Understanding the climate change-displacement-education nexus for building resilient and equitable education systems

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INTRODUCTION

As global warming continues towards 1.5C, and potentially 2C, it is projected that climate change effects on health, food security, water and human security will increase[1]. The most disadvantaged and vulnerable populations, particularly some indigenous people, local communities dependent on agricultural or coastal livelihoods, dryland areas and Small Island Developing States (SIDS), are at a disproportionately higher risk of the adverse consequences[2].

Analysis has shown a dramatic increase in the reported number of extreme weather disasters resulting in people being displaced in last decade[3]. The world's poorest communities who bear little responsibility for climate breakdown are at the highest risk[4]. The achievement of SDG 4[5] hinges on the fulfilment of the critical principles of leaving no one behind and reaching the furthest first, notably communities and learners who are highly vulnerable to the impacts of climate change. Therefore, there is a growing and urgent need for all involved in education systems to better understand the systemic effects of climate change, including their interaction with displacement.

This paper begins to fill the gap in the understanding of the nexus between climate change, displacement, and education, drawing on a plethora of cross-disciplinary evidence and research, emerging better practices and lessons learned from education systems across the world, and foresight work on the futures of education. Beginning with conceptualizing climate-displacement in the context of education, the paper then articulates the bi-directional relationship between climate change and education before diving into the nexus between climate change, displacement, and education, including exploring how education systems can be adapted to be climate-displacement resilient. Finally, as a means of conclusion the concept of regenerative education is introduced to posit a transformational agenda for education in the context of climate change and climate-displacement.

This paper does not present any projections of the number of people, and more specifically learners, who will experience or be affected by climate-displacement. Although climate change poses a real and significant threat to life and livelihoods, narratives predicting large numbers of "climate refugees" which

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[1] IPCC, 'Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change', 2018, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf.

[2] IPCC.

[3] Oxfam, 'Forced from Home: Climate-Fuelled Displacement', 2019, https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620914/mb-climate-displacement-cop25-021219-en.pdf.

[4] Oxfam; Jason Hickel, 'Quantifying National Responsibility for Climate Breakdown: An Equality-Based Attribution Approach for Carbon Dioxide Emissions in Excess of the Planetary Boundary', *The Lancet Planetary Health* 4, no. 9 (2020): e399–404, https://doi.org/10.1016/S2542-5196(20)30196-0.

[5] Sustainable Development Goal 4 – Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The Education 2030 Framework for Action notes, "Natural disasters, pandemics and conflicts, and the resulting internal and cross-border displacement, can leave entire generations traumatized, uneducated and unprepared to contribute to the social and economic…Countries must, therefore, institute measures to develop inclusive, responsive and resilient education systems to meet the needs of children, youth and adults in crisis contexts, including internally displaced persons and refugees recovery of their country or region."

have emerged in the literature and policy sphere risk entrenching climate-displacement as an impending security threat without a robust empirical basis[6]. Forced displacement and migration across international borders has been shown not to be the most plausible type of mobility in response to adverse environmental conditions[7]. The consequences of framing and entrenching climate-displacement as an impending security threat or crisis is a real danger to ensuring the right to education for all and risks furthering the exclusion of the most marginalized learners.

Conceptualizing climate-displacement

Although a distinction is often drawn between climate-induced migration and displacement, there is an emerging consensus that the line between forced and voluntary human mobility is blurred and difficult to define in the context of climate change[8]. Furthermore, the utility of making a distinction between migration and displacement in education can also be deemed problematic as the application of the right to education is universal, not conditional on migration status or reason for moving[9].

The underlying mechanisms and drivers of climate-displacement remain poorly understood, with the relationship between environmental factors and mobility not being deterministic, with environmental conditions alone rarely being the only driver of human mobility[10]. However, evidence does demonstrate that vulnerability, defined by social differentiation in access to resources, is inversely correlated with mobility, meaning those who are most exposed and vulnerable to the impacts of climate change are the least capable to migrate voluntarily and the most at risk of displacement[11].

Despite the universal application of the term 'climate-displacement' in the context of this paper and education, it is important to recognize the varied temporality of mobility captured by this term. There is a need when discussing climate-displacement to understand that the term can cover more temporary forms of displacement, which are typically a reaction to rapid-onset events and change. Extreme weather events demonstrate the most direct and rapid pathway from climate change to human mobility. Such events are known to drive displacement however only a proportion of these lead to permanent displacement[12]. The term in this context, also captures seasonal displacement and more permanent mobility and resettlement, which are usually undertaken as a means of adaptation to reduce risk exposure in highly vulnerable settings[13]. Five broad expected patterns of climate-displacement have been identified: temporary displacement; permanent local displacement; permanent internal displacement; permanent regional displacement; and permanent inter-continental displacement[14]. Each of these categories have differing

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[6] Ingrid Boas et al., 'Climate Migration Myths', *Nature Climate Change* 9, no. 12 (26 December 2019): 901–3, https://doi.org/10.1038/s41558-019-0633-3; Alexander Betts and Angela Pilath, 'The Politics of Causal Claims: The Case of Environmental Migration', *Journal of International Relations and Development* 20, no. 4 (2017): 782–804, https://doi.org/10.1057/s41268-016-0003-y; Maya Goodfellow, 'How Helpful Is the Term "Climate Refugee"?', *The Guardian*, 31 August 2020, https://www.theguardian.com/world/2020/aug/31/how-helpful-is-the-term-climate-refugee.

[7] Sebastian Schutte et al., 'Climatic Conditions Are Weak Predictors of Asylum Migration', *Nature Communications* 12, no. 1 (2021): 1–10, https://doi.org/10.1038/s41467-021-22255-4.

