The intersection between climate change and education

Mapping and analysis of the evidence base (desk study)

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Annexes

Acronyms and abbreviations

ACE	Action for Climate Empowerment
CC	Climate Change
CC-EDU	Climate Change and Education Intersection
CC-GE-SRHR	Climate Change, Gender Equality and Sexual and Reproductive Health and Rights
CCE	Climate Change Education
CERI	Centre for Education Research and Innovation (at OECD)
CSES	Climate-Smart Education System
DRR	disaster risk reduction
ECW	Education Cannot Wait
EiE	Education In Emergencies
EiE Hub	Geneva Global Hub for Education in Emergencies
FCDO	Foreign, Commonwealth and Development Office
GCA	Global Centre on Adaptation
GDP	Gross Domestic Product
GEP	Greening Education Partnership
GPE	Global program on Education
IPCC	Intergovernmental Panel on Climate Change
IIED	International Institute for Environment and Development
L&D	Loss and Damage
MFA	Ministry of Foreign Affairs
NCG	Nordic Consulting Group
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organisation
Norad	Norwegian Agency for Development Cooperation
ODA	Official Development Aid
OECD	Organisation for Economic Co-operation and Development
OHCHR	Office of the United Nations High Commissioner for Human Rights
PTSD	Post-Traumatic Stress Disorder
SDG	Sustainable Development Goals
SRHR	Sexual and Reproductive Health and Rights
StC	Save the Children
ToR	Terms of Reference
UN Women	United Nations entity dedicated to gender equality and the empowerment of women.
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNGA	United Nations General Assembly
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WASH	Water, Sanitation and Health Services
CCRI	Children's Climate Risk Index

Terminology

Unless indicated otherwise, the terminology and concepts used refer to the global glossaries of the Intergovernmental Panel on Climate Change (IPCC) and the Inter-agency Network for Education in Emergencies (INEE). See the full list in Annex 2.

Box 1 - Key concept and definitions

Climate-Induced displacement	Climate-induced displacement refers to the forced movement or relocation of people due to climate change-related crises or disasters, such as extreme weather events, sea-level rise, droughts, and desertification. It can be temporary or permanent and includes both sudden-onset disasters like storms and floods, as well as slow-onset impacts like rising sea levels and increasing droughts. Source: European Union Agency for Asylum.
Direct impacts of climate change on the education system	Impacts occur when school facilities and resources are physically damaged, education provision is disrupted and lives, health and wellbeing of students and teachers are adversely and immediately impacted by sudden-onset, climate change-induced hazard events or occurrences such as cyclones, floods, storm surges, torrential rains and extreme temperatures. Source: UNICEF 2022.
Disaster	A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. Source: UNGA/IPCC.
Extreme weather events	Short-term localised phenomena that deviate from the normal weather conditions, such as heat waves, floods, droughts, storms and wildfire. Source: OECD 2024.
Hazard	The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources (IPCC).
Human mobility	The permanent or semi-permanent move by a person for at least 1 year and involving crossing an administrative, but not necessarily a national, border. Source: IPCC.
Indirect impacts of climate change on the education system	Impacts where the education system and stakeholders are not immediately affected by the climate system but are influenced by incremental environmental changes and delayed climate change impacts through slow-onset events (e.g., drought, sea level rise, salinity intrusion, erosions) and/or via some intermediary (e.g., changes in ecosystems, migration patterns, agriculture, food and water security, diseases). Source: UNICEF, 2022).
Learning environment	The diverse physical locations, contexts, and cultures in which students learn such as outdoor environments, private homes, childcare centres, pre-schools, temporary structures, and schools. The term also encompasses the culture of a school or class- its presiding ethos and characteristics, including how individuals interact with and treat one another- as well as the ways in which teachers may organize an educational setting to facilitate learning, e.g. by conducting classes in relevant natural ecosystems, grouping desks in specific ways, decorating the walls with learning materials, or utilizing audio, visual, and digital technologies. School policies, governance structures, and other features may also be considered elements of a learning environment. Source: INEE.
Learning poverty	Learning poverty means being unable to read and understand a simple text by age 10. This indicator brings together schooling and learning indicators: it begins with the share of children who haven't achieved minimum reading proficiency (as measured in schools) and is adjusted by the proportion of children who are out of school (and are assumed not able to read proficiently). Source: World Bank 2022.
Slow-onset disaster	A disaster that evolves gradually from incremental changes occurring over many years or from an increased frequency or intensity of recurring events. Slow-onset disasters relate to environmental degradation processes such as droughts and desertification, increased salinization, rising sea levels or thawing of permafrost. Source: INEE.
Sudden-onset disaster	A disaster triggered by a hazardous event that emerges quickly or unexpectedly. Sudden-onset disasters may be climate-related (e.g., floods, cyclones, landslides, tornadoes, wildfires), geologic-related (earthquakes, tsunamis, or volcanic eruptions) or not (e.g., chemical explosion or critical infrastructure failure). Depending on their severity and the affected community's vulnerabilities and adaptive capacity, they may also result in temporary (or sometimes protracted) displacement. Source: INEE.

Executive Summary

This report presents a desk study and analysis of relevant literature specific to prioritised themes at the intersection of climate change and education, focusing on basic education in low-income countries. The purpose of the desk study is to establish the evidence base, identify knowledge gaps, trends and promising practices, with the view to inform policy and programming in the intersection between education and climate change.

The desk review covers the following two thematic clusters:

A – the impact of climate-induced disaster and displacement on education, including:

1. Climate change-induced destruction of education infrastructure and degradation of physical learning environments.
2. Climate change, education, vulnerability and gendered inequality.
3. Climate change-induced displacement and impact on educational outcomes.

B – the impact of education on empowerment and climate change action, including:

4. Education as empowerment and children and youth as agents of change,
5. Education as a driver towards achieving climate goals.

This desk study on the intersection of climate change and education is one of two studies commissioned by the Danish Ministry of Foreign Affairs. A similar study on the intersection of climate change, gender equality, sexual reproductive health and rights was prepared under separate cover. The common conceptual framework developed for the studies is founded on the principles of a human rights-based approach, which is at the core of Denmark's official development assistance. Both reports are based on peer-reviewed academic evidence, 'grey' policy-relevant literature produced by organisations and practitioners, and triangulation through stakeholder interviews.

Overall trends and implications

The review underscores the grave current impacts of climate change on education infrastructure and the centrality of efforts to reduce these impacts to protect learners from climate-related disasters. There is compelling evidence that education infrastructure is heavily affected by slow - and sudden-onset disasters and that climate change is a driver of displacement. There is scientific and policy consensus within the Organisation for Economic Co-operation and Development (OECD) that climate change-induced disasters will increase in severity and number in the near future. Likewise, the dire outlook for the intersection of climate change and education is a related increase in damages to educational infrastructure, degradation of learning environments and disrupted education due to climate-induced displacement and human mobility.

The reviewed literature and stakeholder interviews reveal considerable shared urgency in responding to the direct and indirect impacts of climate change on education in more integrated and agile manners, both from a donor perspective and from the perspective of affected contexts.

A trend towards integrating humanitarian, disaster risk reduction and development efforts in the education sector has gained momentum, and policy discourse promotes the converging responses to sudden-onset climate change-induced emergencies (i.e., immediate-term direct effects of climate change) and slow-onset climate change-induced indirect effects. This ongoing integration of Education in Emergencies and Climate-Smart Education Systems field of practices promises a 'climate-smart building back better' approach that increases resilience and is geared towards, for example, ameliorating the slow but steadily worsening effects of extreme heat on education outcomes. In addition, Integrating and boosting climate change education is widely advocated. The global context of the intersection of climate change and education includes the fact that progress on Sustainable Development Goal 4 on quality education is far behind. Funding does not meet the needs, to ensure that all children have access to quality education: the annual shortfall for the education sector in low and middle-income countries is at 100 USD billion (UNESCO, 2023). Funding needs specific to the intersection of climate change and education only add to this.

There is a policy trend towards more integrated, responsive, and efficient use of mechanisms and resources. However, national governments and the international official development financing community face stark choices in considering additional financing targeting the intersection of climate change and education. This poses severe challenges in ensuring children's fundamental right to access to education in low – and middle-income countries.

Key messages

A – The impact of climate-induced disaster and displacement on education

Global context of the intersection of climate change and education

- Climate change exacerbates high rates of learning poverty in low and middle-income countries.
- Climate change undermines the foundations and preconditions for the delivery of quality education.
- Climate change education for climate action is premised on a foundation of quality education.
- Education is under threat from climate change - especially for women and girls.

Destruction and degradation

- Sudden-onset climate disasters like floods, storms, and cyclones degrade educational infrastructure and learning environments. As climate change increases the frequency of these events, the destruction of educational infrastructure will accelerate.
- Frequent and intense heat waves, combined with inadequate investments in heat safety adaptations for classrooms, negatively impact learning environments in developing countries.
- The effects of climate change on educational infrastructure and their subsequent impact on educational attainment and learning outcomes are significantly under-studied.

Vulnerability and gendered inequality

- Education has positive effects on reducing vulnerabilities.
- Climate change exacerbates inequalities and limits access to education, making impoverished communities especially vulnerable. Disasters impacting livelihoods can reduce children's school attendance.
- Children with disabilities are an overlooked, especially vulnerable segment, and structural under-investments in evidence-based education-focused rights-based programming perpetuate their marginalisation.
- Impacts are gendered, and girls' education is particularly vulnerable to climate change and related disasters.

Climate-induced displacement

- Climate change is a key driver of displacement in response to sudden-onset hazards that can disrupt children's education.
- Climate-induced displacement in response to slow-onset climate change-related hazards constitutes an adaptation strategy that also can disrupt children's education.
- Rural-urban migration can increase settlements in slums, which can further marginalise children and limit their access to quality education.
- Duty-bearing countries and organisations struggle to ensure that children on the move in response to sudden or slow-onset hazards enjoy their right to education.
- A rights-based view holds that the right to education is universal and not conditional on migration status or reason for moving.

B – The impact of education on empowerment and climate change action

Education as empowerment and children and youth as agents for change

- Enhanced knowledge about climate change can increase concern but also instil the desire to take action.
- Empowerment and acknowledging children as agents of change is a key policy priority among education actors.
- Empowering children to become agents of change through education is a key policy priority at the intersection of climate change and education and is closely related to the issue of ensuring gender-equitable quality of education.
- The argument that empowerment of children through education leads to positive climate action lacks evidence.

Education as a driver towards achieving climate goals

- A core challenge at the intersection of climate change and education is that without a strong foundation in quality education, learners may not benefit from climate change education.
- A quality education boosts resilience to climate impacts, enables adaptation to change, mitigates future climate change, and reduces gender inequalities.

- Education is a key factor in increasing climate resilience and adaptation strategies.
- Girls' education is a key driver in decreasing vulnerability, particularly mortality, to climate-related disasters.
- Climate Change Education is widely advocated but there is a need for nuanced, context-specific, and evidence-based approaches to underpin initiatives.

Financing and the intersection of climate change and education

- There is a general lack of funding in relation to ensuring that all children have access to quality education.
- Funding gaps in the education sector at large, and at the intersection of climate change and education specifically, pose severe challenges in ensuring children's fundamental right of access to quality education in low and middle-income countries.

Policy implications

- It is widely recognised that the impacts of climate change on education and the role of education in climate action are understudied, and even more so in poorer countries.
- It is seen as essential to the development of resilient and adaptive education systems capable of withstanding and mitigating climate-related challenges that:
    - humanitarian efforts, disaster risk reduction, and development initiatives in the education sector are integrated using a nexus approach.
    - funding for education is at the level that meets the needs.
    - global climate finance includes funding to address the impacts of climate change on education.

Programming

- The intersection of climate change and education requires investments in robust, disaggregated data for evidence-based policy and promotion of the long-term climate-related benefits of investing in education.
- Donors supporting multilateral education organisations and global climate funds play a key role in enhancing the integration of humanitarian and development efforts in the education sector and the integration of education in climate policies and finance.
- The integration of education into national climate policies, such as the Nationally Determined Contributions, drives change. Notably, the Declaration on the Common Agenda for Education and Climate Change at COP28 includes this commitment.
- There is a lack of attention to the critical need to invest in the adaptation of the education sector to the slow-onset effects of climate change. This urgency is similarly reflected in the Declaration on the Common Agenda for Education and Climate Change at COP28.

