2022), <https://bengaluru.citizenmatters.in/managing-drains-how-bbmp-ignores-its-own-guidelines-82930>.

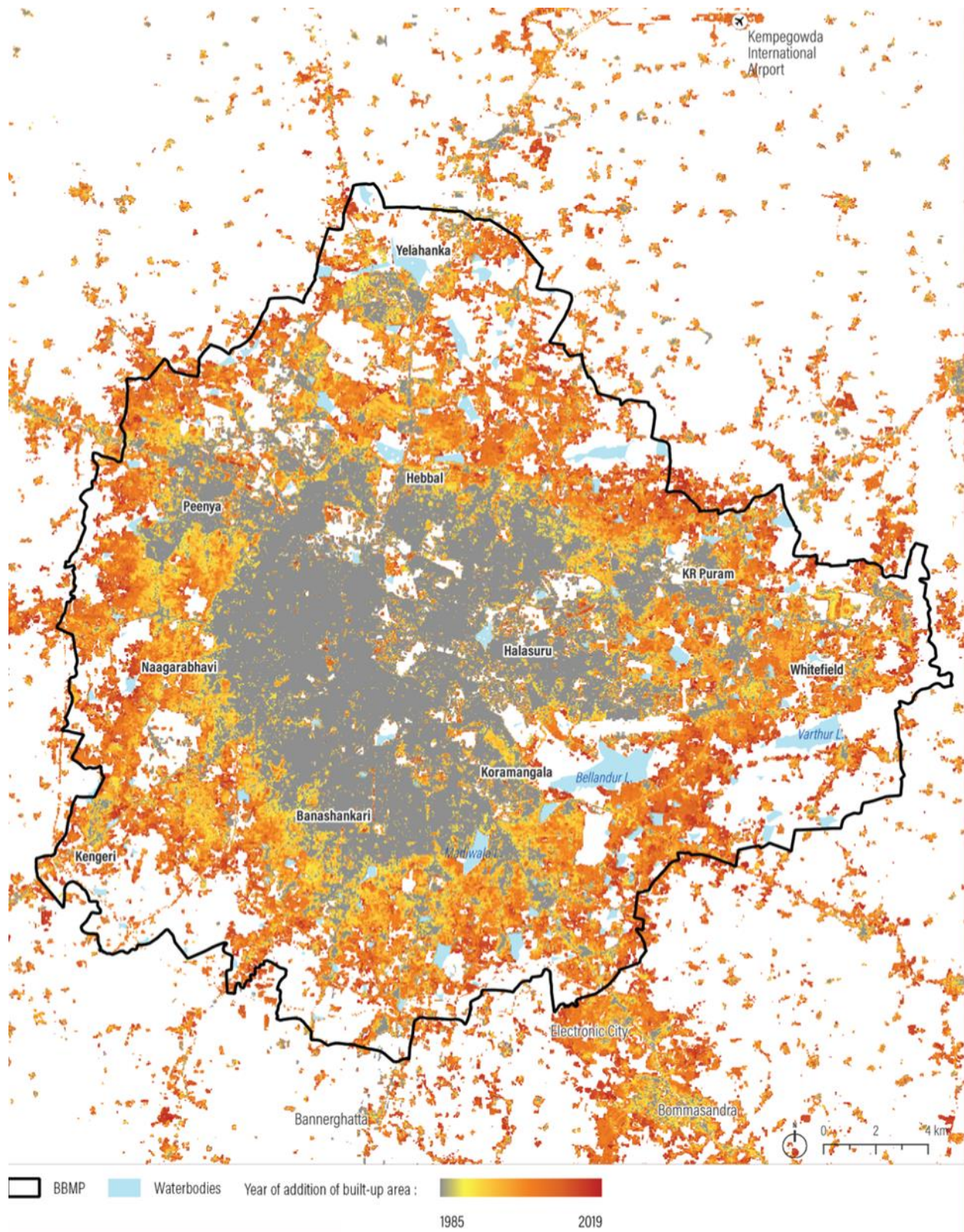


Figure 12: BCAP = Climate Action and Resilience Plan for Bengaluru, showing urban growth from 1985 to 2019. Source: WRI India analysis; World Settlement Footprint Evolution (German Aerospace Center [DLR], European Space Agency [ESA], GEE), <https://geoservice.dlr.de/web/maps/eoc/wsfevolution>.