[8] Boas et al., 'Climate Migration Myths'; Koko Warner et al., 'Changing Climate, Moving People: Framing Migration, Displacement and Planned Relocation', 2013, https://collections.unu.edu/eserv/UNU:1837/pdf11213.pdf.

[9] UNESCO, 'The Impact of Climate Displacement on the Right to Education', Working Papers on Education Policy (Paris, 2020), https://unesdoc.unesco.org/ark:/48223/pf0000374966.locale=en.

[10] Roman Hoffmann et al., 'A Meta-Analysis of Country-Level Studies on Environmental Change and Migration', *Nature Climate Change*, 2020, https://doi.org/10.1038/s41558-020-0898-6; Richard Black et al., 'Migration, Immobility and Displacement Outcomes Following Extreme Events', *Environmental Science & Policy* 27 (1 March 2013): S32–43, https://doi.org/10.1016/J.ENVSCI.2012.09.001.

[11] Black et al., 'Migration, Immobility and Displacement Outcomes Following Extreme Events'; W.N Adger et al., 'Human Security', ed. C B Field et al., *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, United Kingdom: Cambridge University Press, 2014), https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap12_FINAL.pdf.

[12] Adger et al., 'Human Security'; The Government Office for Science, 'Foresight: Migration and Global Environmental Change'.

[13] Adger et al., 'Human Security'.

[14] Warner et al., 'Changing Climate, Moving People: Framing Migration, Displacement and Planned Relocation'.

dynamics and distribute displaced persons and learners across varying policy jurisdictions and geographies[15], which has significant ramifications for how education systems prepare, respond, and adapt.

Although climate change and breakdown make human mobility more probable, vulnerability to environmental and climatic change is inversely linked to mobility, thus not all communities will have the ability and resources to move rendering them immobile and trapped[16]. Immobility has received comparatively little attention[17], yet it presents important policy challenges and concerns for education systems. However, due to limited available research, evidence, and data, particularly in education, on the dynamics of trapping this paper focuses solely on climate-displacement. There is a clear need for future research into immobility and trapped populations, to better understand its impact on education and how education systems can adapt to such dynamics.

Education and climate change

For many communities across the world climate-related risks, environmental change and intensifying extreme weather events are not theoretical, they are a reality with catastrophic consequences. Recently published evidence shows "significant anthropogenic influence" on many high impact events such as droughts, heatwaves, wildfires, rainfall and flooding[18]. The landmark Paris Agreement acknowledges the urgency of work in this area, calling it "a common concern of humankind" and highlighting that climate action should respect and promote the rights of migrants, children, and people in vulnerable situations. Yet, little work has been done on the impact on learners and education systems more broadly.

Despite this gap, learners themselves have been some of the most active and strongest advocates for climate action in the last few years through protest and civil society movements, such as the Fridays for Futures and the Sunrise Movement. Many of these children and youth have periodically opted out of formal education, opting instead for strike action, as a means of calling for accelerated and more radical climate action. Children and learners are now increasingly visible as not only climate victims but as active climate change actors[19].

Education needs are largely invisible in most key discussions on climate change with advocacy for linking the two issues, beyond climate change education, remaining relatively silent. Even less is known about the nexus between climate change, displacement, and education. The immediacy of climate change requires system-wide educational responses that go beyond a single domain of education (e.g. curriculum), with urgent focus needed on how education systems will address:

- **Direct impacts** on the lives and well-being of students, education staff and school communities, on educational infrastructure, equipment, and costs.
- **Indirect impacts** on the livelihoods and the environment of school communities, increasing the likelihood of food insecurity and the spread of vector borne diseases, which consequently reduces the physical and mental health of learners and can lead to displacement[20].

Both direct and indirect impacts increase the exposure and vulnerability of populations to hazards and their capacities to adapt to them. The way in which climate-displacement interacts, aggravates, and multiplies existing vulnerabilities and risk in and through education is of particular concern. However, the risk posed

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[15] Warner et al.

[16] The Government Office for Science, 'Foresight: Migration and Global Environmental Change'; Celia McMichael et al., 'A Review of Estimating Population Exposure to Sea-Level Rise and the Relevance for Migration', *Environmental Research Letters* 15, no. 12 (2020), https://doi.org/10.1088/1748-9326/abb398.

[17] Sonja Ayeb-Karlsson, Dominic Kniveton, and Terry Cannon, 'Trapped in the Prison of the Mind: Notions of Climate-Induced (Im)Mobility Decision-Making and Wellbeing from an Urban Informal Settlement in Bangladesh', *Palgrave Communications* 6, no. 1 (2020): 1–15, https://doi.org/10.1057/s41599-020-0443-2.

[18] World Meteorological Organization, 'United in Science 2020', 2020, https://public.wmo.int/en/resources/united_in_science.

[19] George C Nche, Hilary C Achunike, and Anuli B Okoli, 'From Climate Change Victims to Climate Change Actors: The Role of Eco-Parenting in Building Mitigation and Adaptation Capacities in Children', *The Journal of Environmental Education* 50, no. 2 (4 March 2019): 131–44, https://doi.org/10.1080/00958964.2018.1553839.

[20] UNESCO, 'Education Sector Responses to Climate Change' (Bangkok, 2012), https://unesdoc.unesco.org/ark:/48223/pf0000215305.

to learners by climate-displacement alone is highly dependent on policy responses in the education sector and beyond.