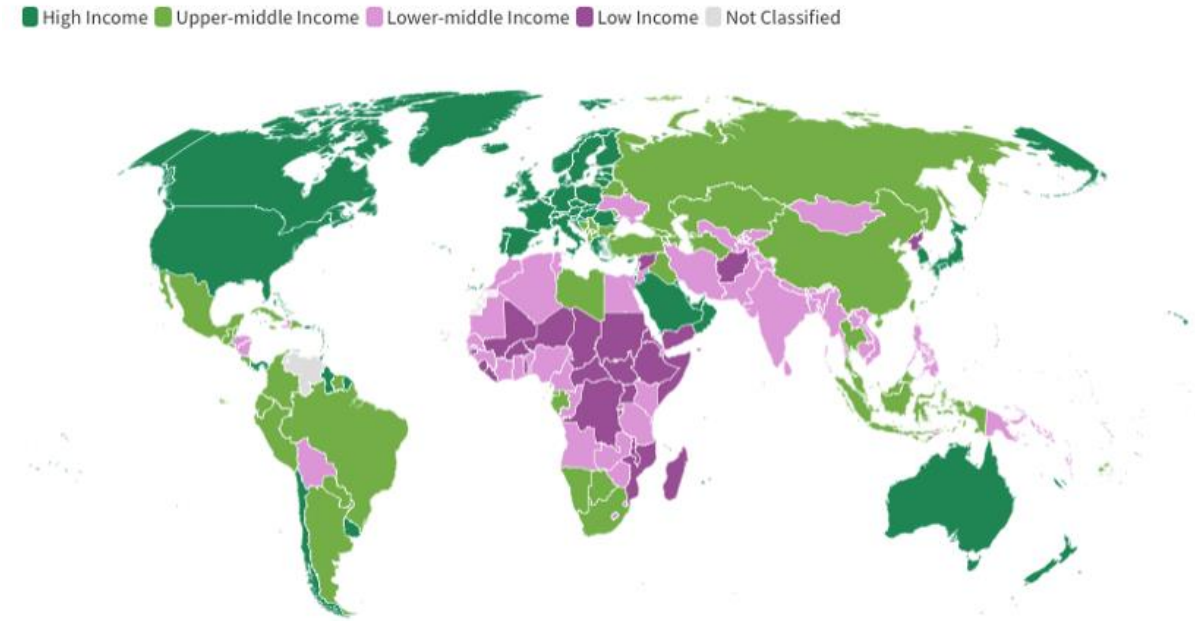
1. Introduction

Purpose

The Danish Ministry of Foreign Affairs commissioned two desk studies to identify the most relevant literature and evidence base of the intersections of climate change and education (CC-EDU) and climate change, gender equality, sexual reproductive health and rights (CC-GE-SRHR). The purpose of the deep dives into these intersections of climate change and social development is to stay abreast of the evidence and facts, identify knowledge gaps and promising practices and be informed on the policy and programming-related trends, with the view to inform future prioritisation and financing considerations.

The CC-EDU and CC-GE-SRHR desk studies are presented separately but apply a common conceptual framework and systematic review methodologies. The common conceptual framework developed for the studies is founded on the principles of a human rights-based approach (HRBA), which is at the core of Denmark's official development assistance (ODA) (see below and Figure 1). As such, both reports are based on peer-reviewed academic evidence, 'grey' policy-relevant literature produced by organisations and practitioners, and triangulation of the data through stakeholder interviews. Geographically, the analysis has aimed to prioritise low-income countries, that are concentrated in Africa as illustrated below (Figure 1). Following the initial findings, an Africa-focussed analysis has been added in Annex 6.[1]

Figure 1 – World Bank Group country classifications by income level (2024)



Source: World Bank (accessed April 2024)

Structure of the report

Chapter 1 of the report presents the purpose of the mapping and review (see above). **Chapter 2** presents the human rights based conceptual framework and the specific analytical framework used for the CC-EDU intersection. **Chapter 3** presents the review findings, and **Chapter 4** presents trends and implications emerging from the review findings. Sources consulted are presented in Annex 1; concepts and definitions in Annex 2, with details of the methodology presented in Annex 3. Annexes 4 present toolboxes and best practices. Annex 5 presents a summary overview of the CC-EDU intersection, focusing on the African continent.

Focus of the report

This report analyses prioritised themes in the CC-EDU intersection, focusing on basic education. The review was scoped to establish the evidence base, and trends as follows.[2] The structure of Chapter 3 is organised along the below five themes and includes a section on financing and the CC-EDU intersection. [3]

A – the impact of climate-induced disaster and displacement on education, including:

1. Climate change-induced destruction of education infrastructure and degradation of physical learning environments.
2. Climate change, education, vulnerability and gendered inequality.
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B – the impact of education on empowerment and climate change action, including:

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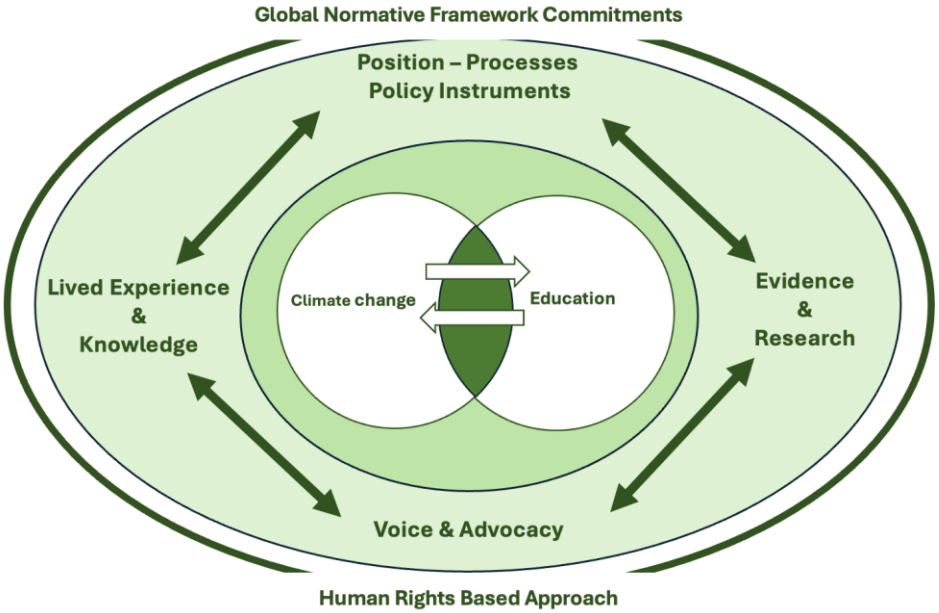
2 Conceptual and analytical frameworks

A human rights based conceptual framework

Applied to the task of assessing information, evidence, and knowledge, in this application, the HRBA serves as a reminder and counterbalance to the structural dilemma that systems of power and privilege influence what knowledge and information is invested in, is available and made to count and considered in evidence-based decision-making.

Figure 2 – Conceptual Framework human rights based lens on climate change intersections and social development applicable to the CC-EU and CC-GE-SHRR



Source: NCG Denmark

The framing of the analysis postulates that evidence-based policy and programmatic actions in the CC-GE-SRHR and CC-EDU intersections occur in a 'contested space'. The HRBA foundation of the conceptual framework values civil societies' 'voice and advocacy' as shaped by 'lived experience and knowledge' of the individuals and communities affected and living with the front-line effects of climate change. At the global level, and with significant variance across countries, power and empowerment dynamics characterise a contested space in which advocacy, often through voices of civil society and think tanks, seek to influence influence 'positions-processes and policy instruments' agreed on by decision-makers within a global normative framework such as the Paris Agreement 2015 and other United Nations' normative frameworks. Specifically for the intersection CC-EU, it is highlighted that the relationship between climate change effects, mitigation and adaptation and education is complex but commonly conceived as bi-directional. On this risk side, climate change causes learning losses, school dropouts, and long-term impacts that threaten education outcomes, underscoring the need for adaptation and mitigation. On the risk-response side, the proposition is that education propels climate action, innovation, skills, mindsets and behaviours that will support mitigation and adaptation.

Evidence-based decision-making is based on the available social and natural scientific evidence which reflects social and political systems that (re) produce the current state of rights deficiencies in the CC-GE-SRHR and CC-EDU intersections. There is an underlying risk that objectively and factually correct scientific evidence is not necessarily neutral where climate change and human rights intersect, often because research and robust evaluations are more difficult, less prioritised and carried out in poorer countries

Therefore, the authors acknowledge with humility that reviewing the state of the literature presented reflects that there is more academic literature and robustly evaluated practice where funding has enabled scientists, practitioners, and organisations.[4] Where related gaps were identified, this has been pointed out in the report.

An analytical lens on the CC-EDU intersection

The relationship between climate change effects, mitigation and adaptation and education is complex but commonly conceived as bi-directional (GCA, 2022) (World Bank, 2024b). On this risk side, climate change causes learning losses, school dropouts, and long-term impacts that threaten education outcomes, underscoring the need for adaptation and mitigation. On the risk-response side, the proposition is that education propels climate action, innovation, skills, mindsets and behaviours that will support mitigation and adaptation (UNESCO, 2023) (GPE, 2022) (World Bank, 2024b) (OECD, 2024).

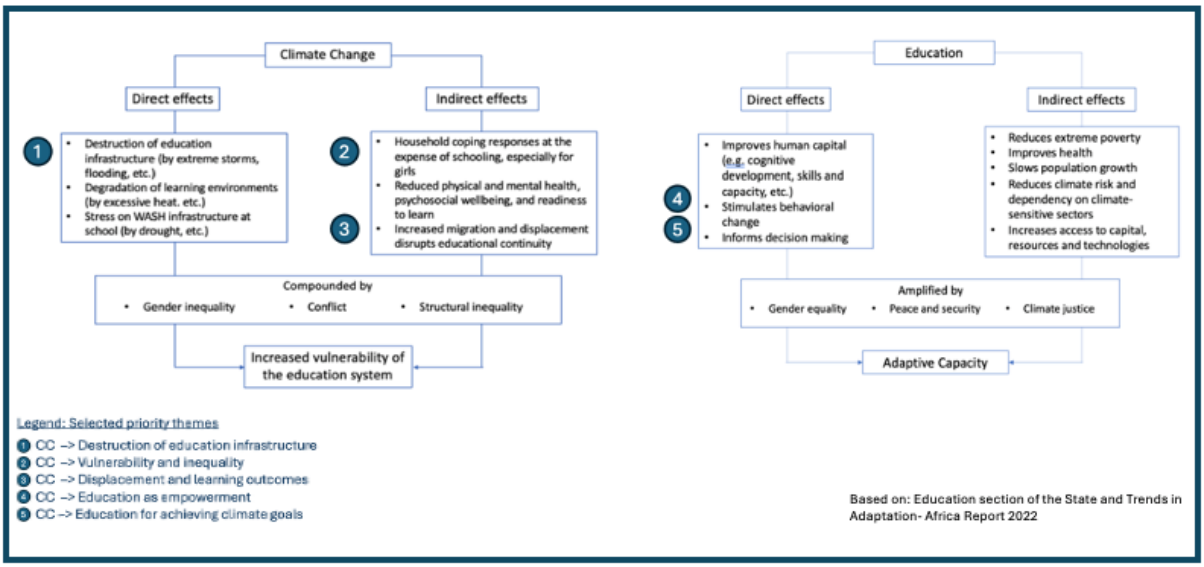
The analytical lens applied distinguishes between the direct and indirect impacts of climate change and education (UNICEF, 2022) (GCA, 2022) (World Bank, 2024b), as illustrated in Figures 2 below, see also Annex 3.

Direct impacts of climate change on the education system occur when school facilities and resources are physically damaged, education provision is disrupted, and lives, health and wellbeing of students and teachers are adversely and immediately impacted by fast-onset, climate change-induced hazard events or occurrences such as cyclones, floods, storm surges, torrential rains and extreme temperatures.

Indirect impacts of climate change on the education system are ones where the education system and stakeholders are not immediately affected by the climate system but are influenced by incremental environmental changes and delayed climate change impacts through slow-onset events (e.g., drought, sea level rise, salinity intrusion, erosions) and/or via some intermediary (e.g., changes in ecosystems, migration patterns, agriculture, food and water security, diseases).

Indirect effects can emerge through economic shocks, food insecurity, health shocks, and increased conflict, migration, and displacement. These pathways result in reduced student readiness to learn due to health and nutrition shocks, diminished demand for schooling due to household coping mechanisms, and disruption to education services due to displacement and conflict (World Bank, 2024b).

Figure 3 – Climate change and education intersection framework



Note: based on (GCA, 2022) *showing the priority areas of CC-EDU desk review presented.*

3. Situational analysis CC-EDU

3.1 Global context of the CC-EDU intersection

Key messages

- Climate change exacerbates high rates of learning poverty in low and middle-income countries.[5]
- Climate change undermines the foundations and preconditions for the delivery of quality education.[6]
- Climate change education for climate action is premised on a foundation of quality education.[7]
- Education is under threat from climate change - especially for women and girls.[8]

Key facts

- Low-income countries are more impacted by extreme weather events (OECD, 2024).
- The World Bank projects that between 68 and 132 million people could be pushed into poverty by 2030 by climate change (World Bank, 2020).
- The average of Learning Poverty in in low- and middle- income countries is 55% for females, and 59% for males. The gap is narrower in low-income countries, where Learning Poverty averages about 93% for both boys and girls. (World Bank, 2024c).
- In Sub-Saharan Africa, the learning poverty rate was at 86%, with 9 out of 10 children not being able to read and understand a basic text by age 10 (World Bank, 2024b).

The global education sector context includes the fact that progress on Sustainable Development Goal, SDG4[9] on quality education is far behind the global commitments (see box) (United Nations, 2023). The broader global context is a polycrisis of conflict, climate change, COVID-19, global decline in democracy and the rise of authoritarian regimes that threatens to unravel some of the progress that has been made on achieving the SDGs. (World Economic Forum, 2023) (UN, 2023). The World Bank projects that between 68 and 132 million people could be pushed into poverty by 2030 by climate change (World Bank, 2020).

Even without the effects of climate change, the learning poverty rate[10] (a proxy for the lack of quality education) in low-middle-income countries was 57% (higher for boys at 59%, with 55% for girls).[11] That means that 6 out of 10 children could not read and understand a basic text by age 10. In Sub-Saharan Africa, the learning poverty rate was even higher at 86% (World Bank, 2024b). An average of only 40% of youth in low-income countries attend secondary school (FCDO, 2022).