According to a 2022 study by the BMS Institute of Technology, between 2000 and 2019, the city lost 450 acres of wetland, from 42 water bodies. Bellandur lake, whose catchment area was the worst hit by the recent rains, lost 243 acres.²³²

To boost accuracy and speed of forecasting, the Karnataka State Natural Disaster Monitoring Centre had applied in 2012 to acquire a Doppler radar exclusively for Bengaluru. However, that proposal has also remained unimplemented.

In its 2021 report, the Comptroller and Auditor General had cited the Storm Water Department for serious lapses in stormwater management. The Department did not even have a manual to standardize and specify drain design, construction and maintenance. It did not consider design adaptations and other strategies to manage high-intensity rainfall. The report also flagged lack of proper drain linkages and groundwater recharge structures.²³³

The Justice N.K. Patil Committee on management and revival of lakes proposed, in 2012, a well-maintained canal system, preventing floods and recharging ground water. Environmental groups have blamed the disaster's impacts on the state's failure to implement that advice.²³⁴



Figure 13: The stormwater drain at Ejipura, filled with garbage. Source: Pinky Chandran.

For years, the Karnataka State government and BBMP also has had a long-term storm-drain remodeling plan of adaptation to the recurring floods. However, the 16-year-old project is seen by flood-management experts as a project to support the land mafia.

²³² GoK, *op. cit.*

²³³ *Ibid.*

²³⁴ Pinky Chandran, "Lack of stormwater drain planning in Bengaluru is a risk factor for future floods," As the Drain Goes-Part 2, *Citizen Matters* (17 March 2023), <https://bengaluru.citizenmatters.in/lack-of-stormwater-drain-planning-108616>.

Meanwhile, “organized” encroachment of *kharab* (waste) lands such as wetlands is especially profitable. This emerges by dumping construction refuse many dump truck loads in a parcel of wetland to transform it into a saleable piece of property. Legal and extralegal means are used to grab wetlands for quick profit.²³⁵

Loss, damage and remedy

According to the municipal corporation, the flood inundated 7,700 houses, left over 170 houses partially damaged, and submerged at least 12 informal settlements in Bengaluru’s tech corridor.²³⁶ The affected informal settlements around the IT hub were neglected as “illegal.” They lacked public works, including adequate drainage systems. In the flood’s aftermath, the news media and public officials focused more on affected opulent villas and luxury cars, and apartments worth over €1 million.²³⁷

The Mahadevapura suburb next to the ORR was the worst hit, with 3,000 homes inundated, 21 partially damaged. East and west zones had 1,141 and 1,048 houses affected, respectively. The Dasarahalli was the least hit, with water entering 261 homes.²³⁸

The Greater Bengaluru Municipal Corporation has estimated that nearly 397km of roads were damaged, at a loss of €37,039,333. Damaged footpaths, measuring up to 3km, represented €440,000.

The Outer Ring Road Companies Associations (ORRCA), representing major IT and banking firms, estimated that the companies it represents have suffered a loss of €27,859,275 due to the flooding.²³⁹ Indirect costs (to tech workers) did not escape valuation. On 30 August, the flooded ORR caused thousands to be stranded for hours. According to ORRCA claimed a loss of €24,729,525 to the industry.

Ironically, in the IT hub, available technology should have helped residents to avoid encroaching on lake beds and wetlands. However, thousands have bought flats in buildings close to water bodies. Geographic Information System (GIS) spatial data should have been able to alert buyers

²³⁵ Malini Ranganathan, “Why Bengaluru is not immune to floods: It’s all about land (and money),” *Citizen Matters* (10 December 2015), <https://bengaluru.citizenmatters.in/why-bengaluru-is-not-immune-to-floods-it-s-all-about-land-and-money-17973>.