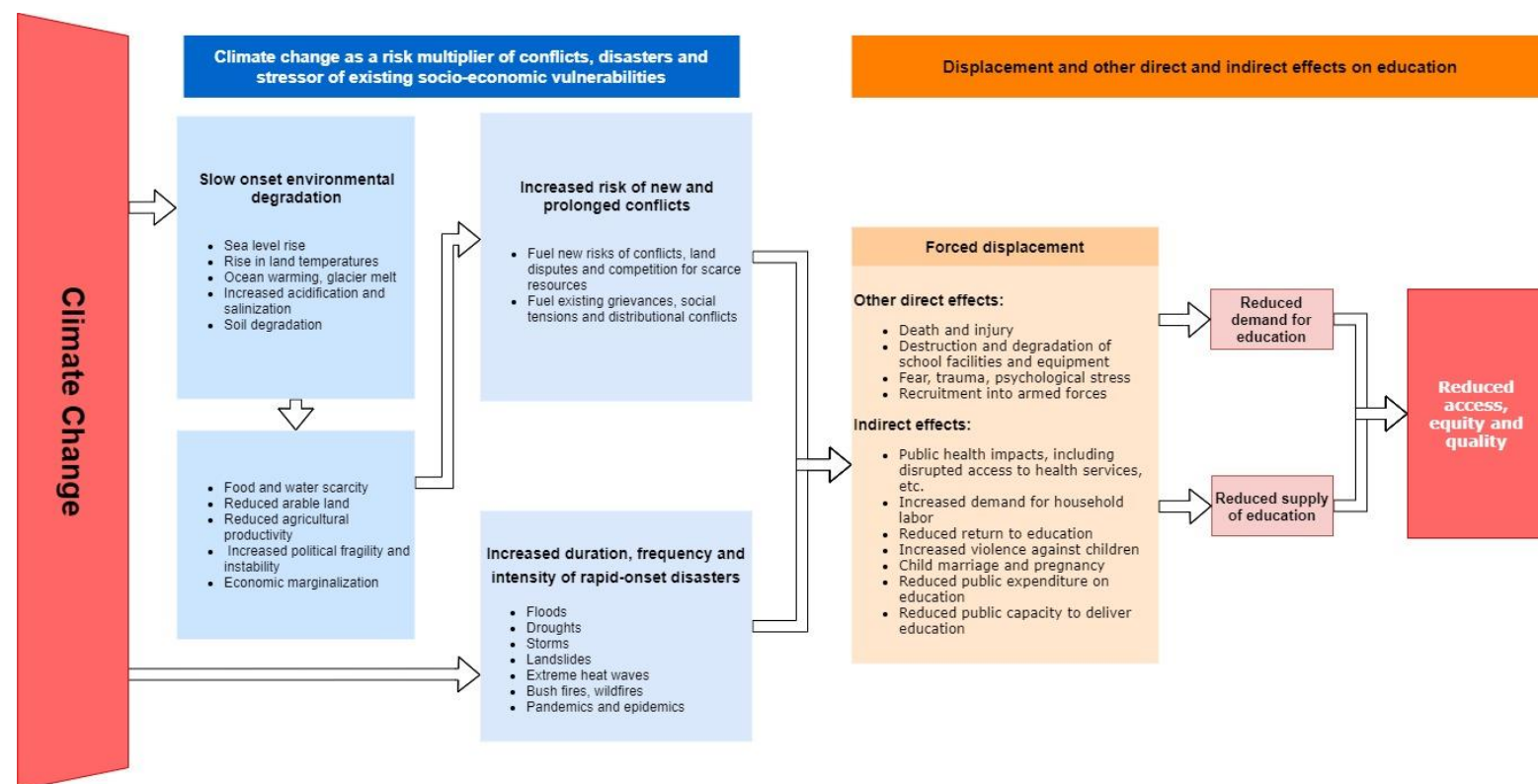## CLIMATE CHANGE - DISPLACEMENT—EDUCATION NEXUS

Figure 1- Visualisation of authors' current thinking and conceptualisation of climate change-displacement-education nexus.

Before outlining the relationship and nexus between climate change, displacement and education, it is important to reiterate that little research has been conducted into this nexus, thus the understanding of the particular challenges in education is limited[21]. It must also be noted that the nexus between climate-displacement and education exists and acts in complex socio-economic and political contexts, which require granular understanding, analysis, and action. Within these contexts climate change and displacement overlap and intersect with existing vulnerabilities and inequalities, notably those based on gender, disability, race, and migration status. Therefore, without due consideration and analysis of such intersections there is a significant risk that existing inequalities in education will become further entrenched and exacerbated, limiting any transformational change offered by education. It is already known that displaced learners are more likely to encounter discrimination, racism, and social exclusion on basis of their identity when attending schools in alien environments[22].

The exacerbation of existing inequalities due to the climate crisis is likely to affect vulnerable children and adolescents the most, particularly in the education space[23]. The 2030 Framework for Action underscores such issues and concerns, calling for the needs of displaced populations to be addressed in order to strengthen the inclusion of forcibly displaced people in education[24].

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[21] UNESCO, 'The Impact of Climate Displacement on the Right to Education'.
[22] UNICEF, 'No Place To Call Home: Protecting Children's Rights When the Changing Climate Forces Them to Flee' (London, 2017), https://www.unicef.org.uk/publications/no-place-to-call-home/.
[23] UNICEF, 'It Is Getting Hot: Call for Education Systems to Respond to the Climate Crisis' (Bangkok, 2019), https://www.unicef.org/eap/media/4596/file/It is getting hot: Call for education systems to respond to the climate crisis.pdf.
[24] UNESCO, 'SDG4 - Education 2030 Framework for Action' (Paris, 2015), http://uis.unesco.org/sites/default/files/documents/education-2030-incheon-framework-for-action-implementation-of-sdg4-2016-en_2.pdf.