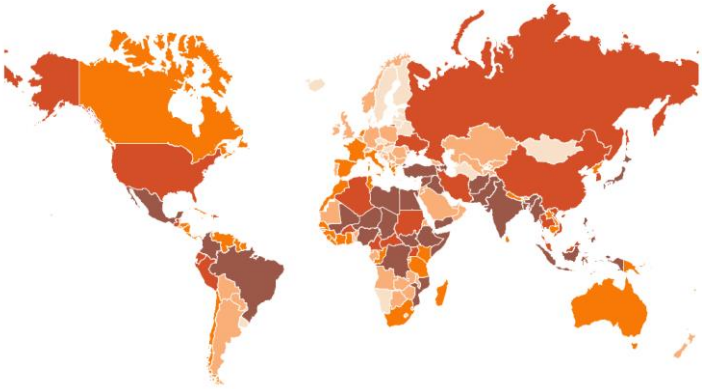
The global education sector is underfinanced. The proportion of official development aid (ODA) to education decreased from 11.7% in 2010 to 9.7% in 2021.[12] Before considering the intersection of climate change and education (which is the focus of this review), the 2023 UNESCO Global Education Monitoring Report posits that the annual global funding gap for the education sector in low and middle-income countries is 100 USD billion (UNESCO, 2023), which is likely to increase due to climate change (GCA, 2022) (GPE & StC, 2023).

The impacts of climate change create a child's rights crisis, considering the enormous consequences for children's education, health, protection and participation (UNICEF, 2021). Climate change is leading to more frequent and severe extreme weather events, such as cyclones, floods, droughts, wildfires and heatwaves. Climate change impacts are predicted to increase in frequency, severity and geographic scope, making already bad situations worse (IPCC, 2023). Low-income countries are more impacted by extreme weather events (OECD, 2024). Over the past 20 years, schools were closed in around 75% or more of the extreme weather events that impacted 5 million people or more (World Bank, 2024b). These climate-related disruptions to the education sector have far-reaching negative effects. Extreme weather events can require students' relocation to alternative areas, lead to the closure of schools, hinder the learning of students, and increase the poverty and vulnerability of students and their families (OECD, 2024). These impacts undermine the adaptive capacity of climate-vulnerable populations (World Bank, 2024b) Notably, 25 of the 33 countries where children shoulder extremely high vulnerability to climate shocks are in Africa (GCA, 2022). In short, education is under threat from climate change - especially for women and girls.[13]

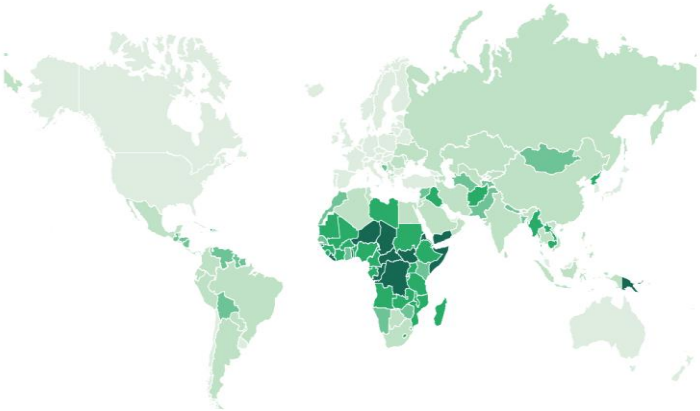
As illustrated in Figure 4, considering global variation and distribution in climate change hazards and exposure, combined with the lack of coping capacity, human vulnerability to climate change differs globally (IPCC, 2022).

Figure 4 – Geographical distribution of climate change hazards and exposure, lack of coping capacity and resulting vulnerability

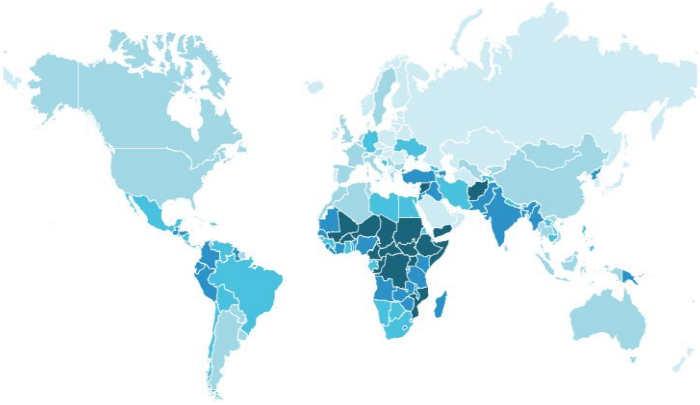
A – Hazard & Exposure



B - Lack of coping capacity



C – Vulnerability



Legend:
Darker colours indicate:
1. more hazard and exposure (A).
2. greater lack of coping capacity (B).
3. greater vulnerability (C) .

Source: INFORM Climate Change Tool[14]

Climate risks are a function of three elements: climate hazards, (lack of) coping capacity and exposure. Where the risk of climate change hazards and exposure is high (A in the map above), and there also is a lack of capacity to cope with the effects of climate change through mitigation and adaptation (B), vulnerability to climate change impacts will be high (C). The map illustrates that vulnerability on the African continent is high due to a combination of high hazard and exposure to climate change combined with a very pronounced lack of coping capacity

3.2 Climate change-induced destruction of education infrastructure and degradation of physical learning environments

Key messages

- Sudden-onset climate disasters like floods, storms, and cyclones degrade educational infrastructure and learning environments. As climate change increases the frequency of these events, the destruction of educational infrastructure will accelerate. [15]
- Frequent and intense heat waves, combined with inadequate investments in heat safety adaptations for classrooms, negatively impact learning environments in developing countries.[16]
- The effects of climate change on educational infrastructure and their subsequent impact on educational attainment and learning outcomes are significantly under-studied.[17]

Key facts

- The Pakistan Floods in 2022 are estimated to have interrupted the educational services of around 3.5 million children (Sujaya, Abdul-Haq, & Imran, 2023).
- In Malawi, 620 schools were damaged during tropical Cyclone Freddy in 2023, and nearly 5% of students faced school closures (Care Denmark & Danish Red Cross, 2023) (World Bank, 2024b).
- Bangladesh suffered damages to education infrastructure for almost USD 6 million during floods in 2022 (Care Denmark & Danish Red Cross, 2023).
- The cost of the recovery of the education sector following Cyclone Idai in Malawi, Zimbabwe, Mozambique, and the Comoros was estimated at USD 122 million (Sims, 2021).
- In Ethiopia, an analysis of 2.47 million test takers of national university entry exams from 2003-2018 found that high temperatures during the school year leading up to the exam reduce test scores (World Bank, 2024).
- While there is some variation in the precise temperature level, exceeding specific temperature thresholds compromises learning outcomes (World Bank, 2024b).

Literature analysis

Sudden-onset climate-related disasters impact physical education infrastructures and learning environments[18] by destroying or damaging them or causing local communities to use schools as shelters.

Such damaged physical education infrastructure includes, but is not limited to, school buildings, classrooms, sports facilities, and water, sanitation, and hygiene (WASH) facilities.[19]

Since sudden-onset climate-related disasters become more frequent and severe, so does the scale and pace of the destruction and damage to education infrastructure. However, disaster risk reduction-related ODA has barely increased with only 0.5% from 2010-2019, while climate-related disasters are increasing in frequency and have almost doubled in the past 20 years (UN General Assembly, 2023).

Examples of sudden-onset disaster impacts include the Pakistan Floods in 2022, which damaged 18,950 schools, while another 7,652 schools required cleaning and repairing or were used as shelters. The floods are estimated to have interrupted the educational services of around 3.5 million children (Sujaya, Abdul-Haq, & Imran, 2023). In Mozambique only, Cyclone Idai affected more than 4,200 classrooms in 2019 and disrupted educational services for more than 380,000 students and 9,600 teachers (UNOCHA, 2019). In Malawi, 620 schools were damaged during tropical Cyclone Freddy in 2023, and nearly 5% of students faced school closures (Care Denmark & Danish Red Cross, 2023) (World Bank, 2024b). Bangladesh suffered damages to education infrastructure for almost USD 6 million during floods in 2022 (Care Denmark & Danish Red Cross, 2023). Such impacts on educational infrastructure highly affect children's access to quality education following a climate-related disaster. The impacts of climate change on education infrastructure were also highlighted as a main area of impact by all stakeholders interviewed for this review.[20]

The Comprehensive School Safety Framework in Nepal

This framework is a well-established tool to increase education infrastructure resilience to climate change impacts, among other hazards. Following the devastating earthquake of 2015, Nepal integrated the Comprehensive School Safety Framework nationwide to transform school safety and is now a leading actor in this field.

This example illustrates how the Comprehensive School Safety Framework can be implemented to strengthen education infrastructure. Read more about Nepal's efforts here.

The CSSF Is promoted by the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector

At the country level, responses to slow-onset effects are found lacking. The Global Partnership for Education (GPE) found that when education is included in National Action Plans (NAP), it is often only in relation to climate-induced disasters and emergency responses, rather than adapting to slow onset events such as hotter classroom conditions, droughts, seasonal flooding, air pollution, and mitigating the impacts these have on learning (GPE & StC, 2023). According to the Global Centre on Adaptation (GCA), climate-related disruptions to the education sector have far-reaching negative effects on the adaptive capacity of climate-vulnerable populations in Africa. Notably, 25 of the 33 countries where children shoulder extremely high vulnerability to climate shocks are located in Africa (GCA, 2022).

> ***"While hurricanes and floods often capture the headlines, extreme heat quietly exacts a toll on lives and livelihoods . . . In 2024 we declare extreme heat a priority . . . Let us be the architects of resilience, the enablers of hope."***
>
> *IFRC Secretary-General Jagan Chapagain. March 2024 on the occasion of the first Global Summit on Extreme Heat for more information see here.*

Increases in classroom temperature caused by more frequent and intense heat waves were highlighted as a specific area of slow-onset climate change impact[21] that is likely to negatively affect students' learning outcomes.[22] Heat is linked to negative impacts on students' health and well-being, and it can affect their concentration, which combined is likely to have negative effects on their learning outcomes. While there is some variation in the precise temperature level, exceeding specific temperature thresholds compromises learning outcomes (World Bank, 2024b). Poorly ventilated spaces, including school buildings, have been reported to present desperate conditions during extreme heat and common sandstorms in North Africa, resulting in children missing class days, but exact numbers are unclear, as countries do not appear to be proactively tracking such data (GCA, 2022). Analysing data from 2003-2018 on 2.47 million test takers of national university entry exams in Ethiopia, the World Bank found that high temperatures during the school year leading up to the exam reduce test scores, controlling for temperatures when the exam is taken (World Bank, 2024). Similarly, in their study among 335 primary school teachers in India, Lala and Hagashima found that hot conditions cause discomfort among students, and 96% of the teachers admitted that students get distracted and lose concentration due to heat (Lala & Hagashima, 2023). Moreover, Kutywayo et al. found that 72.9% of South African respondents reported difficulties concentrating during periods of high temperatures (Kutywayo, et al., 2022). Heat is also highlighted by children globally to negatively impact education, with access to school, concentration, and being unable to do sports being specific concerns to them (Save the Children, 2022). Several stakeholder interviews highlighted heat and rising classroom temperatures as an impact of climate change on education.[23] A focus on heat safety adaptations in education facilities is therefore urgent, and the lack thereof disproportionally affects children experiencing the consequences of climate change in developing countries (Lala & Hagashima, 2023).

Gaps

The effects on educational attainment and learning outcomes of climate change's impacts on educational infrastructure are under-studied and not robustly evaluated. In the literature review, evidence-based data and findings on learning outcomes were sparse, and it was highlighted as an evidence gap in two stakeholder interviews.[24] A possible reason for this relates to difficulties in measuring learning outcomes. UNESCO defines it as "the totality of information, knowledge, understanding, attitudes, values, skills, competencies or behaviours an individual is expected to master upon successful completion of an educational programme."[25] Using this broad definition, one can argue that measuring the impacts of a climate-related disaster on attitudes, values, or skills, for instance, is conceptually and practically challenging.

Indeed, the included studies that examine the effects of climate change on educational attainment and learning outcomes paint an unclear picture. For instance, Pal et al. reference a study by Eskander and Barbier from 2014, which found a significant negative effect on primary education and literacy in areas heavily affected by cyclones (Pal, Tsusaka, Nguyen, & Ahmad, 2023). However, Nordstrom and Cotton, who studied the impacts of droughts in 2015-2016 on girls' education in Zimbabwe, reached different conclusions. They found that girls living in drought-affected areas were 2.8 percentage points more likely to be enrolled in school after the droughts than girls living in unaffected areas. There was no significant difference in literacy. However, they also found that the drought-affected girls had four percentage points lower test scores, and the authors found a decrease in self-declared leadership behaviours among the affected girls (Nordstrom & Cotton, 2020).

While the data on impacts on educational attainment and learning outcomes needs to be further developed, lessons from the COVID-19 pandemic might serve as a valuable example. UNESCO, UNICEF, and the World Bank published the report 'The State of the Global Education Crisis: A Path to Recovery' in 2021, presenting data on learning losses due to school closures during the pandemic. They found that fourth to sixth graders in Ethiopia experienced declines in numeracy scores, especially in rural areas, and first graders in Pakistan experienced impacts on arithmetic learning levels in government schools. For instance, 'number recognition' declined from 18% to 10%. Last, in South Africa, students in second grade suffered learning losses in reading of up to between 57% and 70%, while fourth graders experienced learning losses in reading between 62% and 81% compared to a normal school year (UNESCO; UNICEF; World Bank, 2021). While data for learning losses due to climate change and related disasters still need to be developed, these numbers indicate the potential impacts of such events.