²³⁶ Figures provided by the Greater Bengaluru Municipal Corporation. TNN, *op. cit.*

²³⁷ Tarab Zaidi, “Bengaluru Floods: Luxury cars Bentley, Lexus seen submerged in Bengaluru,” *Business Today* (6 September 2022) <https://www.businesstoday.in/latest/trends/story/bengaluru-floods-luxury-cars-bentley-lexus-seen-submerged-in-bengaluru-346520-2022-09-06>.

²³⁸ “7,700 homes flooded, Bruhat Bengaluru Mahanagara Palike puts overall loss at R340 crore,” *The Times of India* (26 September 2022), <https://timesofindia.indiatimes.com/city/bengaluru/7700-homes-flooded-bruhat-bengaluru-mahanagara-palike-puts-overall-loss-at-rs-340-crore/articleshow/94441510.cms>.

²³⁹ “Floods caused Rs 225 cr loss: ORR Companies Association,” *Deccan Herald* (1 September 2022), <https://www.deccanherald.com/india/karnataka/bengaluru/floods-caused-rs-225-cr-loss-orr-companies-association-1141393.html>

about where lake boundaries are. Some have speculated that this data may have been deliberately suppressed to benefit builders and vested interests in the government.²⁴⁰

As torrential rain was coming down in Bengaluru, Karnataka Chief Minister Basavaraj Bommai announced the government had decided to release €33 million to manage the flood situation in the city. The state government decided to release a further €66 million to manage the rain and flood situation across the state, and another €66 million to restore infrastructure such as roads, electric poles, transformers and schools across the state, and another €33 million for Bengaluru alone.

Other public expenditures included €73 million to deputy commissioners of various districts, while separate €55 million was allocated for building infrastructure. BBMP was also seeking €55 million from the central government to remedy arising problems.²⁴¹

A total of €165 million was allocated for construction of storm water drains in Bengaluru once the water receded. Another public company, State Disaster Response Force, exclusively for Bengaluru, received €1,044,136 for boats and other equipment.²⁴²

Displaced families were to be provided compensation of ₹25,000 (€281) and immediate arrangements for alternative places to stay, food and other basic facilities. The Chief Minister also announced compensation of ₹500,000 (€6,179) for the two laborers killed after heavy rains overnight on 17–18 May 2022 while working on the Cauvery V Stage project pipeline at Ullal Upanagara in western Bengaluru.²⁴³ Injured workers were offered ₹200,000 (€2,247).²⁴⁴ In May 2023, an estimate set the cost of needed infrastructure construction at €310 million in India's Silicon Valley.²⁴⁵

Individual households saw compensation in more-modest numbers. The Karnataka State Disaster Management Authority (KSDMA) set the rules for rain damages compensation. The compensation for partial damages is determined based on the assessment by the BBMP officials.

²⁴⁰ Rasheed Kappan, "Bengaluru floods: Anatomy of a drainage system gone horribly wrong," (13 September 2022), <https://www.newslaundry.com/2022/09/13/bengaluru-floods-anatomy-of-a-drainage-system-gone-horribly-wrong#:~:text=%E2%80%9CGeographic%20Information%20System%2C%20or%20GIS,vested%20interests%20in%20the%20government.>

²⁴¹ *The Times of India* (26 September 2022), *op. cit.*

²⁴² "Karnataka govt releases Rs 300 crore to manage floods in Bengaluru," *Business Standard* (6 September 2022), https://www.business-standard.com/article/current-affairs/karnataka-govt-releases-rs-300-crore-to-manage-floods-in-bengaluru-122090600025_1.html.

²⁴³ The victims were Dev Bharath, from Bihar, and Ankit Kumar, from Uttar Pradesh. "Karnataka CM announces ₹25,000 compensation for flooded homes, ₹5 lakh for those killed in Bengaluru rains," *The Hindu* (18 May 2022), <https://www.thehindu.com/news/cities/bangalore/karnataka-cm-announced-25000-compensation-for-flooded-homes-5-lakh-for-those-killed-in-bengaluru-rains/article65425469.ece>.