The education sector is particularly vulnerable to the impacts of climate change and displacement[25]. At times of hardship, education is often the first casualty, and despite progress, education is often neglected in the aftermath of mass movements due to conflicts and disasters[26]. In 2019, education received only 2.6 percent of total humanitarian funding and continues to be overlooked in many crises routinely being the most underfunded sector in humanitarian appeals[27]. Forced displacement, whether due to conflict or disasters which are both intertwined with climate change, has a negative impact on education adding considerable strain on already struggling education systems[28]. Furthermore, learners displaced or trapped by environmental change fall through the cracks of international protection mechanisms focused on the legal definition of 'refugees', leaving them in a state of limbo[29]. The rights of those internally displaced are detailed in the Guiding Principles on Internal Displacement, including principle 23 which reaffirms the right to education, however these principles are not legally binding[30].

These challenges overlap and interact with the more visible and blatant impacts of climate change, notably intensifying extreme weather events, which deny and inhibit learners' access to education. In the wake of climate-related disasters, children and learners may be displaced to locations that are simply too far from educational facilities to make continuity of learning possible[31]. For those within reach of schooling infrastructure, they may find schools destroyed, damaged or being used to provide shelter for stricken and displaced communities, of which they may be part[32]. Even when schools remain operational, they are often faced with teacher shortages, which are a common feature of displacement situations, due in part to teachers having fled, coupled with a lack of equitable and reliable remuneration needed to ensure their supply, retention, and motivation[33]. Currently, these impacts of internal displacement on education systems tend not to be included in planning processes, meaning education infrastructure in host areas is unprepared to absorb new students[34].

Evidence recently produced by IDMC has begun to reveal the scale of disruption caused to learners by internal displacement, estimating that more than 4.4 million children of primary and lower secondary school age between the ages of 5 and 14 in sub-Saharan Africa are at risk of having their education affected by internal displacement[35]. However, when considered against the backdrop of 127 million primary and secondary school school-age children and young people living in crisis-affected countries being out of school, which accounts for 50% of the global out-of-school population, the estimate for IDPs is likely to be conservative[36]. The discrepancy in these data demonstrate the need to better document and understand displacement and its intersection with education, including the role and influence of climate change.

Climate-displacement as a risk multiplier and aggravator in education

Climate-displacement is likely to see sizeable populations move from high-risk settings to urban areas where the risks are different yet still high. There is the potential for the emergence of overlapping and

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[25] UNESCO, 'Global Education Monitoring Report 2019: Migration, Displacement and Education - Building Bridges, Not Walls' (Paris, 2018), https://unesdoc.unesco.org/ark:/48223/pf0000265866; UNICEF, 'It Is Getting Hot: Call for Education Systems to Respond to the Climate Crisis'.

[26] UNICEF, 'No Place To Call Home: Protecting Children's Rights When the Changing Climate Forces Them to Flee'.

[27] Inter-Agency Network for Education in Emergencies, '20 Years of INEE: Achievements and Challenges in Education in Emergencies', 2020, https://inee.org/system/files/resources/20 Years of INEE_ENGLISH.pdf.

[28] UNESCO, 'Global Education Monitoring Report 2019: Migration, Displacement and Education - Building Bridges, Not Walls'.

[29] UNESCO and UNEP, 'Climate Change Starters Guidebook: An Issues Guide for Education Planners and Practitioners' (Paris, 2011), https://unesdoc.unesco.org/ark:/48223/pf0000211136.

[30] United Nations, 'Guiding Principles on Internal Displacement', n.d., https://www.internal-displacement.org/sites/default/files/publications/documents/199808-training-OCHA-guiding-principles-Eng2.pdf.

[31] UNICEF, 'No Place To Call Home: Protecting Children's Rights When the Changing Climate Forces Them to Flee'.

[32] UNICEF; UNICEF, 'It Is Getting Hot: Call for Education Systems to Respond to the Climate Crisis'.

[33] UNESCO, 'Global Education Monitoring Report 2019: Migration, Displacement and Education - Building Bridges, Not Walls'.

[34] UNICEF and IDMC, 'Equitable Access to Quality Education for Internally Displaced Children' (Geneva, 2019), https://www.internal-displacement.org/sites/default/files/publications/documents/Education for Internally Displaced Children_web.pdf.

[35] IDMC, 'The Impacts of Internal Displacement on Education in Sub-Saharan Africa', 2020, 1–42, https://unesdoc.unesco.org/ark:/48223/pf0000373666.

[36] Inter-Agency Network for Education in Emergencies, '20 Years of INEE: Achievements and Challenges in Education in Emergencies'.

increasingly complex emergencies and protracted crises, involving displacement, unplanned urbanisation and a lack of quality or any education provision. Additionally, people who are trapped by climate and environmental change may become more prone to humanitarian emergencies and possibly even further displacement if their situation worsens, or if extreme events occur[37].

Children and youth with disabilities are particularly vulnerable to disasters, and by implication climate change and displacement, due to the socioeconomic and health factors inherent to disabilities[38]. To fully achieve inclusiveness, education systems in the face of climate-displacement and trapping need to consider the impact of these dynamics on learners with disabilities. Considering climate change is affecting the most vulnerable first and hardest, there is an urgent need to examine the impacts on and possibilities for learners with disabilities. This specific angle is drastically under researched and little attention is currently paid to displaced learners with special educational needs and disabilities, reflecting a broader normative ableism in education scholarship and systems[39].

At least half of all internally displaced persons are women and girls, totalling around 21 million[40]. Displacement has gender-specific implications for both education responses and outcomes, in few cases mobility creates opportunities to break free of gendered social moulds but more frequently it exacerbates gender-based vulnerability[41]. For example, research from Bangladesh shows that due to the poorest being hit hardest by environmental hazards, they are more likely to have some family members move regularly or permanently to seek work leaving vulnerable women and children behind[42]. When women and girls are displaced by climate change evidence shows the potential for them to fall into a poverty trap is much higher and their prospect to return and restore their lives, including through education, is lower than their male counterparts[43]. Research in Somalia by IDMC also reveals the gendered impacts of displacement on education, when forced to make a choice between sending their boys or girls to school drought-displaced families whose resources were not enough for both sent mostly boys[44].