Convergence of the evidence[26]

The evidence base shows a strong convergence towards impacts on the physical educational infrastructure of climate change and related sudden-onset disasters. This was highlighted in both the academic and grey literature and in the stakeholder interviews. The evidence on the impact of slow-onset disasters on education is less convincing. Evidence drawing mainly on data available in richer countries highlights that increased classroom temperature caused by extreme heat has a particularly negative effect on learning environments. In low-income countries, where heat-related hazards overlap with low mitigation and adaptation capacities and high exposure and vulnerability, these effects can be assumed to be more severe. However, corroborating evidence on the effects of extreme heat on classroom temperatures in these geographies is sparse.

3.3 Climate change, education, vulnerability and gendered inequality

Key messages

- Education has positive effects on reducing vulnerabilities. [27]
- Climate change exacerbates inequalities and limits access to education, making impoverished communities especially vulnerable. Disasters impacting livelihoods can reduce children's school attendance.[28]
- Children with disabilities are an overlooked, especially vulnerable segment, and structural under-investments in evidence-based education-focused rights-based programming perpetuate their marginalisation.[29]
- Impacts are gendered, and girls' education is particularly vulnerable to climate change and related disasters. [30]

Key facts

- In a study on climate change literacy in Africa, respondents with post-secondary education were 35 percentage points more likely to be climate change literate than those without education (Simpson, et al., 2021).
- Only 6 out of 10 studies on climate adaptation studies that use education and age as explanatory factors are statistically significant (Tan-Soo, Li, & Qin, 2022).
- After the 2010 floods in Pakistan, 24% of girls in sixth grade dropped out of school compared to 6% of boys (Save The Children, 2021).
- With each additional summer drought a child experiences, they have 16% lower odds of having completed any schooling. (Randell & Gray, 2016)
- Across 50 countries (including 2 in North Africa and 8 in Sub-Saharan Africa) covering 56% of the world's population, almost 70% of children believe climate change is a global emergency which can produce higher stress and anxiety (UNDP, 2021).
- Hickman et al. (2021) find that half of the respondents reported feelings of sadness, anxiety, anger, helplessness, powerlessness, and guilt in relation to climate change and 45% said that these feelings negatively affect their daily life and functioning.

Literature analysis

Climate change exacerbates existing inequalities and severely impacts people living in poverty, which can affect their access to education (World Bank, 2020). In developing countries, foundational education is a key factor in climate change resilience and adaptation strategies and can decrease vulnerability.[31] In their systematic literature review, Tan-Soo et al. found that *educational level* and *age* are the most used explanatory variables in adaptation studies from developing countries. They found that the effects of education on adaptation

abilities and strategies are mostly positive, but only 57% (6 out of 10) of them are statistically significant. Furthermore, they found that education yields mostly positive effects on climate mitigation, with statistically significant positive effects in 79% of them (Tan-Soo, Li, & Qin, 2022). The Work Bank substantiates that education attainment fosters pro-climate behaviours based on data from Europe, China and Thailand (World Bank, 2024b). Education equips girls with life skills and socio-emotional competencies necessary to navigate and adapt to a changing world, contributing to community resilience against climate impacts (World Bank, 2024c). Educated women are better able to make decisions that protect their families and communities from climate risks, such as using sustainable agricultural practices and supporting climate-friendly policies (World Bank, 2024b) (OECD, 2024)

Nor Diana et al. found that large families among farmers in Southeast Asia with high levels of education have a higher probability of adapting to climate change (Nor Diana, Zulkepli, Siwar, & Zainol, 2022). Similarly, Hoffmann and Muttarak found that education significantly raises preparedness actions in Thailand and the Philippines (Hoffmann & Muttarak, 2017). Sims also found that education has effects on reducing vulnerabilities and found evidence that formal education directly supports cognitive and problem-solving skills, knowledge, and risk perception. In turn, this increases the probability of responding better to climate-related disasters (Sims, 2021).

Geography of the literature

The identified country-specific academic studies on resilience are mainly from Asia except Chigwanda et al. whose study is from Zimbabwe. The systematic review of Tan-Soo et al. focuses on 'developing countries', and the grey literature has a global south perspective. Hence, the evidence base from Africa specifically is limited on this and further context-specific research is needed to gain a deeper understanding of education and climate change resilience and adaptation in Africa.

Moreover, studying the links between education and climate change literacy, Simpson et al. point out some of the complexities of this area. In their literature review, they only found four quantitative studies that showed a significant positive effect of education on climate change literacy (and four qualitative studies). In addition, they found one study with significant negative effects. However, using data from the Afrobarometer,[32] they found education to be the strongest predictor of climate literacy. Respondents with post-secondary education were 35 percentage points more likely to be climate change literate than those without education (Simpson, et al., 2021).

The included literature highlights girls as particularly vulnerable to climate change.[33] In her systematic review of the intersection between girls' education and climate change, Pankhurst found that increased education among girls decreases their individual vulnerability to climate-related disasters (Pankhurst, 2022). Similarly, Yadav and Rattan found that women's education is the strongest tool to reduce disaster fatalities among women and enhance their adaptive capability (Yadav & Lal, 2017). Save the Children found that after the 2010 floods in Pakistan, 24% of girls in grade six dropped out of school compared to 6% of boys. They project that if current trends continue, climate-related disasters will contribute to preventing 12.5 million girls from completing their education annually (Save The Children, 2021).

When families' livelihoods are impacted by climate change and related disasters, it can affect children's school attendance.[34] Lost livelihoods, such as crop loss in rural contexts, can increase food insecurity, which can cause families to pull children out of school to pick up more household chores. For instance, Kousky found that climate-related disasters can lead to increased child labour and decreases in school attendance (Kousky, 2016). Similarly, Pankhurst found strong evidence in her systematic review that climate change increases familial and domestic burdens among girls (Pankhurst, 2022), and Sims highlights the inability to pay for school fees as an indirect impact of climate change (Sims, 2021). Further, the World Bank found that climate change can exacerbate poverty, inequality, and children's access to education (World Bank, 2020). Last, it was highlighted in two stakeholder interviews that it is essential that the impacts of climate change on livelihoods are integrated into education and climate change programming.[35]

Resilience through school gardens in Madagascar

Antafotenia Primary School in Madagascar has initiated a school garden project in which each class is allocated a plot where the students grow crops. Additionally, the school has allocated time and resources in the curricula for the students to take care their plots and receive education on sustainable farming to increase crop resilience. During a school year nearly 200 students from 90 families are involved in the project.

This illustrates how school gardens can strengthen livelihoods through increased food security and education on resilient crops and farming. Read more about this and similar projects here.

Across 50 countries (including 2 in North Africa and 8 in Sub-Saharan Africa) covering 56% of the world's population, almost 70% of children believe climate change is a global emergency which can produce higher stress and anxiety (UNDP, 2021).[36] Hickman et al. found in their global study that half of the respondents reported feelings of sadness, anxiety, anger, helplessness, powerlessness, and guilt in relation to climate change and 45% said that these feelings negatively affect their daily life and functioning. Additionally, there was a trend that the most reported worry and most significant impacts on daily functioning tended to be in poorer countries in the global south (Hickman, et al., 2021).[37]

The mental health of students is also compromised by climate shocks. Droughts, hurricanes, and wildfires can have negative impacts on student mental health (World Bank, 2024b). Climate-related disasters affect children and young people's mental health with detrimental effects on learning outcomes.[38] For instance, Lawrance et al. found that experiencing climate-related disasters directly affects risks of PTSD, depression or low mood and distress (Lawrance, Thompson, Fontana, & Jennings, 2021). The findings from the Hickman study were statistically significant with only a 0.1% probability (p-value of .001) that the results are due to random chance. This very low probability strongly suggests that the findings are robust.

These findings on the negative mental health impacts of climate change need to be further substantiated as this can have implications for children and young people's daily lives and functioning (Hickman, et al., 2021), including learning ability. Furthermore, it can affect policy priorities such as the integration of Climate Change Education into national curricula.

Lastly, there is a shortage of geography-specific research that could offer valuable insights into the impacts of climate change. However, the limited available academic literature sheds light on how climate change and related disasters affect educational enrolment, attendance, and attainment across Africa. In Northern Nigeria, Codjoe and Atiglo found that children's school attendance is low during droughts but high when the rain comes (Codjoe & Adiglo, 2020). Similar patterns are evident in Randell and Gray's study in Ethiopia. They found that frequent drought experiences reduce school completion, while rainfall in early childhood had the opposite effect and increased school completion rates. With each additional summer drought a child experiences, they have 16% lower odds of having completed any schooling. Conversely, greater summer rainfall during both early life and school ages is associated with having completed any schooling and with attending school during the year (Randell & Gray, 2016). More rain during girls' childhood in Indonesia results in the girls attaining more education. According to them, this results from higher crop yields due to the heavy rains (Hanna & Oliva, 2016). In addition, Chigwanda et al. found in Zimbabwe that when girls' households experience drought and connected loss of livelihoods, their capacity to support education is reduced (Chigwanda, Mutopo, & Mutanana, 2023).

Codjoe and Atiglo argue that this impact on school enrolment and attendance is due to children having to take up more chores because of decreasing household income due to droughts (Codjoe & Adiglo, 2020). Indeed, Kousky also found that among children from 7 to 15 years in Tanzania, income shocks due to crop loss led to increased child labour and decreased school attendance (Kousky, 2016). This is also supported in Pankhurst's literature review (Pankhurst, 2022). Such studies provide valuable context-specific insights, yet more studies from both African and Asian countries on these connections are needed to inform context-specific responses.

Gaps

Several evidence and data gaps were identified. First, while the literature pointed to the effects of climate change on livelihoods, the evidence base needs to be further developed for this finding. As UNICEF pointed out, the links between climate change and education are not always straightforward and manifest over different timescales through multiple pathways. Indirect impacts could be more long-lasting, and the needs of different populations by gender, urban/rural, minority, children or adolescents with disabilities, and socioeconomic status need to be considered (UNICEF, 2019).

Second, there is an evidence gap on how climate change affects educational outcomes among children with disabilities and other intersectional issues.[39] For instance, the EiE Hub argues that education for children with disabilities are particularly vulnerable to climate change and related disasters but that the data is scarce (GGHEE, 2023). It was also mentioned in several stakeholder interviews that disaggregated data with a focus on children with disabilities, among other intersectional issues, is missing.[40] This constitutes a concrete risk of overhearing the voice of marginalised children as the specific impacts of climate change on children with disabilities and other intersectional issues are poorly established. Similarly, GPE argue that child vulnerability data should be disaggregated according to age, sex, disabilities, and other relevant socioeconomic characteristics to enable targeted interventions (GPE, 2022).[41] This

gap is not only an evidence gap but can impact rights-based policy and programming in the climate change and education intersection as well. Thus, further intersectional research and data are needed to strengthen the knowledge and inform evidence-based policies and programming to ensure every child's rights.

Third, data, research and evaluations are needed to unpack the relationship between educational deprivation in quality education as expressed in leaning poverty discussed in section 3.1, and the foundation for providing quality climate change education (CCE) that is further discussed in the sections below. On the one hand, lack of quality education is flagged as a structural problem, i.e. a present challenge that aggravates the effects of climate change (GCA, 2022). On the other hand, CCE as an aspiration and policy goal is offered as a crucial priority in leveraging education to promote agency and climate action as (see sections 3.4 and 3.5).[42]

Convergence of the evidence base

The evidence base strongly converges towards education as a key factor in decreasing vulnerability to climate change and advancing adaptation measures. Several systematic reviews, academic research, and grey literature found this. It also strongly supports that girls' education is particularly vulnerable. While some studies found that impacts on livelihoods affect educational attainment and attendance, more research is needed for a robust evidence base. The importance of quality of education is a central tenet in the literature reviewed. Given the broad policy consensus on the importance of CCE, it is important to consider how quality CCE can impact children's agency for climate action. This includes understanding the counterfactual scenario to understand if and how CCE can be impactful in contexts deprived of foundational quality education for all (FCDO, 2022).

3.4 Climate change-induced displacement and impact on educational outcomes

Key messages

- Climate change is a key driver of displacement in response to sudden-onset hazards that can disrupt children's education. [43]
- Climate-induced displacement in response to slow-onset climate change-related hazards constitutes an adaptation strategy that also can disrupt children's education. [44]
- Rural-urban migration can increase settlements in slums, which can further marginalise children and limit their access to quality education.[45]
- Duty-bearing countries and organisations struggle to ensure that children on the move in response to sudden or slow-onset hazards enjoy their right to education. [46]
- A rights-based view holds that the right to education is universal and not conditional on migration status or reason for moving. [47]

Key fact

- Up to 80% of children on the move are not achieving expected literacy levels (UNICEF, 2022b).
- About half (46%) of the 68.3 million persons displaced by conflict and violence and 7.7 million displaced by disasters live in Sub-Saharan Africa.[48]
- in Sub-Saharan Africa, internally displaced children are 1.7 times more likely to be out of primary school than their non-displaced peers (Education Cannot Wait, 2023).
- Climate change could force 216 million people to migrate within their own countries by 2050 (World Bank, 2021).
- The UN projects that by 2050, the slum population in Sub-Saharan Africa will be 230 million (UN, 2023).

Climate change and related disasters are key drivers of climate-induced displacement, which can disrupt children's education. A rights-based view – which also is the point of departure of this review – holds that the right to education is universal and not conditional on migration status or reason for moving (IDMC, 2021) (UNESCO, 2020).

According to the OECD, the increase in extreme weather events will also make climate-induced displacement more likely, while most of the displacement occurs in low-income countries (OECD, 2024). For instance, Leal Filho et al. found climate-related events to be among the top drivers of migration in Kenya and Ethiopia (Leal Filho, et al., 2023b). Drabo and Mbaye found a significant correlation between natural disasters and migration (Drabo & Mbaye, 2015). Education Cannot Wait estimated that 13 million children of school age were displaced in 2022 due to climate shocks (Education Cannot Wait, 2023).