²⁴⁴ *The Times of India* (26 September 2022), *op. cit.*

²⁴⁵ Gulam Zia, "Bengaluru Urban Flood Report – 2023" (Mumbai: Knight Franck Pvt., Ltd., 2023), <https://www.knightfrank.com/research/report-library/bengaluru-urban-flood-report-2023-10243.aspx>; Deep Kaushik Vakil, "India's IT hub Bengaluru may need \$339 million to fix drainage, avoid flooding, report says," (31 May 2023), <https://content.knightfrank.com/research/2674/documents/en/bengaluru-urban-flood-report-2023-10243.pdf>.

In May 2022, the BBMP released compensation to 3,311 households in Bengaluru that were flooded and suffered damage during the rains that month. That was the first time the civic body of Bengaluru paid compensation for flooding of homes due to rains.²⁴⁶

Those whose houses were flooded were eligible only for ₹10,000 (€112) compensation, except in cases where the government announces a higher compensation at its discretion. The Karnataka Chief Minister announced ₹25,000 (€281) compensation in a few areas. For houses that were completely damaged and uninhabitable, some households received ₹50,000 (€562).²⁴⁷ NGOs working with economically weaker sections in Bengaluru have alleged that close to 163 families from the marginalized communities that had suffered losses owing to floods during the last monsoon were yet to receive compensation by March 2023.²⁴⁸

Such discretion, discrepancies and delays raise questions as to (1) the methodology of valuations, (2) the adequacy of such compensation within RRF criteria and (3) the priority given to needy households.

Bengaluru summary

A major cause of the severity of losses and damage in Bengaluru has been wetland encroachment, by design. Once levelled with debris, the wetland automatically qualifies it for the Karnataka Industrial Area Development Board to approve it as a special economic zone. Constant dumping of construction debris for over a decade has left no trace of the ecosystem that once fed nearby lakes such as Bellandur.

This combined with poor road infrastructure and drains unsuitable in both their design and location. Longer periods and greater intensity of rainfall has long warranted investment in stormwater storage infrastructure beyond current capacity. Related lakes do not have sluice gates and so, flood management cannot be done.²⁴⁹

Government bodies delayed needed infrastructure projects for decades. Meanwhile, needed projects have become more expensive to execute.²⁵⁰ While the duty to ensure reparations for victims of associated human rights violations lies with the state, multiple parties bear

²⁴⁶ "Bengaluru flooding: BBMP announces ₹10,000 compensation for 1,064 houses in Mahadevapura zone," *The Hindu* (13 September 2023), <https://www.thehindu.com/news/cities/bangalore/bengaluru-flooding-bbmp-announces-10000-compensation-for-1064-houses/article65883851.ece>.

²⁴⁷ D.N. Shree, Ramesh Sneha and DHNS, "Bengaluru's flood-hit areas wait for better infra and compensation," *The Deccan Herald* (28 July 2023), <https://www.deccanherald.com/india/karnataka/bengaluru/bengalurus-flood-hit-areas-wait-for-better-infra-and-compensation-1241614.html>.

²⁴⁸ Sneha Ramesh, "Victims of last year's Bengaluru floods await compensation," *The Deccan Herald* (13 March 2023), <https://www.deccanherald.com/india/karnataka/bengaluru/victims-of-last-years-bengaluru-floods-await-compensation-1199955.html>.

²⁴⁹ Rasheed Kappan, "Bengaluru floods: Anatomy of a drainage system gone horribly wrong," *NewsLaundry* (13 September 2022), <https://www.newslaundry.com/2022/09/13/bengaluru-floods-anatomy-of-a-drainage-system-gone-horribly-wrong>.

²⁵⁰ Naveen Menezes, "Cost of remodelling Bengaluru's drains jumps three times The BBMP has remodelled 428 km of the drains and plans to start the work on the remaining 414 kilometres," *Deccan Herald* (26 December 2021), <https://www.deccanherald.com/india/karnataka/bengaluru/cost-of-remodelling-bengalurus-drains-jumps-three-times-1065065.html>.

responsibility for the urbanization practices that exacerbated the flood impacts: citizens, corporations and government bodies themselves broke the law.

VIII. Conclusion

Scientific studies show that climate change was an important contributing factor to many impacts reported here. However, the human-made conditions for environmental hazards to become disasters affirm their classification as violations of multiple human rights, including gross violations. Those afflicted are, thus, entitled to remedy and reparation defined in the RRF.