ADAPTATION AND BUILDING CLIMATE-DISPLACEMENT RESILIENCE IN EDUCATION SYSTEMS THROUGH CRISIS-SENSITIVE PLANNING

The lack of data and the difficulty of predicting population movements due to environmental change poses a range of challenges for education policymakers and planners. The extent to which climate change, environmental change, and displacement disrupt learners' access to equitable and quality education and more broadly determine equal access to education is highly dependent on policy action and planning. To this end, governments and specifically education ministries must recognize education's role in adapting to and mitigating climate change by engaging in and steering concerted climate action. Ultimately, the goal should be to limit and reduce the release of greenhouse gas emissions, whilst increasing countries' adaptation to negative climate change effects. Intervention areas for education to actively contribute to climate change adaptation and mitigation include Education for Sustainable Development (ESD), the use of vocational and technical education and training and higher education research and development to

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[37] The Government Office for Science, 'Foresight: Migration and Global Environmental Change'.

[38] Helen J Boon et al., 'School Disaster Planning for Children with Disabilities: A Critical Review of the Literature', *International Journal of Special Education* 26, no. 3 (2011), https://files.eric.ed.gov/fulltext/EJ959015.pdf.

[39] Caroline Oliver and Nidhi Singal, 'Migration, Disability and Education: Reflections from a Special School in the East of England', *British Journal of Sociology of Education* 38, no. 8 (17 November 2017): 1217–29, https://doi.org/10.1080/01425692.2016.1273757.

[40] IDMC, 'Women and Girls in Internal Displacment', 2020, https://www.internal-displacement.org/sites/default/files/publications/documents/202003-twice-invisible-internally-displaced-women.pdf.

[41] UNESCO, 'The Intersections between Education, Migration and Displacement Are Not Gender-Neutral' (Paris, 2019), https://unesdoc.unesco.org/ark:/48223/pf0000366980/PDF/366980eng.pdf.multi.

[42] Edmund C. Penning-Rowsell, Parvin Sultana, and Paul M. Thompson, 'The "Last Resort"? Population Movement in Response to Climate-Related Hazards in Bangladesh', *Environmental Science & Policy* 27 (2013): S44–59, https://doi.org/10.1016/j.envsci.2012.03.009.

[43] Namrata Chindarkar, 'Gender and Climate Change-Induced Migration: Proposing a Framework for Analysis', *Environmental Research Letters* 7, no. 2 (2012), https://doi.org/10.1088/1748-9326/7/2/025601.

[44] IDMC, 'Women and Girls in Internal Displacment'.

facilitate the transition to green economy, retrofitting and construction of green and climate resilient school infrastructure, and other green purchasing of education supplies as outlined in figure 2.

AN ACTIVE AGENDA FOR CLIMATE CHANGE ADAPTATION AND MITIGATION IN AND THROUGH EDUCATION

Climate change and environmental education in schools and communities through Education for Sustainable Development (ESD) to facilitate climate actions and transition to green economy	Vocational education and technical training, and R&D for sustainable development	Construction of green school infrastructure, transport and waster management

ACTION PILLARS

Education policy, planning & implementation in the face of climate change and displacement

- Policies and plans to protect learners, teachers and school personnel from risks and ensure education continuity
- School infrastructure is safe and climate resilient through relocation, retrofitting, replacement and construction of climate resistant infrastructure
- MoEs have access to educational and non education data (such as climate and environmental change models and population movements) to inform planning and decision making for inclusive education continuity
- Education is part of national, regional and global policies, financing strategies and actions to adapt to and mitigate climate change and displacement
- MoE and partners possess individual, organizational and institutional capacities to plan for climate risk analysis, preparedness and mitigation strategies and for addressing needs for displaced learners and teachers

Education financing & coordination

- Build an enabling financial environment and public procurement mechanisms for investment in climate resilient education
- Provide financial support to low-income and vulnerable households including displaced communities that are at risk of climate disasters
- Provide contingency funds for climate disaster prevention and response and inclusion of displaced populations
- MoEs and partners coordinate to ensure effective climate adaptation strategies