Conceptualising 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.

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.

Source: (IDMC, 2021)

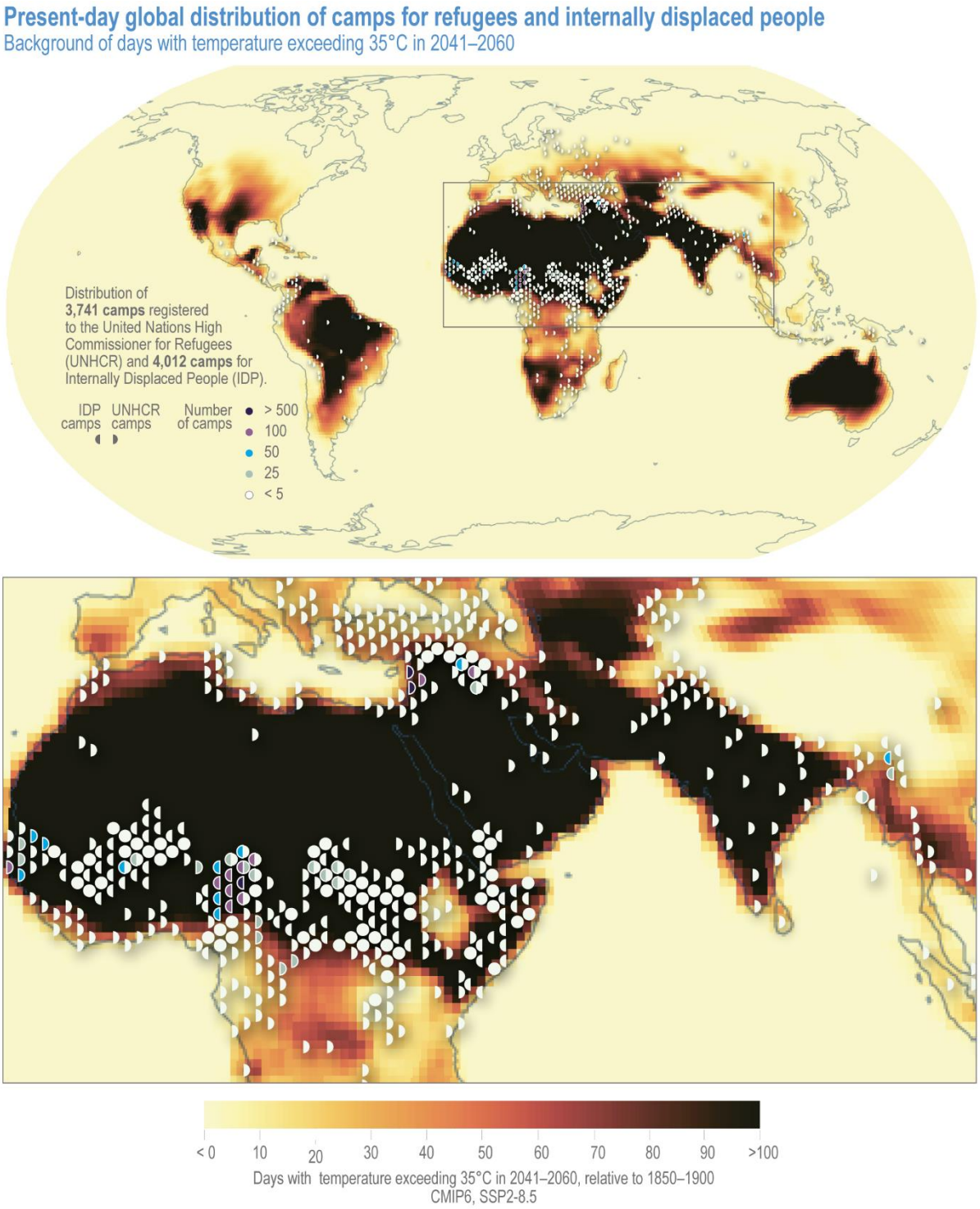
Policy-relevant literature provides strong indications of the negative effects of displacement on education. For instance, UNICEF found that up to 80% of children on the move are not achieving expected literacy proficiency levels (UNICEF, 2022b). UNHCR analysed data from 70 countries hosting refugees and found that the gross enrolment rates for refugees are as follows: pre-primary school 38%, primary school 65%, secondary school 41%, and tertiary school 6%.

About half (46%) of the 68.3 million persons displaced by conflict and violence and 7.7 million displaced by disasters live in Sub-Saharan Africa.[49] Education Cannot Wait found that in Sub-Saharan Africa, internally displaced children are 1.7 times more likely to be out of primary school than their non-displaced peers (Education Cannot Wait, 2023). According to these findings, duty-bearing countries and organisations struggle to ensure that children on the move enjoy their right to education. However, methodologically, it is very challenging to attribute the impacts of (internal) displacement to climate change. For example, the IDMC, in a 2020 study on the impacts of internal displacement on education in sub-Saharan Africa, specifically mentions that its analytical model is not suited to do so (IDMC, 2020). Looking at the map overlaying extreme heat, however, the convergence of climate hazards, vulnerability, and exposure[50] on the African continent is striking (see Figure 4 below and Figure 3 in Section 3.1).

The International Data Alliance for Children on the Move (IDAC)

IDAC is a global, cross-sectoral alliance that aims to improve data and statistics to support evidence-based policymaking for displaced children. One of their priority areas is education and customisable datasets can be downloaded via their website.

Figure 5 – Extreme heat and camps for refugees and IDPs



Source: IPCC2022 Poverty, Livelihoods, and Sustainable Development

It needs to be recognised that climate-induced displacement also constitutes an adaptation strategy. Yet, it continues to be perceived primarily as a humanitarian issue and a secondary area of policy action (OECD, 2023). Human mobility as an adaptation to climate change – and

access to quality education as a subset of such adaptation strategies is – a significant trend. By 2050, cross-border climate migration is projected to account for about 10% of total likely international migration overall in Africa (OECD, 2023). Moreover, rural-urban movement can impede children's right to education. Increased urbanisation can result in a stronger workforce and economy; however, it can also increase settlements in slums, which can further marginalise children and limit their access to quality education (UNESCO, 2020).

According to the World Bank, climate change could force 216 million people to migrate within their own countries by 2050 (World Bank, 2021). The OECD's International Programme for Action on Climate points out that ignoring the eventual effects of climate change on human mobility will not only lead to human loss but will also disrupt economies and make development cooperation less effective in the long run. This implies addressing the root causes of displacement and the sustainable integration of populations into new territories, including their impact on and inclusion in social protection, health, and educational services, as well as access to dignified livelihoods, such as decent employment (OECD, 2023).

Gaps

Better data on the impacts of climate change on education in complex emergencies is crucial. Climate change effects occur amidst interconnected factors, affecting data quality. More academic research, particularly from a global south and context-specific perspective, is needed to substantiate and refine findings on how climate-induced displacement impacts children's education.

Recent advances in addressing data and analysis on educational deprivation are reflected in policy-relevant 'grey' literature on the impact of climate change, environmental degradation, and biodiversity. These efforts build on innovations such as Children's Climate Risk Index (CCRI) and INFORM RISK (Education Cannot Wait, 2023).[51]

However, there is a need to reduce fragmented data collection on humanitarian and development programming. It is essential to use crisis-sensitive indicators to capture learning quality, climate, and environmental conditions, and to establish cause-and-effect relationships among these indicators (GGHEE, 2023). Data collection insufficiently support equitable approaches to policy planning and implementation, and needs greater and systematic focus on inequalities and disaggregating data by age, gender, and disability status to understand the specific impact of the climate crisis educational deprivation of different groups of children. (Save The Children, 2021).

Convergence of the evidence base

While the evidence base strongly converges toward climate change as a key driver of displacement, there is a lack of data and evidence on the impacts of climate-induced displacements on children's education.

3.5 Education as empowerment and children and youth as agents of change

Key messages

- Enhanced knowledge about climate change can increase concern but also instil the desire to take action. [52]
- Empowerment and acknowledging children as agents of change is a key policy priority among education actors. [53]
- Empowering children to become agents of change through education is a key policy priority at the intersection of climate change and education and is closely related to the issue of ensuring gender-equitable quality of education. [54]
- The argument that empowerment of children through education leads to positive climate action lacks evidence.[55]

Key Facts

- Children's right to actively participate is recognised under the UN Convention on the Rights of the Child.[56]
- Children are recognised as agents of change in the Sendai Framework for Disaster Risk Reduction. [57]

Literature analysis

Reviewed evidence shows that enhanced knowledge about climate change can increase concern and desire to take action.[58] For instance, Kutywayo et al. found links between knowledge, concerns, and climate-related experiences. Learners with the lowest knowledge scores were also least concerned about climate change, and vice versa. Additionally, they found strong links between knowledge, levels of concern and desire for action. This suggests that information and school learning may result in attitudinal shifts (Kutywayo, et al., 2022). Similarly, Chigwanda et al. found in their study that respondents who indicated they understand the causes and impacts of climate change use this knowledge to raise awareness and increase adaptation measures in their community (Chigwanda, Mutopo, & Mutanana, 2023). This is also pointed out by the OECD. They argue that creating inclusive spaces where students' concerns and emotions are expressed openly can help proactively address climate-related mental health and well-being issues.

The point made is that education can empower students with relevant knowledge and skills to cope with the various impacts of climate change (OECD, 2024). Last, Nkoana paints a more

nuanced picture and found that environmental awareness influences perceptions of both future and current climate change risks (Nkoana, 2020). However, unlike Kutywayo et al. and Chigwanda et al., Nkoana found that students were more concerned about short-term risks (crime, lack of access to basic services, and unemployment, for instance) than longer-term risks such as climate change (Nkoana, 2020).

The Children's Solutions on Climate Change programme

UNICEF Mongolia initiated this programme to empower young people to demonstrate leadership on climate issues. The project has four components:

- Establishing national climate ambassadors with responsibility for developing child-led solutions.
- Mobile entertaining education to deliver knowledge on climate issues.
- Eco Passports with which participants assessed their local area and identified possible impacts of climate change and solutions to be implemented with small grants.
- Development of the Children's Report on Climate Change.

This example illustrates concrete actions to empower children and youth as agents of change. Read more of UNICEF Mongolia's initiatives to empower children and youth here

It was also evident from the review that empowerment and acknowledging children as agents of change is a key policy priority among central actors in the education sector.[59] In addition to the above-referenced actors, it became evident in our interview with Oxfam Denmark that empowerment is also a central part of their policies and programming.

Children and youth are also recognised as agents of change in the Sendai Framework for Disaster Risk Reduction 2015-2030, adopted in 2015. Children have long been viewed as victims of climate change. However, their right to actively participate is recognised under the UN Convention on the Rights of the Child (CERI, 2023) and progress is made to include children and young people's voice at front of climate policies both locally and globally. For instance, key actors such as UNICEF and GPE have youth ambassadors from across the world to represent and strengthen children's voices in climate and education policies globally.[60] They participate in panel debates and give speeches at events such as COP to ensure that children and young people are recognised as agents of change.

UNICEF's introduction of the Children's Climate Risk Index (CCRI) was supported with translation by the international youth-led non-profit Climate Cardinals , ensuring that the CCRI accessible in four African languages (Somali, Swahili in east Africa, Hausa and Yoruba in West Africa). In 2022, Save the Children published the report 'Generation Hope' in which they consulted 54,000 children globally on their experiences and priorities for climate change and inequality (Save the Children, 2022). In this report, access to education and health services along with adequate nutrition, housing and clothing was highlighted by the young people as key priorities in addressing climate change and inequality. This was then used at COP and other high-level events to advocate for stronger integration of education and climate change.[61]

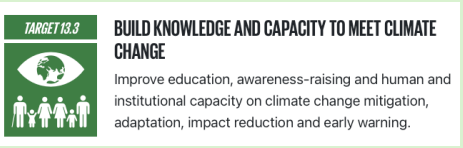
Empowerment is also central to Climate Change Education, which is a key pillar of the Greening Education Partnership (GEP) spearheaded by UNESCO. GEP is a global initiative

which aims to “empower learners with the skills required for inclusive and sustainable economic development within the context of the transition toward digital and green economies.”[62] The Malala Fund is a key actor in amplifying the voices of girls and young women (Malala Fund, 2021).Thus, empowering children to become agents of change through education is a key policy priority within the climate change and education intersection and is closely related to the issue of ensuring gender-equitable quality of education.[63]

Gaps

Two significant gaps were highlighted in both the academic and grey literature and in the stakeholder interviews. First, the evidence base for the argument that empowerment of children through education leads to positive climate action must be developed further. Only one identified academic article examines whether increased knowledge leads to actual climate action.[64] From the literature, it is evident that a common assumption made by actors engaged in the climate change and education intersection is that (better) climate change education will lead to youth and children taking agents of change roles at both global, national, and community level.[65] This also is a foundational assumption in the SDG framework (see Box).In Sims’ literature review, for instance, she refers to three studies that argue for an environmental benefit of transformative education for girls with a focus on empowerment (Sims, 2021). However, two of these studies have a global focus, and one is a ‘resource guide’. Additionally, both Bangay and Pankhurst support the position that the evidence that education positively impacts environmental attitudes and behaviour is limited, especially in low and middle-income countries (Bangay, 2021); (Pankhurst, 2022).