The increasing magnitude and frequency of disasters exposes weaknesses in disaster risk reduction (DRR) policies, including those related to housing and urban development. This neglect can be a symptom of the remoteness of public servants from local communities. In turn, that undermines vulnerability risk assessments and participatory risk management. Certain dimensions of vulnerability depend on how communities relate to the issue of disasters based on their intuitive or rational judgment; i.e. their perception of risk.²⁵¹

External financial and technical support is urgent and indispensable for the planning and implementation of remedy and reparation that should be undertaken in regions affected by environmental and climate change-associated disaster. The Post-Disaster Needs Assessment is a tool that forms a useful base for the identification of needs and required funding. Affected communities need tools at appropriate scale and degree of specificity.

We find that climate-caused disasters have a disproportionately harsh impact on the most-impooverished people. These scenarios alone have hurled millions into poverty and, in some cases, had significant impact on national poverty rates.²⁵²

Many of the hardest-hit areas already had high rates of poverty and children suffering from malnutrition. The needs are often acute and long lasting. A year after the Pakistan super flood of 2022, an estimated 20.6 million people, including 9.6 million children, still needed humanitarian assistance, while nearly 2 million people were still living near stagnant floodwaters.²⁵³ The prolonged lack of safe drinking water and toilets, along with the continued proximity of vulnerable families to bodies of stagnant water, risk causing widespread outbreaks of waterborne diseases such as cholera, diarrhea, dengue, and malaria.²⁵⁴

²⁵¹ Barreto and Teles, *op. cit.*

²⁵² Erwin Knippenberg, Mattia, Amadio, Nadeem Javaid and Moritz Meyer, “Quantifying the poverty impact of the 2022 floods in Pakistan,” *World Bank Blogs* (18 May 2023), <https://blogs.worldbank.org/developmenttalk/quantifying-poverty-impact-2022-floods-pakistan>.

²⁵³ UNICEF, “Pakistan Floods Situation Report,” March 2023, <https://www.unicef.org/media/138756/file/Pakistan-Floods-SitRep-March-2023.pdf>.

²⁵⁴ UNICEF, “More than 10 million people, including children, living in Pakistan’s flood-affected areas still lack access to safe drinking water,” 21 March 2023, <https://www.unicef.org/press-releases/more-10-million-people-including-children-living-pakistans-flood-affected-areas>; WHO, “It was just the perfect storm for malaria” – Pakistan responds to surge in cases following the 2022 floods,” press release, 18 April 2023, <https://www.who.int/news-room/feature-stories/detail/it-was-just-the-perfect-storm-for-malaria-pakistan-responds-to-surge-in-cases-following-the-2022-floods>.

Often, the countries most-affected by climate disaster also find themselves trapped in a vicious downward spiral of debt, pulled downward and economic crisis within an unjust global financial system. The IMF then imposes draconian fiscal adjustment measures on the heavily indebted and struggling nations as a prerequisite for bailout funding.²⁵⁵ Massive crop, livestock, and infrastructure losses caused by the floods, the global energy and grain supply interruptions triggered by the ongoing Ukraine war, a fiscal crisis, record-level inflation and political instability contribute to complex and protracted crises.

The emergency appeals for aid, like the one the UN coordinated for Pakistan, set ambitious target. However, even those funds go mainly to short-term relief efforts, not to compensate long-term costs associated with L&D. These may include severe disruption of crop cycles, a drop in agricultural revenue and a risk of severe food shortages.²⁵⁶ Such longer-term tangible and intangible L&D could also arise from public health crises that follow disasters.

Amid advancing climate change, the global community's response has fallen far short of required to mitigate and/or adapt to climate change. In any case, climate finance is often provided in the form of loans, and that is true also for disaster relief. A January 2023 international conference aimed at raising funds for climate resilience in Pakistan resulted in over \$10 billion in pledges, but about 90% was in the form of loans over three years that must be repaid.²⁵⁷

Current United Nations Office of Disaster Risk Reduction (UNDRR) policies tend to focus only on the physical consequences of the problem (i.e., mass movement processes), while neglecting preventive measures often requiring public investment. The relatively higher priority that climate finance gives to mitigation approaches, compared with adaptation, tends to leave communities vulnerable to disasters and forces them to disproportionately bear the costs without remedy and reparation.