AN ENABLING INSTITUTIONAL, POLICY AND FINANCING FRAMEWORK for CLIMATE CHANGE MITIGATION AND ADAPTATION
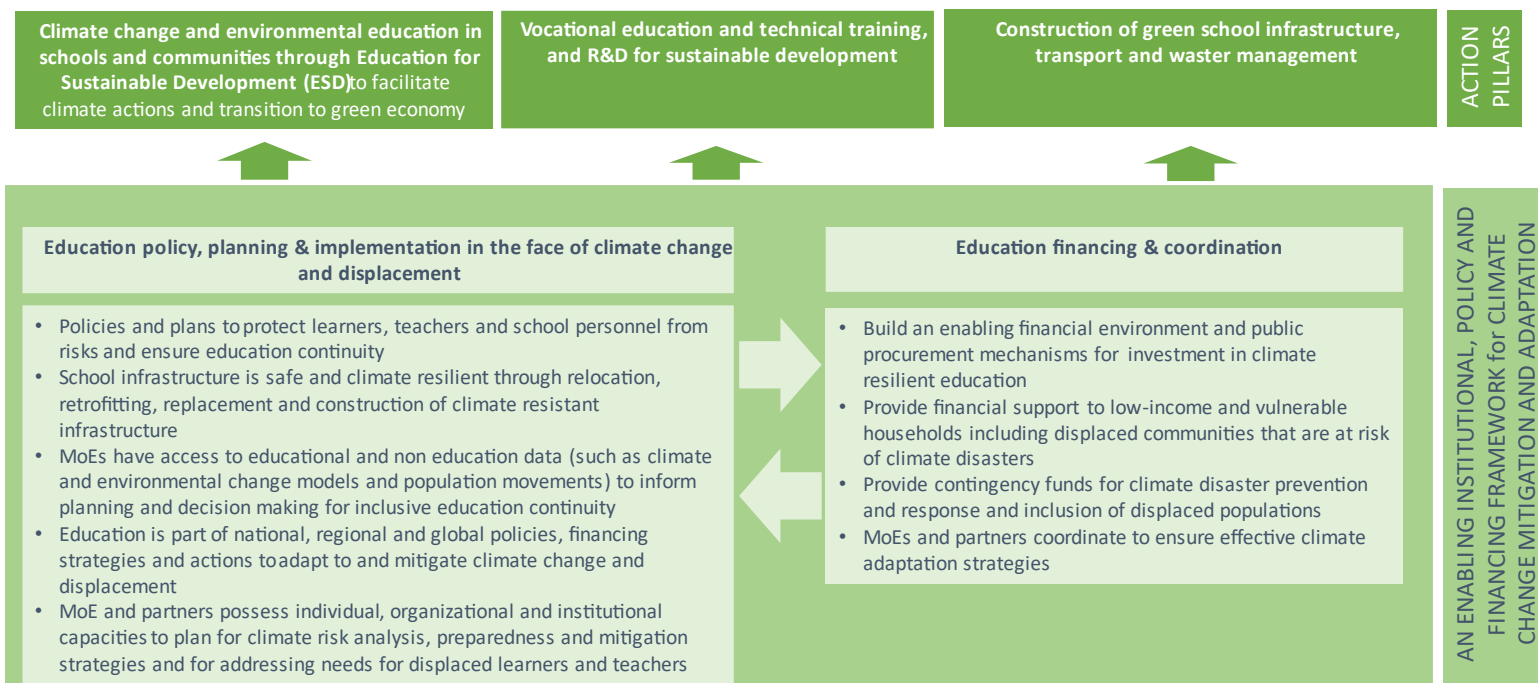
Figure 2: Education's contribution to climate change adaptation and mitigation. Source: UNESCO IIEP, forthcoming

Education systems must also adapt to the effects of climate change including displacement by taking action to prepare for and adjust to both the current effects of climate change and the predicted future impacts[45]. Both, mitigation and adaptation strategies require an enabling institutional, policy and financing framework. To that end, it is crucial to understand how risks resulting from climate change including displacement impact education service delivery and how education systems can reduce their impact and occurrence, as defined in UNESCO-IIEP's crisis-sensitive educational planning approach.

Crisis-sensitive educational planning (CSP) involves identifying and analysing the risks to education posed by conflict and natural hazards including climate-related hazards.. This means understanding both how these risks impact education systems, and how education systems can reduce their impact and occurrence. The aim is to lessen the negative impact of crises on education service delivery, whilst fostering the development of education policies and programmes that will help prevent future crises arising in the first place and manage those that cannot be prevented. A key part of CSP is to preserve education even in the most difficult circumstances whilst overcoming inequity and exclusion in education, which can exacerbate the risk of grievances and conflict when left unchecked.

Climate change mitigation and adaptation strategies are most effective when they are well planned and budgeted for, led and supported by national and local policies, coordinated across different governmental and non-governmental entities, and financed and procured sustainably[46]. Educational planning that is sensitive to risks and underlying factors that expose certain populations to disproportional risks has the potential to address and mitigate those risks, reducing the vulnerability of affected populations.

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[45] European Commission, 'Climate Action: Adaptation to Climate Change', n.d., https://ec.europa.eu/clima/policies/adaptation_en.

[46] IIEP, 'Extensive Literature Review on the Interactions between Climate Change, Conflict and Disasters, and Education' (Paris, 2021).

Invest in new approaches to data, evidence and research

Despite continued improvements in the availability of data and modelling on the role of environmental and climate change on human mobility, including an increasing number of context-specific micro-level studies, disaggregated and detailed data remains unavailable[47]. Education-specific data and modelling related to climate-displacement is virtually non-existent. To understand scale, depth, and dynamics of displacement and its impact on education, including with relation to climate change, a new approach to data, evidence, and research is needed. Education planners and managers not only require access to predictive models to assess the likelihood and scale of future displacement linked with climate change, but they also need to be able to link findings from these predictive models to other non-educational data (such as household surveys, poverty dynamics, etc.). Furthermore, such data and modelling need to then feedback into education management information systems (EMIS) to inform crisis prevention and crisis management strategies for affected areas. This includes specific education strategies for displaced learners and teachers before, during, and after crises hit.

Safe and climate resilient school infrastructure

In the past decades, many countries have adopted safer school construction guidelines and standards to ensure the safety of learners and education personnel. However, investment in climate-proof education infrastructure is slow. As climate change introduces new risks, including extreme heat waves, flooding and drought, education facilities must adapt. Planning for suitable school construction sites needs to take into consideration climate change projections to avoid areas which are likely to be affected by rising sea levels, floods or typhoon risks[48]. Temporary or mobile education facilities can be an adaptive and cost-effective solution for climate displaced learners or replace school buildings damaged by extreme weather. Adaptive solutions remain limited with the result that students affected by the climate crisis and displacement miss classes and risk dropping out of school.

Ensuring that education infrastructure is climate resilient and adaptive to population movements requires new approaches in educational planning, specifically the integration of geospatial, climate change, and displacement data into school mapping and other planning tools. Existing practices that take into consideration regular movements of populations such as of nomadic families may offer useful insights into the opportunities and challenges of mobile school infrastructure. Similar, experiences from decades-long investments in school safety as part of the disaster risk reduction in education agenda will be key in identifying strategies to ensure both, climate resilient and displacement appropriate school infrastructure.