Climate action and education in Agenda 2030



Source: The Global Goals

Furthermore, interviews with several stakeholders pointed to the gap between policy and advocacy positions and the evidence base to shore these up.[66] Save the Children highlighted that the evidence would benefit from a differentiation between local initiatives to empower communities to adapt via climate change education and a global, policy level. For instance, they have experience from South Sudan where education played a significant role in increasing adaptation measures due to increased knowledge through schools. This, then, increased school enrolment in the local community.[67] While such examples are crucial, the review identified a significant gap on the impacts of Climate Change Education on empowerment and positive climate action.

Second, within the climate-related destruction theme (see section 3.2), UNICEF highlights that on a pilot scale, agents of change projects can be effective and that a financing gap exists to bring these practice-proven examples up to scale (UNICEF, 2019, p. 40). Moreover, it points out that the Sendai Framework on Disaster Risk Reduction from 2015 provides a reference for scaling up efforts and investments in children as agents for change-related climate action (UNICEF, 2022). The argument is that climate finance for the education sector should also focus on initiatives that can encourage students and school staff to engage in climate action (as mentioned above, one of the SDGs). However, it is unclear if UNICEF's position is based on

rigorous evaluation methodologies used to assess the pilot projects in question. Thus, while opportunities to scale up best practices on empowering children and youth to become agents of change exist (UNICEF, 2019). Evidence-based prioritisation would require (investments in) robust evaluations to underpin an evidence-based argumentation as per the review's remit, but such evaluations were not available.[68]

Convergence of the evidence base

While the evidence base converges toward the argument that enhanced knowledge leads to increased concern, the evidence in support of this argument needs further substantiation. Moreover, evidence in support of the argument that enhanced knowledge leads to positive climate action needs significant substantiation. A core challenge at the intersection of climate change and education is that without a strong foundation in quality education, learners may not benefit from climate change education.

3.6 Education as a driver towards achieving climate goals

Key messages

- A core challenge at the intersection of climate change and education is that without a strong foundation in quality education, learners may not benefit from climate change education.[69]
- A quality education boosts resilience to climate impacts, enables adaptation to change, mitigates future climate change, and reduces gender inequalities.[70]
- Education is a key factor in increasing climate resilience and adaptation strategies.[71]
- Girls' education is a key driver in decreasing vulnerability, particularly mortality, to climate-related disasters.[72]
- Climate Change Education is widely advocated but there is a need for nuanced, context-specific, and evidence-based approaches to underpin initiatives.[73]

Key facts

- For every additional year of girls' schooling on average, a country's score on the Notre Dame Global Adaptation Initiative Index (ND-GAIN[74]), is expected to increase by 3.2%,[75] effectively decreasing vulnerability to climate-related disasters (Sims, 2021).
- Education equips girls with the life skills and socio-emotional competencies necessary to navigate and adapt to a changing world, contributing to community resilience against climate impacts policies (World Bank, 2024c).
- Educated women are better able to make decisions that protect their families and communities from climate risks, such as using sustainable agricultural practices and supporting climate-friendly policies (World Bank, 2024c).

Literature analysis

As presented in section 3.1, the fundamentals in the global education sector are that even without taking account of climate change, globally, the status and pace in ensuring the delivery of quality foundational education (i.e. achievement of SDG 4) presents its own set of challenges. Learning poverty rates were used as a proxy for the scale of challenges. In the context of impacts at the intersection of climate change and education disparities and inequalities in access and enjoyment of quality education increase learning inequalities (see section 3.3) A good-quality education can improve resilience to climate impacts now, enable adaptation to current and future changes, and mitigate future climate change and address gender inequalities.[76]

Two main findings emanated from the review. First, education is a key factor in increasing climate change resilience and adaptation.[77] For instance, Hoffman and Muttarak found that an additional year of schooling raises the odds of undertaking disaster preparedness measures by 6.3% in the Philippines and 4.1% in Thailand for people with no disaster experience. This supports the evidence that education is a key factor in resilience and adaptation (Hoffmann & Muttarak, 2017). This finding is also illustrated above in the section 'Lack of education and vulnerabilities to climate change and related disasters exacerbates existing inequalities.'

Second, especially girls' education is a key driver to decreasing vulnerability, and particularly mortalities, to climate-related disasters.[78] In addition to the referenced studies, several of them highlight a 2013 empirical study by Streissnig et al. where they found that female education is the pre-eminent factor in decreasing mortalities to climate disasters.[79]

School-led adaptation in Tanzania

Schools can provide space for local adaptation. In Tanzania, the Digalama Primary School initiated a forest conservation initiative in the local community to reduce overexploitation as lack of natural resources can limit their capacity to adapt. The school provided education on conservation and created income from the forest via a beehive initiative. The revenue from selling honey was reinvested in a fishing pond and banana farming.

Access to natural resources is essential in increasing resilience and this example illustrates how it can be implemented locally. See more about this and similar cases here.

Malala Fund also highlighted a 2010 study by the World Bank that shows countries with higher levels of girls' education have suffered "far fewer" losses from droughts and floods than countries with lower levels of girls' education (Malala Fund, 2021).

Gaps

Throughout the review, several studies highlighted missing evidence of the impacts of Climate Change Education. Thus, while CCE is widely advocated for, there is a strong need for nuanced, context-specific, and more robust evidence-based approaches.[80]

This gap is evident in several ways. For instance, the UN highlights that while 94% of all countries claim to have CCE included in their curricula, a study of 100 countries indicates that this is only true for 47% of them (UN, 2023). This is in line with UNICEF, which found that the integration of CCE in East Asia and the Pacific varies (UNICEF, 2019). Conversely, Apollo and Mbah found that CCE is increasingly being integrated in curricula in East African countries.

Climate Justice

The principle that the benefits reaped from activities that cause climate change and the burdens of climate change impacts should be distributed fairly. Climate justice means that countries that became wealthy through unrestricted carbon emissions have the greatest responsibility to not only stop warming the planet but also to help other countries adapt to climate change and develop economically with non-polluting technologies

Source: INEE

However, challenges with this integration include uncertainty about teachers' role, whether they should only convey the science or empower students through climate justice, misconceptions about the causes and effects of climate change, and the lack of integration of local challenges in CCE (Apollo & Mbah, 2021). Similarly, Mbah et al. argue that CCE should be more contextually relevant with respect for Indigenous Knowledge Systems and lived experience through a place-based, participatory, and holistic approach (Mbah, Ajaps, & Molthan-Hill, 2021).

GPE also argues that CCE should be taught across all subjects and have a climate justice perspective to empower children to become climate agents. Likewise, they argue that teachers need support in their role as catalysts for climate action (GPE, 2022). This, however, seems to be lacking. With reference to a UNESCO survey from 2021 among teachers with 58,280 respondents from 144 countries (90% developing countries), Ma and Chen found that only 55% of them had obtained prior in-service training on climate change during their teaching careers (Ma & Chen, 2023).

In her systematic literature review, Sims also found that there is a lack of evidence-based research on the impact of CCE on behavioural changes, especially in low and middle-income countries (Sims, 2021). This is particularly relevant as UNESCO highlight behavioural changes as a benefit of climate change education, particularly in context of Action for Climate Empowerment (ACE).[81] Hence, there is a need for more evidence-based research on the positive climate-related impacts of CCE (Sims, 2021) and how incorporating local contexts and knowledge systems can benefit the implementation of CCE.[82]

Convergence of the evidence base

The convergence of the evidence strongly points to the substantial positive impacts of education on climate change resilience and adaptation measures. This is also true for the positive impacts of girls' education on vulnerability, particularly mortality. As noted above, the evidence base on the positive impacts of Climate Change Education is not well-established and further research and evidence is a priority.

3.7 Financing and the CC-EDU intersection[83]

Key messages

- There is a general lack of funding in relation to ensuring that all children have access to quality education.[84]
- Funding gaps in the education sector at large, and at the intersection of climate change and education specifically, pose severe challenges in ensuring children's fundamental right of access to quality education in low and middle-income countries.[85]

Key facts

- Damages due to tropical cyclones, global estimates indicate the education sector experiences financial losses of USD 4 billion annually. (World Bank 2024b).
- Only 2.4% of climate finance from four global climate funds[86] supports child-responsive activities, with education-specific projects being negligible.[87]
- Disaster Risk Reduction interventions, in general, are severely underfunded. [88]
- While climate-related disasters have almost doubled in the past 20 years, disaster risk reduction funding has only increased by 0.5 per cent from 2010-2019. [89]
- In 2022, only 30 per cent of education needs in 2022 humanitarian response plans and appeals received funding, and only 3 per cent of humanitarian funds are allocated to Education in Emergencies.[90]

As presented in the preceding sections, climate change and slow-onset and sudden-onset climate disasters heavily impact the education sector.

Direct impacts of climate-related disasters on education infrastructure require additional funding to rebuild and adapt to future disasters, while *indirect impacts* of climate change on livelihoods, children's access to education and learning outcomes.

The need for additional financing is pressing, as is highlighted in the below-referenced reports and in several stakeholder interviews.[91] Initiatives like the Global Partnership for Education launched at COP28 (see box) attest to this. As mentioned in section 3.1, specific financing needs in the CC-EDU intersection would come in addition to an estimated annual shortfall of USD 100 billion globally towards achieving SDG 4 on quality education. In turn, quality education is the foundation for children's resilience to climate change and the opportunity to contribute to mitigation and adaptation (see Section 1.6).

The financing landscape further includes that:

- Education in emergencies (EiE) lacks funding as well: only 3% of humanitarian funds are allocated to EiE contexts, and only 30% of education needs in 2022 humanitarian response plans and appeals received funding (Education Cannot Wait, 2023).
- DRR interventions, in general, are severely underfunded. A mid-term review of the Sendai Framework for Disaster Risk Reduction 2015-2030[92] found that while climate-related disasters have almost doubled in the past 20 years, DDR funding has only increased by 0.5% from 2010-2019. Burdens fall unevenly, the African continent has suffered, with an economic impact directly attributable to climate change-related disasters of 12.3% of total GDP in this period (UN General Assembly, 2023).
- Only 2.4% of climate finance through four key multilateral climate funds[93] in the period 2006-2023 supported projects that incorporated child-responsive activities with education-specific projects being negligible (GPE & StC, 2023) (CERI, 2023).
- Adaptation requires policymakers to allocate sufficient funding for boosting climate resilience within the education sector no global figures exist to summarize the additional financing needed for this effort. Looking at just damages due to tropical cyclones, global estimates indicate the education sector experiences financial losses of USD 4 billion annually (World Bank, 2024b).

There thus is a general lack of funding in relation to ensuring that all children have access to quality education, and national governments and the international ODA financing community face stark choices in considering additional financing targeting the CC-EDU intersection. Far too many receive no education, and many others receive and low-quality education. These funding gaps in the education sector and the intersection of climate change and education pose severe challenges in ensuring children's fundamental right to access education in low and middle-income countries.

Unlocking climate finance for the education sector

During COP28, the Green Climate Fund, Global Partnership for Education, and Save the Children announced an investment of USD 70 million through their *Building the Climate Resilience of Children and Communities through the Education Sector* partnership. This financing mechanism will support climate-resilient and green schools in vulnerable countries. Read more here.

Moreover, actors from the Greening Education Partnership (GEP) announced a UN Multi-Partner Trust Fund at COP28 to support greening education systems. Furthermore, 46 countries, including Denmark, endorsed a declaration for a common agenda for education and climate change. Stronger investment was one of three commitment areas. Find the declaration here, read the announcement of the trust fund here and learn more about the GEP here.

4 Emerging trends and implications for policy and programming

4.2 Policy level implications

Key messages

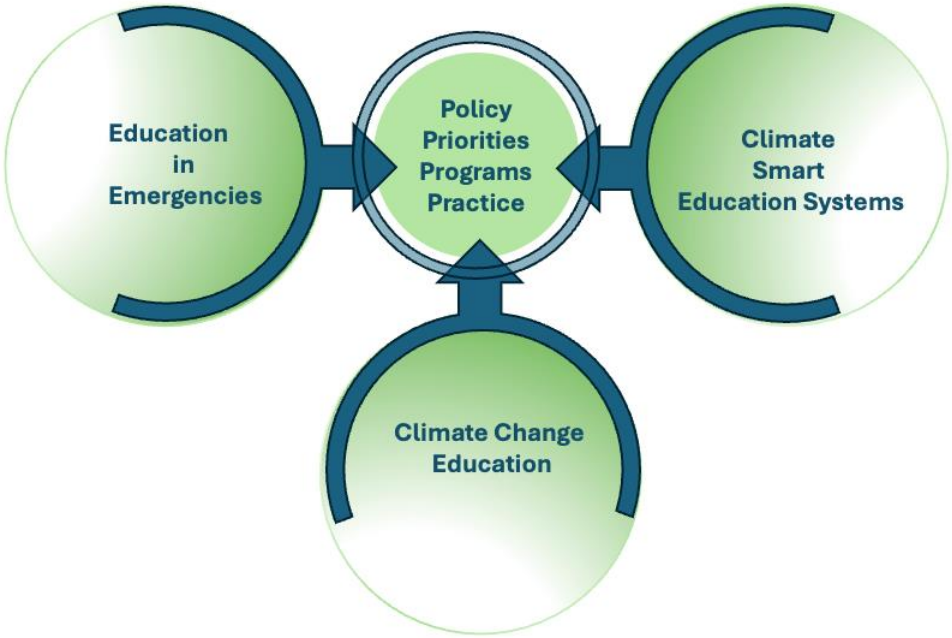
- It is widely recognised that the impacts of climate change on education and the role of education in climate action are understudied, and even more so in poorer countries.
- It is seen as essential to the development of resilient and adaptive education systems capable of withstanding and mitigating climate-related challenges that:
    - humanitarian efforts, disaster risk reduction, and development initiatives in the education sector are integrated using a nexus approach.
    - funding for education is at the level that meets the needs.
    - global climate finance includes funding to address the impacts of climate change on education.