Given the concentration of all impact assessments on material and economic costs, losses and damage, a significant portion of values at stake remain overlooked, or the subjects of general qualitative descriptions without quantification or a view to restitution of those values within the RRF.

Present assessments of L&D from climate change remain at the regional, national or sectoral level. In no case is a realistic or thorough quantification methodology applied to household L&D, and even less for intangible values at stake.

²⁵⁵ "Pakistan lays out budget but may not satisfy IMF," *Aljazeera* (9 June 2023), <https://www.aljazeera.com/economy/2023/6/9/pakistan-lays-out-budget-but-may-not-satisfy-imf>.

²⁵⁶ Ciara Nugent, "Pakistan Flooding Raises Tough Questions About Who Should Pay For Catastrophic Climate Impacts," *Time* (1 September 2022), <https://time.com/6210211/pakistan-floods-cost/>.

²⁵⁷ UNDP, "International Conference On Climate Resilient Pakistan," Palais des Nations, Geneva, 9 January 2023, <https://www.undp.org/international-conference-climate-resilient-pakistan>; "Almost 90pc of Geneva pledges are project loans, Dar reveals," *Dawn* (11 January 2023), <https://www.dawn.com/news/1731101>.

Throughout the environmental assessment following the Kakhovka Dam breach, it became evident that various actors and ongoing activities remain uncoordinated.²⁵⁸ In such situations, several actors may be conducting sampling and analysis, but for different purposes and using different methodologies and approaches. The resulting cacophony of data could lead to waste of efforts and contradictions or confusion of outcomes.

Within this context, the newly decided and currently evolving LDF seeks to provide some solution to harms incurred. However, it remains to be seen how the LDF's scope will provide reparations to victims (i.e., affected populations and communities) and wider remedies that prevent repetition of harm.

IX. Recommendations:

Overall, L&D assessment and sampling processes should support a targeted remedy and reparation of victims, with a clear focus on major threats and a sound prioritization of action. For instance, identifying the location of landmines and UXOs may be a priority in post-disaster clean-up efforts.

The international financial system must be reformed to better serve the needs of the most-impooverished people and communities, with a greater fulfillment of human needs. Nations hit by extreme weather events should have options for immediate debt relief and greater access to grants and concessional loans. The worsening and inequitable impacts of climate change make the need for these reforms even more urgent.

Meanwhile, the Peace and Security pillar of the UN's structure and operations must be reformed. In the coming Pact of the Future (2024). The pernicious pattern of conflict fueled by the five Permanent Members of the Security Council makes urgent the repealing of the veto procedure. In order to better ground actions to cease conflict in international law criteria, conflict parties, regardless of Permanent Member status, should not have the right to vote on Security Council resolutions.

Among climate experts and policymakers, the toll of environmental and climate change-associated loss and damage is unavoidable, especially because they are so extreme.²⁵⁹ Cases show that countries are forced to deal with climate catastrophes in an ad hoc way: procrastinating adaptation measures; ignoring laws, regulations and guidelines; or holding emergency-aid appeals.²⁶⁰

Recovery needs remain substantial in all past and ongoing cases explored here. The pathway to housing recovery must be informed by extensive experiences locally and within global good

²⁵⁸ UNEP, *op. cit.*, p. 70.

²⁵⁹ Aryn Baker, "What It's Like Living in One of the Hottest Cities on Earth—Where It May Soon Be Uninhabitable," *Time* (12 September 2019), <https://time.com/longform/jacobabad-extreme-heat/>.

²⁶⁰ Ciara Nugent, "Pakistan Flooding Raises Tough Questions About Who Should Pay For Catastrophic Climate Impacts," *Time* (1 September 2022), <https://time.com/6210211/pakistan-floods-cost/>.

practices, seeking the policy coherence aligning relief, development and human rights approaches, emphasizing relevant and binding human rights and humanitarian obligations, as well as the voluntary development commitments of states. The magnitude of losses in private investments in their homes accumulated over years (or decades) warrants strategic approaches to recovery, reconstruction and compensation for lost use of usurped properties.