Mainstream climate change into education sector plans and policies

Integrating climate risk and vulnerability assessments into standard education sector and situation analysis allows for improved information on vulnerable populations affected by or at risk of displacement, as well as on segments of the population who remain in place and immobile. Such assessments consequently inform the preparation of crisis-sensitive education policies and sector plans, supporting governments for example in tackling the challenge of ensuring the provision of equitable and quality education to vulnerable populations without locking them into areas of extreme risk which may increasingly become unviable[49].

Education policies and sector plans should detail strategies at school, community, and system level to prevent, prepare for, and mitigate crisis. Depending on the context, this can include strategic provisions for building new schools in hazard-free areas, potentially introducing a double shift system in areas affected by climate-displacement, and setting up comprehensive school safety programs including school-level contingency plans, school staff training in DRR and alternative education modalities. The small island state of Kiribati for example has issued a 'migration with dignity policy', as part of the nation's long-term relocation strategy which addresses climate induced sea level rise. Based on potential host countries' demand for skilled workers such as in health and care, the policy aims to equip the population with relevant

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[47] IIEP.

[48] UNICEF, 'It Is Getting Hot: Call for Education Systems to Respond to the Climate Crisis'.

[49] Cristina Cattaneo et al., 'Human Migration in the Era of Climate Change', *Review of Environmental Economics and Policy* 13, no. 2 (2019): 189–206, https://doi.org/10.1093/reep/rez008.

qualifications to access decent work opportunities abroad[50]. During the process of policy and plan development, MoEs need to ensure representation of affected communities, ensuring that their voices, opinions, and perspectives are heard and addressed in policies and plans.

Concrete provisions for climate change actions including for displacement in sector plans allow Ministries of Education (MoEs) to allocate domestic finances and lobby for external financial resources[51]. In several countries in East Asia and the Pacific, funding allocated to MoEs for climate-related disaster response is mainstreamed into education budgets. However, contingency funds available for education in the case of climate-related disasters are– like global emergency funding –disproportionally small compared to other sectors, including agriculture and infrastructure[52].

Much remains to be done to understand and monitor the effectiveness of climate adaptation measures in education to learn, adapt to and test new strategies. This includes education sector plans and policies that promote research and development and public debate, including at school and community level to evaluate the effectiveness of strategies taken and to allow local-level decision makers and implementers to diagnose design mistakes and implementation weaknesses. Such a trial-and-error approach at local level must be taken seriously by system leaders through institutionalized feedback loops to devise system strengthening reforms that allow for effective strategies to adapt to climate change and mitigate effects that cannot be prevented.

Finally, addressing climate change and displacement effectively through preparedness and adaptation requires a collective and coordinated response across sectors, with relevant government agencies fully involved, including ministries of environment, national emergency management authorities, ministries of health and other national and sub-national stakeholders. A key concern for effective leadership remains governments' and societies' "myopic worldview", underestimating or simply neglecting increasing risks due to climate change[53]. This is visible in low investments in preparedness. As investment in preparedness has far less visible outcomes and can require unpopular decisions such as prioritizing wetlands over settlements, thus it is often eclipsed by issues considered more politically salient by politicians and voters. Putting budgets towards disaster preparedness which carries a significant return on investment in saved time and money during responses[54] requires both effective leadership including in education and an informed public.

CONCLUSION -- BEYOND ADAPTATION, TOWARDS A SUSTAINABLE FUTURE IN EDUCATION:

To conclude, this paper through conceptualizing climate-displacement and exploring its relationship and multitude of intersections with education has elucidated some of the complexity, nuance, and interconnectedness of the risks and challenges posed by climate change. The discussion and evidence presented is by no means exhaustive and is limited by the availability of education-specific research and evidence. Furthermore, it is essential that there is recognition that despite the urgent need for mitigation and adaptation detailed in the previous section, moving towards a sustainable future requires a much broader and radical rethinking of education.

Climate-displacement poses a real challenge to existing knowledge, understanding, and ways of working, including blurring the lines between the conventional categorizations of human mobility. The impacts of climate-displacement in, on and through education are likely to be highly unequal, with existing inequalities involving gender, disability, income and wealth, race, and migration status at risk of being exacerbated and becoming entrenched. To avoid repeating the discussion above and to provide scope for future research and thinking in this area, as a means of concluding, this paper offers thoughts, questions, and potential

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[50] UNICEF, 'It Is Getting Hot: Call for Education Systems to Respond to the Climate Crisis'.

[51] UNICEF.

[52] UNICEF.

[53] Andrew Healy and Neil Malhotra, 'Myopic Voters and Natural Disaster Policy', *American Political Science Review* 103, no. 3 (2009): 387–406, https://doi.org/10.1017/S0003055409990104.

[54] Healy and Malhotra.

directions on how education in the context of climate change and displacement can go beyond adaptation and towards a sustainable future in education.

UNESCO's International Commission on the Futures of Education, an independent commission convened to rethink education in a world of increasing complexity, uncertainty, inequalities, risks, and possibilities, has recently highlighted the urgency of changing course in education towards the concept of "regenerative education"[55]. The commission has observed that it is increasingly becoming obvious that our existing education systems are inadequately prepared and no longer viable in the context of accelerating climate change. We are now at a critical juncture in education, demonstrated viscerally by COVID-19, where radical change is required in the design of education systems, the organization of educational institutions, and pedagogical approaches[56].