This review of the CC-EDU intersection has been focussed on the prioritised themes explored in the preceding sections. Themes looking into the impact of climate-induced disaster and displacement on education included (i) destruction of education infrastructure and degradation of physical learning environments, (ii) education, vulnerability and gendered inequality, and (iii) climate change-induced displacement and impact on educational outcomes. Priority themes exploring the impact of education on climate change action included (iv) education as empowerment and children and youth as agents of change, (and (v) education as a driver towards achieving climate goals.

This deep dive into prioritised themes inevitably means that the emerging trends and implications for policy and programming offered below only offer a partial look at the full range of issues in the CC-EDU intersection.

In the following, broadly speaking, three areas relevant to the CC-EDU are used as proxies to discern trends in policy development and what these could imply for donors and organisations providing financing action in the CC-EDU intersection: Education in Emergencies (EiE), Climate-Smart Education Systems (CSES), and Climate Change Education (CCE).

Figure 6 – Considering EiE, CSES and CEE and implications for policy, priorities, programmes and practice



From a development policy and ODA perspective, the most dynamic development policy fields include the (a) breaking down of pillars between EiE and CSES and (b) the accelerated momentum of the 'greening of education' agenda encompassing CCE.

Overall, the impacts of climate change on education and education on climate action are insufficiently understood. Clear data and analysis are required to underpin planning.[94] The impacts of climate change on education and education on climate action are insufficiently understood due to a lack of consistent and reliable data and research on interlinkages between climate and education. This includes data on the direct impacts of extreme storms leading to the destruction of infrastructure, of extreme heat leading to degradation of the learning environment and of droughts or famines stressing essential water, sanitation, and hygiene facilities critical for school attendance and retention. It also includes missing data on the indirect impacts through household coping responses in the face of loss of income and livelihoods or displacement, leading households to withdraw children (especially girls) from schooling. Climate change also impacts the health and well-being of educators and learners, reducing their readiness to teach and learn. These vulnerabilities are further compounded by systemic challenges in society such as gender and structural inequalities (GCA, 2022)

As climate change and related disasters will increase in severity and number in the future, the trends emerging from the reviewed literature reveal considerable shared urgency in making donor and domestic responses in the CC-EDU intersection more integrated and agile.

Integration of EiE and CSES

In the education sector, a trend of integrating humanitarian, Disaster Risk Reduction (DRR) and development efforts has gained momentum. According to the OECD, accelerating this integration should be a priority (OECD, 2024). Policy discourse promotes convergence on responding to sudden onset climate change-induced emergencies (i.e. immediate term *direct effects of climate change*) and slow-onset climate change-induced *indirect* effects.[95]

This breaking down of pillars is taking place between the EiE community, which *responds* to climate-related disasters, destruction, and displacement, and the CSES community with an increasing emphasis on *resilience* through prevention and 'building-back-better' through climate-smart standards and measures. This policy-level convergence is demonstrated by the GPE[96] in 2023, joining the EiE Hub.[97]

Convergence of Climate-Smart Education Systems and Education in Emergencies in practice

Schools could be designed to be capable of withstanding and/or adapting to climate-related shocks. African countries should avoid further investments in traditional "gray" education infrastructure that is vulnerable to damage or destruction or place the people inside them at higher risk of exposure to climate-related hazards. "Gray" education infrastructure refers to schools built with iron roofs, corrugated asbestos sheeting, or from shipping containers—unsustainable materials that are known for their poor ventilation and insulation. Air temperatures inside classrooms constructed with these materials often exceed 30°C, causing heat stress and other heat-related symptoms, including thirst and drowsiness. Many of these structures are also easily destroyed during flooding or windstorms (GCA, 2022, p. 394).

The most compelling evidence presented in sections 3.2, 3.3, and 3.4 highlights several key points:

- Education infrastructure is heavily affected by both slow-onset and sudden-onset disasters.
- Climate change is a significant driver of displacement.
- Education plays a crucial role in enhancing resilience and adaptation measures.
- Disruptions to education, such as destroyed infrastructure and displacement, can adversely affect educational attainment.
- a lack of education increases vulnerability to climate change, as highlighted in sections 3.3 and 3.6.

These findings underscore the critical need for robust educational systems to mitigate the impacts of climate change and support affected communities. The integration of Education in Emergencies and Climate-Smart Education Systems responds to this converging evidence by addressing both education after a disaster has struck and adapting education systems to the future impacts of increasing climate-induced disasters, including infrastructure.

Adapting schools to climate change

Some of the efforts mentioned in the literature to adapt schools to the increasing impacts of climate change are relocating to school locations that are safer from climate-related disasters, helping establish legislative frameworks for school infrastructure, and scaling up best practices and lessons learned from countries that have implemented school relocations due to risks from climate change and related disasters. See the following references for more information (IFRC, 2020); (GPE & StC, 2023); (GPE, 2023b) (OECD, 2024).

Furthermore, there is compelling evidence in sections 1.3 and 1.6 that the impacts of climate change and related disasters are not gender-neutral.[98] Women are more vulnerable to climate change and related disasters, with higher mortalities in climate-induced disasters than men. Therefore, it is a priority to integrate girls' and women's voices systematically and meaningfully in EiE efforts and when implementing Climate-Smart Education Systems, for instance, in the seven dimensions of GPE's Climate-Smart Education Framework.

Evidence of extreme heat impacting education directly through high classroom temperatures is convincing.

As highlighted in section 3.2, this has grave impacts on learning, and a focus on adapting school infrastructure to extreme heat is urgent**.** According to IPCC, climate change caused by human activity has increased the frequency and intensity of heatwaves since the 1950s, and additional global warming will further intensify this trend.[99] Across the African continent, people living in cities are expected to be increasingly affected by heat waves, with as much as one-third of urban inhabitants across Africa projected to be impacted by extreme heat.[100], especially as urbanisation rates are high in East Africa , which effectively exposes more people to the effects of extreme heat in urban areas.

Moreover, extreme heat is a policy priority area (World Bank, 2024b) (GCA, 2022). Several efforts being initiated globally. For instance, the IFRC and USAID held the first-ever global summit on extreme heat on March 28, 2024. A toolkit for higher education institutions to mitigate the impacts of extreme heat was developed and published during the summit, and as highlighted in section 3.2, the World Bank has strong evidence from Ethiopia of the impacts of extreme heat on learning at universities. Thus, it should be a priority to mitigate these impacts and to strengthen the evidence of the impacts of extreme heat on students at primary and secondary levels, particularly in developing countries.

CCE and the greening of education and the education sector at large

In the context of the OECD, the ongoing process of rethinking education in the context of climate change points towards resilience as comprising four key stages: awareness, assessment, action, and adaptation (OECD, 2024). CCE is relevant for all these aspects of building systemic resilience as education increases resilience to climate change, and increased knowledge can lead to increased concern for the climate, as highlighted in sections 3.5 and 3.6. However, the review also revealed that there is limited evidence supporting that CCE has positive impacts on climate behaviour and action, especially in developing countries. With

CCE being an important global policy priority, it is important to support the area with substantial evidence and robust data through research and strong evaluations.

The World Bank proposes a four-pronged approach consisting of (i) education management for climate resilience, (ii) school infrastructure for climate resilience, (iii) Ensuring learning continuity in the face of climate shock, and (iv) leveraging students and teachers as change agents.

Promoting CCE must go hand-in-hand with addressing challenges such as attention to localisation, conditions and circumstances and emerging evidence on negative mental health impacts and unintended consequences, including climate anxiety that impacts learning outcomes. As pointed out earlier, further research is needed on how climate-related mental health impacts are and can be integrated into the climate-related behavioural impacts of CCE (Sims, 2021), on how to meaningfully integrate local contexts and knowledge systems[101] and how to better prepare teachers for CCE (Ma & Chen, 2023). Climate anxiety experienced by children in countries impacted by climate change needs to be taken into consideration when designing educational curricula on climate change. This also needs to have in mind climate anxiety as this is a global issue (Hickman, et al., 2021) and has implications on how climate change is communicated and taught to affected children.[102] Additionally, it was found that there are many national difficulties in the integration of CCE into national curricula and are not keeping up with youth demand (UN, 2023)

Mechanisms and finance

A main policy trend is towards more integrated, responsive, and efficient use of mechanisms and resources. This is particularly evident in the grey policy literature (see box on recent OECD publications).

As illustrated in the previous chapter, the evidence base robustly points towards significant financial needs related to access to education impacted by sudden-onset climate-induced disasters and the ensuing rapid-onset emergencies. Adaptation slow-onset effects of climate change needs to be faster. At COP 28, the Declaration on the Common Agenda for Education and Climate Change was signed by 39 countries, including Denmark.[103] This latest policy development has firmly set the CC-EDU intersection on the global policy agenda.

CC-EDU policy development in the OECD and COP context

Policy development in the Climate Change and Education intersection is accelerating. Two recent OECD publications include:

Addressing Forced Displacement in Climate Change Adaptation – No Longer a Blindspot (OECD, 2023) found here.

Rethinking Education in the Context of Climate Change: Leverage Points Transformative Change (OECD, 2024) found here.

Declaration on the Common Agenda for Education and Climate Change at COP28 found here.

4.3 Programming level implications

Key messages

- The intersection of climate change and education requires investments in robust, disaggregated data for evidence-based policy and promotion of the long-term climate-related benefits of investing in education.
- Donors supporting multilateral education organisations and global climate funds play a key role in enhancing the integration of humanitarian and development efforts in the education sector and the integration of education in climate policies and finance.
- The integration of education into national climate policies, such as the Nationally Determined Contributions, drives change. Notably, the Declaration on the Common Agenda for Education and Climate Change at COP28 includes this commitment.
- There is a lack of attention to the critical need to invest in the adaptation of the education sector to the slow-onset effects of climate change. This urgency is similarly reflected in the Declaration on the Common Agenda for Education and Climate Change at COP28.

The intersection of climate change and education requires investments in robust, disaggregated data for evidence-based policy and promotion of the long-term climate-related benefits of investing in education. This enhanced knowledge could then be utilised to integrate education systematically into climate change discussion processes and funding mechanisms, thereby unlocking education financing from multilateral climate funds.[104] Strengthened global education alliances can leverage their position to change this through well-funded, targeted, and evidenced-based policy advocacy.[105] This evidence base and knowledge was requested by several stakeholders interviewed, who need it to argue for increased spending on education within climate finance.[106]

Donors supporting multilateral education organisations and global climate funds play a key role in enhancing the integration of humanitarian and development efforts in the education sector and the integration of education in climate policies and finance. Both GPE and the EiE Hub expressed this gap as essential and are strong potential collaborators in conducting the analysis. As demonstrated in the preceding sections, the response to the direct impact of climate change in the CC-EDU intersection involves boosting disaster risk reduction by incorporating building back better strategy calibrated through a CSES lens. In the CC-EDU intersection, building back better implies the application of climate-smart standards and technologies and solutions in the (re)construction of educational facilities (see GCA box above). This tallies with a specific need to invest in building the evidence base on how climate-smart approaches (including in construction) improve value for money of investments in education (GPE, 2023b).

The integration of education into national climate policies, such as the Nationally Determined Contributions, drives change. [107] Notably, the Declaration on the Common Agenda for

Education and Climate Change at COP28 includes this commitment.[108] An analysis of 160 Nationally Determined Contributions (NDCs) found that while 108 mention education, 61% of the NDCs mention it 'passively' without describing children and young people's role in mitigation or adaptation efforts (Kwauk, Cooke, Hara, & Pegram, 2019). Additionally, girls' education is a key factor in building resilience against climate change and related disasters, as highlighted earlier, but only 30 NDCs mention girls explicitly.[109] This is a barrier to both integrating education into climate policies and securing equal access to education for all children (GPE, 2023b). Integrating education into national climate policies, such as the NDCs, was also highlighted in two stakeholder interviews as essential for working with education and climate change at a national level.[110]

There is a lack of attention to the critical need to invest in the adaptation of the education sector to the slow-onset effects of climate change. This urgency is similarly reflected in the Declaration on the Common Agenda for Education and Climate Change at COP28. The identified lack of integration of education into NDCs illustrates a need for further in-depth country-level analysis to provide context-specific evidence on the integration of climate and education policies. Additionally, climate change policy documents should recognise the role that the Ministry of Education and school-level education can play in accelerating climate change mitigation and adaptation efforts.[111]

Annexes

Annex 1 – Bibliography

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Annex 2 – Concepts and definitions