It is crucial that all spheres of government play enabling roles in supporting families and communities to rebuild their houses and settlements according to disaster and climate-resistant standards. This includes state organs' support for social production of housing and habitat, as states collectively have committed to do.²⁶¹

Building safer homes and public spaces must be a driving principle if the reconstruction strategy is to succeed. To achieve more sustainable post-disaster settlements, housing reconstruction should have a longer-term horizon and be supported by better planning, updated development regulations, coordinated infrastructure service delivery, and stronger capacity of communities and government institutions to cope with, and manage disaster risks.

A community-based planning approach is recommended to support collective activities such as information sharing and training for housing reconstruction and to facilitate community-driven planning and implementation of integrated social, economic, and physical resilience measures.

At the housing level, the predominant form of suggested financial assistance is cash grants for owner-driven rebuilding and repair. Such grants could be protected from squandering, abuse and corruption by a system of tokens, a form of digital tokens (a type of traceable crypto currency) that can be used expressly for building-back-better reconstruction purposes.

Widescale technical assistance is recommended to accompany financial assistance and social production, especially where households are repairing and constructing homes with their own resources. That assistance includes information, normative and technical training, quality assurance, building financial literacy and environmental awareness among households. Experience suggests that affected households will not wait to reestablish their homes, hence the government and development partners need to act swiftly.²⁶²

Much of the development and disaster-risk literature refers to building “resilience” and “resilient communities.” While resilience is a desirable quality, it is more appropriate applied to structures and system than to persons. For the persons and communities most vulnerable to L&D, in particular, victims of human rights violations, demanding their “resilience” puts an undue onus on them to recover to the *status quo ante*, as the term implies. That recovery should accompany fulfilment of applicable human rights, including adequate housing; sustainable development; water and sanitation; adequate food; and a clean, healthy and sustainable environment. Corresponding to those rights are states' individual, collective,

²⁶¹ New Urban Agenda, A/RES/71/256, 25 January 2017, paras. 32 and 46, <https://habitat3.org/the-new-urban-agenda/>.

²⁶² Main report, p. 51.

domestic and extraterritorial obligation to respect, protect and fulfill them, as well as to ensure progressive realization of those human rights and the “continuous improvement of living conditions.”²⁶³

For the IOM’s Sindh Baseline Study, the training of enumerators was held on 25 September 2022 in both Sukkur and Hyderabad, and data collection was carried out from 26 September to 2 October 2022. Following this exercise, DTM is planning to roll out its Community Needs Identification Tool (CNIT). Data for this exercise will mainly be collected through focus group discussions comprising of temporarily displaced persons (TDPs).

The household and community scales of quantification are needed to fill gaps left by complementary tools for sector-wide or national-scale climate-risk assessments and the related big data revolution in climate-risk management. Assessments of L&D from climate change remain at the regional, national or sectoral level; in no case is a realistic or thorough quantification methodology yet applied to household L&D, and even less for intangible values affected. That shortcoming has been the focus of HIC-HLRN recommendations to the Transitional Committee for the new LDF operationalized at CoP28.²⁶⁴

It is important to ensure adequate coordination between actors, to reduce duplication of efforts and ensure that resources are directed to key gaps. The sharing of information and data between actors should be encouraged, while noting potential sensitivities associated with ongoing investigations of environmental damage caused by the war. Planning and implementation of assessments and associated action plans for remedy must be done in consultation with relevant stakeholders and with inclusive and effective public participation. Internationally, stakeholder engagement at the level of meaningful participation of multiple actors needs improvement and should become more consistent among international organizations. Nationally, environmental working groups should be further developed and supported, where the inclusion of national actors would be important. Information-exchange whether for response or recovery options would benefit all actors involved.²⁶⁵

²⁶³ ICESCR, articles 2.1 and 11, *op. cit.*

²⁶⁴ See HIC-HLRN, “Quantification of Loss and Damage Impacts Associated with Climate Change,” 21 November 2023, https://www.hlrn.org/img/documents/L&D_quantification_cases_final.pdf.

²⁶⁵ UNEP, *op. cit.*, p. 70.