> *The concept of regenerative education has obvious consequences for the organization of educational institutions, curricula and pedagogical practices. But at present, the ways we organize education and structure opportunity across the world do not do enough to ensure peaceful societies, a livable planet, and shared progress that benefits all.*
>
> *International Commission on the Futures of Education, 2021*

Responding to this in the context of climate-displacement, education systems must seek to go beyond just adapting to the challenges posed, they must respond to the demands of learners for justice and a sustainable future, whilst simultaneously addressing the inequalities faced by displaced learners. Although building resilience in education systems is critical, it must not become a vehicle through which tolerance of increased precarity and risk is cultivated[57].

Furthermore, climate-displacement has the potential to induce widespread psycho-social trauma, cause a heightened sense of injustice and breakdown social cohesion within and amongst communities and learners[58]. For many displaced learners, and their communities, the injustice and inequality goes beyond displacement and the associated loss of their security and livelihood with the impacts extending to a severing of their connection to their ancestral land, identity, wellbeing and culture[59]. In this context education must be reimagined and reshaped to fulfil its regenerative role. For example, at a granular level teachers and support staff in areas hosting those climate-displaced learners need to be provided with the skills and knowledge to open space for the expression of this injustice and allow learners to reestablish their culture, languages, and identity whilst learning in displacement. This space and practice have the potential to open new forms of solidarity, pedagogy, learning and provides the opportunity to build sustainable peace.

The need to address injustice, trauma, and inequality, not sustain and reproduce them, in and through education has been recognized in the field of peacebuilding and the associated nexus between conflict, peace, and education[60]. It has been recognized that education can make a significant contribution to sustainably addressing inequality as well as political, economic, social, and cultural transformation within

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[55] UNESCO, 'International Comission on the Futures of Education: Progress Update' (Paris, 2021), https://unesdoc.unesco.org/ark:/48223/pf0000375746.locale=en.

[56] UNESCO.

[57] Black et al., 'Migration, Immobility and Displacement Outcomes Following Extreme Events'.

[58] Ayeb-Karlsson, Kniveton, and Cannon, 'Trapped in the Prison of the Mind: Notions of Climate-Induced (Im)Mobility Decision-Making and Wellbeing from an Urban Informal Settlement in Bangladesh'.

[59] Oxfam, 'Forced from Home: Climate-Fuelled Displacement'.

[60] Mario Novelli, Mieke T A Lopes Cardozo, and Alan Smith, 'The 4Rs Framework: Analyzing Education's Contribution to Sustainable Peacebuilding with Social Justice in Conflict-Affected Contexts', *Journal on Education in Emergencies* 3, no. 1 (2017): 14–43, http://s3.amazonaws.com/inee-assets/resources/JEiE_V3_N1__4Rs_Framework.pdf.

crisis-affected societies[61]. However, the potentially transformative role of education is deeply connected to and embedded within processes of social justice and societal transformation[62]. Such an approach recognizes that representation of affected communities is a critical first step.

Those most affected by climate change are largely absent from debate around the issue, even within their own states they often do not impact the political agenda[63]. This is true in the education space learners, teachers, and communities are noticeably absent from discussions on climate change and its effects on education. In this regard, it is vital that those affected by climate change are immediately included in key decision-making processes regarding education. Moving from analysis to action, it is vital that those learners, teachers, and communities who are impacted by climate change, including those in host communities, are given space and genuine power in shaping how education systems respond. Finally, the need for participatory approaches and representation applies beyond education policy and planning, those researching and involved in knowledge production around the nexus between climate change, displacement, and education should also be acutely aware of representation.

The call for representation, recognition and inclusivity of affected and local communities is also echoed in debates in the humanitarian space, the Network of Empowered Aid Response has led this call in relation to the Grand Bargain stating, "there needs to be a bold transformative shift in the process to one which is inclusive, truly global and accountable"[64] and observing the lack of meaningful spaces where local actors can engage[65].

To interact and engage in a shift towards the concept of "regenerative education", defined above, education responses to displacement should embrace the need to go beyond a push or call to re-establish or return to pre-displacement 'normalcy' which likely upholds existing social inequalities, as previously outlined, as this would disallow opportunities to radically rethink environmental and social relations constructed through education[66]. For education to play a regenerative and reparative role it must be alive to past and present injustices, creating a space for multiple and at times competing knowledge traditions and seeking to understand the entangled histories of climate-displaced learners[67]. Similarly to violence and conflict, displacement, and its drivers, cannot be separated from the entrenched societal histories in which they occur or be framed as singular instances of crisis[68].

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[61] Novelli, Cardozo, and Smith.

[62] Novelli, Cardozo, and Smith.

[63] Benoît Mayer, '"Environmental Migration" as Advocacy: Is It Going to Work?', n.d.

[64] Network for Empowered Aid Response, 'NEAR's Recommendations on the Future of the Grand Bargain', 2020, https://static1.squarespace.com/static/5fc4fd249698b02c7f3acfe9/t/60115a22eef3935c51ca76e9/1611749930381/Future+of+the+Grand+Bargain+-+NEAR+Statement.pdf.

[65] Network for Empowered Aid Response, 'What Impact Is the Grand Bargain Having in the Global South?', 2020, https://static1.squarespace.com/static/5fc4fd249698b02c7f3acfe9/t/601158f3bfa61501b1067754/1611749626670/NEAR+Grand+Bargain+Survey+Report.pdf.

[66] Danielle Zoe Rivera, 'Disaster Colonialism: A Commentary on Disasters beyond Singular Events to Structural Violence', *International Journal of Urban and Regional Research*, 2020, https://doi.org/10.1111/1468-2427.12950.

[67] Arathi Sriprakash et al., 'Learning with the Past: Racism , Education and Reparative Futures', Futures of Education Initiative (Paris, 2020), https://unesdoc.unesco.org/ark:/48223/pf0000374045.

[68] Rivera, 'Disaster Colonialism: A Commentary on Disasters beyond Singular Events to Structural Violence'.