Climate Resilience	In this context climate resilience refers to the capacity of social, economic, and environmental systems to cope with a hazardous event, or trend, or disturbance, responding or reorganising in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation. Source: IPCC, 2018.
Climate-Induced displacement	Climate-induced displacement refers to the forced movement or relocation of people due to climate change-related crises or disasters, such as extreme weather events, sea-level rise, droughts, and desertification. It can be temporary or permanent and includes both sudden-onset disasters like storms and floods, as well as slow-onset impacts like rising sea levels and increasing droughts. Source: European Union Agency for Asylum.
Direct impacts of climate change on the education system	Impacts occur when school facilities and resources are physically damaged, education provision is disrupted and lives, health and wellbeing of students and teachers are adversely and immediately impacted by sudden-onset, climate change-induced hazard events or occurrences such as cyclones, floods, storm surges, torrential rains and extreme temperatures. Source: UNICEF 2022.
Disaster	A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. Source: IPCC.
Extreme weather events	Short-term localised phenomena that deviate from the normal weather conditions, such as heat waves, floods, droughts, storms and wildfire. Source: OECD 2024.
Gender equality	Gender equality refers to the equal rights, responsibilities and opportunities of women, men, girls and boys. Equality does not imply sameness but that the rights of women and men will not depend on the gender they were born with. Gender equality implies that the interests, needs and priorities of all genders are taken into consideration, recognizing the diversity of different groups. Gender equality is not a women's issue but should concern and fully engage all genders while recognizing that neither all men nor all women are a homogenous group. Source: UN Women Training Center glossary on definitions.
Hazard	The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. Source: IPCC
Human mobility	The permanent or semi-permanent move by a person for at least 1 year and involving crossing an administrative, but not necessarily a national, border. Source: IPCC.
Indirect impacts of climate change on the education system	Impacts where the education system and stakeholders are not immediately affected by the climate system but are influenced by incremental environmental changes and delayed climate change impacts through slow-onset events (e.g., drought, sea level rise, salinity intrusion, erosions) and/or via some intermediary (e.g., changes in ecosystems, migration patterns, agriculture, food and water security, diseases). UNICEF 2022.
Intersectionality	Intersectionality looks at the ways in which various social categories such as gender, class, race, sexuality, disability, religion and other identity axes are interwoven on multiple and simultaneous levels. The discrimination resulting from these mutually reinforcing identities leads to systemic injustice and social inequality. Source: European Network Against Racism, 2021.
Learning environment	The diverse physical locations, contexts, and cultures in which students learn such as outdoor environments, private homes, childcare centres, pre-schools, temporary structures, and schools. The term also encompasses the culture of a school or class- its presiding ethos and characteristics, including how individuals interact with and treat one another- as well as the ways in which teachers may organize an educational setting to facilitate learning, e.g. by conducting classes in relevant natural ecosystems, grouping desks in specific ways, decorating the walls with learning materials, or utilizing audio, visual, and digital technologies. School policies, governance structures, and other features may also be considered elements of a learning environment. Source: INEE.
Learning poverty	Learning poverty means being unable to read and understand a simple text by age 10. This indicator brings together schooling and learning indicators: it begins with the share of children who haven't achieved minimum reading proficiency (as measured in schools) and is adjusted by the proportion of children who are out of school (and are assumed not able to read proficiently). Source: World Bank 2022.
Robust evaluations	As working definition evaluations are considered robust if they use experimental methods like randomised control trials and quasi-experimental methods that estimate the impact and cost-effectiveness of government and NGO programs. Source: World Bank.

Sexual and Reproductive Health and Rights (SRHR)	The state of physical, emotional, mental, and social well-being in relation to sexuality and reproduction, not merely the absence of disease, dysfunction, or infirmity. Source: Guttmacher-Lancet Commission.
Slow-onset disaster	A disaster that evolves gradually from incremental changes occurring over many years or from an increased frequency or intensity of recurring events. Slow-onset disasters relate to environmental degradation processes such as droughts and desertification, increased salinization, rising sea levels or thawing of permafrost. Source: INEE.
Sudden-onset disaster	A disaster triggered by a hazardous event that emerges quickly or unexpectedly. Sudden-onset disasters may be climate-related (e.g., floods, cyclones, landslides, tornadoes, wildfires), geologic-related (earthquakes, tsunamis, or volcanic eruptions) or not (e.g., chemical explosion or critical infrastructure failure). Depending on their severity and the affected community's vulnerabilities and adaptive capacity, they may also result in temporary (or sometimes protracted) displacement. Source: INEE.
Vulnerability in the context of climate change	This refers to "The propensity or predisposition to be adversely affected" by the impacts of climate change. Vulnerability is determined by sensitivity and susceptibility to harm and by adaptive capacity, among other factors. Source: IPCC, 2018.

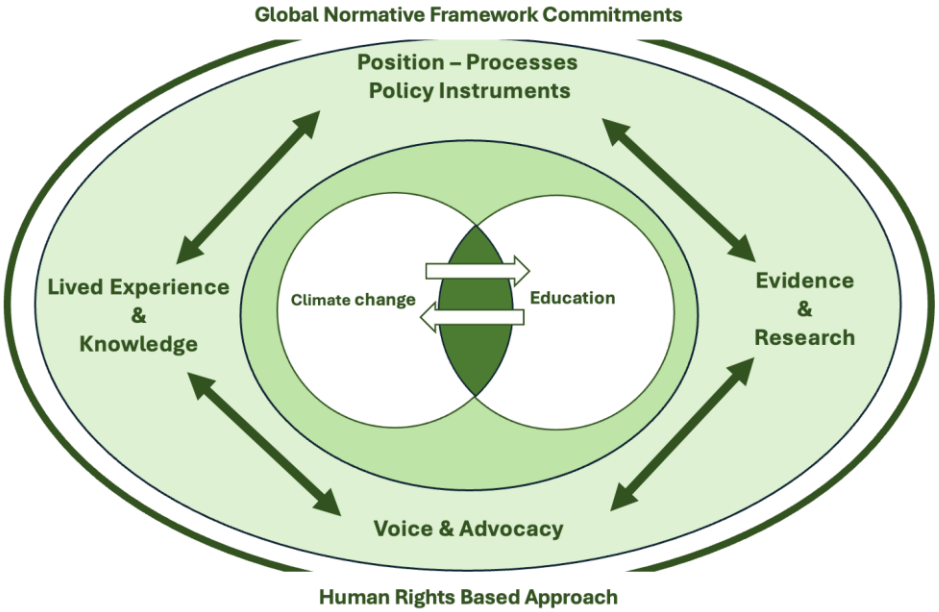
Annex 3 – Methodology

A methodology for reviewing the evidence base was developed to ensure an up-to-date understanding of the intersection between climate change and education. A comprehensive methodology was developed to review the literature and evidence base.

Thematic areas related to climate and education were established based on existing knowledge, consultations with key stakeholders, discussions with the MFA team and topics high on the agenda of international climate dialogues. Five thematic areas were finally selected as focus points on the intersection between climate change and education, and the MFA approved these thematic areas.

Thematic focus areas for the climate change and education intersection	
1.	Destruction and degradation of education infrastructure and learning environments
2.	Lack of education increases vulnerabilities to climate disasters and change and can exacerbate existing inequalities
3.	Forced displacement due to climate disasters and its impact on educational outcomes
4.	Education as empowerment and children as agents of change
5.	Better education as a driver to reach climate goals

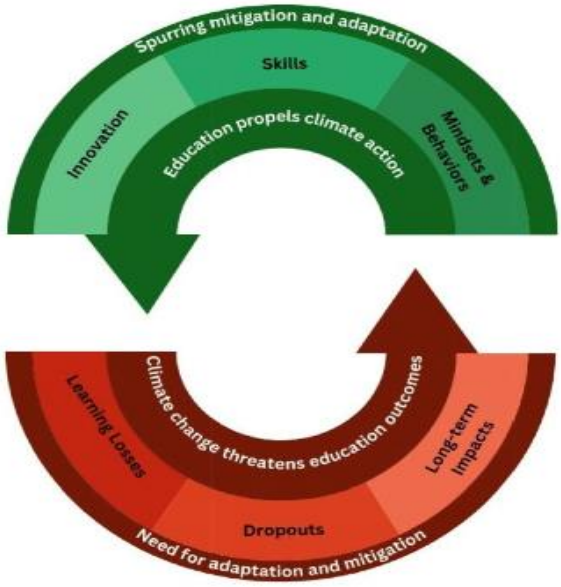
Figure 1: Selected thematic areas within CC-EDU intersection framework



Source: NCG Denmark

The framing of the analysis postulates that evidence-based policy and programmatic actions in the CC-GE-SRHR and CC-EDU intersections occur in a 'contested space'. The HRBA foundation of the conceptual framework values civil societies' 'voice and advocacy' as shaped by 'lived experience and knowledge' of the individuals and communities affected and living with the front-line effects of climate change. At the global level, and with significant variance across countries, power and empowerment dynamics characterise a contested space in which advocacy, often through voices of civil society and think tanks, seek to influence policy positions, and more or less inclusive process a global normative framework such as the Paris Agreement 2015 and United Nations' normative frameworks. Specifically for the intersection CC-EU, it is highlighted that the relationship between climate change effects, mitigation and adaptation and education is complex but commonly conceived as bi-directional. On this risk side, climate change causes learning losses, school dropouts, and long-term impacts that threaten education outcomes, underscoring the need for adaptation and mitigation. On the risk-response side, the proposition is that education propels climate action, innovation, skills, mindsets and behaviours that will support mitigation and adaptation.

Figure 7 – The bi-directional relationship between climate change and education



Source: The Impact of Climate Change on Education (World Bank, 2024b)

Climate change and education review of evidence and literature

To identify relevant peer-reviewed academic literature, we searched in two databases, namely Scopus and Web of Science. Search strings were created for the climate change and education intersection generally and for each of the five thematic areas. These are added below. The searches were limited to 2015 to present to limit the scope of the study and as 2015 is the year of the Paris Agreement and the Sustainable Development Goals. Searches from both databases was uploaded to Rayyan, a program that can be used to sort literature and that can remove duplicates from the searches. This yielded 3,678 results (see section of search strings below) .

These were sorted by relevance based on keywords and geography from the title of the article. If the title did not clarify an article's relevance, abstracts were read. This 'first edit' yielded 222 'maybe' articles and 88 'included' articles. Abstracts for the 310 articles were then read to conduct the second edit which yielded 40 included articles. This was further reduced to **33 academic articles**.

The 'grey' literature was identified through key stakeholder interviews, web searches and snowball sampling. This yielded **63 relevant reports** to be included. These reports did not include toolboxes and frameworks.

The final **shortlist of relevant literature of 49 articles** was approved by the MFA before the situational analysis was initiated. Two additional relevant articles were identified after the shortlist was approved.

Search strings for the climate change and education intersection:

General searches: (Article, title, abstract, keywords)

Data range: 2015 to present

Database: SCOPUS (Article, title, abstract, keywords), Web of Science (Abstract)

climate AND (change OR crisis OR adaptation OR mitigation OR disaster OR resilience) AND (education OR school OR learning = 23.789 results

General searches: (Title)

Data range: 2015 to present

Database: SCOPUS (Title)

climate AND (change OR crisis OR adaptation OR mitigation OR disaster OR resilience) AND (education OR school OR learning) = 1006 results

Thematic area searches

Destruction and degradation of education infrastructure and learning environments

- climate AND (change OR crisis OR adaptation OR mitigation OR disaster OR resilience) AND (education OR school OR learning OR 'learning AND environment' OR damage OR destruction OR dropout OR attendance OR 'loss "and" damage' = SCOPUS: 'Title' search: 333 results/ Web of Science: Title search: 1080 results

Lack of education increases vulnerabilities to climate disasters and change (economic instability/livelihoods, for instance) and can exacerbate existing inequalities

- climate AND (change OR crisis OR adaptation OR mitigation OR disaster OR resilience) AND (education OR school OR learning) AND (vulnerability OR poverty OR

inequality OR livelihood) = SCOPUS: Only 11 results on ‘Title’, expanded to ‘Abstract’: 1486 results /Web of Science: 'Title’ search 1327 results

Forced migration due to climate disasters and its impact on educational outcomes

- climate AND (change OR crisis OR adaptation OR mitigation OR disaster OR resilience) AND (education OR school OR learning) AND (migration OR migrant OR ‘forced AND displacement’ OR refugee) = SCOPUS: Only 1 result when searching on ‘Title’, expanded to ‘Title, Abstract, Keywords’: 49 results/Web of Science: ‘Title’ search only yielded 13 results, expanded to 'Abstract’ search: 362 results (title search only produce 13)

Education as empowerment and children and youth as agents of change

- climate AND (change OR crisis OR adaptation OR mitigation OR disaster OR resilience) AND (education OR school OR learning) AND (empowerment OR participation) AND (children OR youth) = SCOPUS: ‘Title’ gave 1 result, expanded to ‘Abstract’: 99 results /Web of Science: Title only gave 4 results, expanded to Abstract: 109 results

Better education as a driver to reach climate goals

- climate AND (change OR crisis OR adaptation OR mitigation OR disaster OR resilience) AND (education OR school) AND ("climate goals" OR "community resilience" OR "climate impact") = ‘Title’ only gave 1 result, expanded to ‘Abstract’: 92 results/Web of Science: ‘Title’ gave 1 result, expanded to ‘Abstract’: 56 results

  Note: ‘learning’ was removed from this search because it gave many results on ‘machine learning’ that was not related to education.

Climate change/education intersection longlist consists of **3678** articles after removing duplicates.

Organisations interviewed for the review

- Global Partnership for Education
- Geneva Global Hub for Education in Emergencies
- Education Development Trust
- Oxfam Denmark
- UNICEF Denmark
- Save the Children
- Education Cannot Wait
- World Bank SIEF

Annex 4 – Toolboxes and best practices

A – Frameworks

The Comprehensive School Safety Framework (CSSF) 2022-2030 supports the education sector policymakers, planners, school administrators, and their partners to promote child rights, sustainability, and resilience in the education sector. The framework provides a comprehensive approach to resilience and safety from all hazards and all risks confronting education and child protection sector populations, systems and programs. It supports access, quality, and management strategies in the education sector.

This framework was mentioned in a stakeholder interview with the EiE Hub as the most well-established and thorough framework in the intersection between climate change and education.

FCDO suggest using their Pathways of Change Framework to address climate change in and through education. The framework works along two lines, namely 1) more resilient and inclusive education systems including the Comprehensive School Safety Framework, Education in Emergencies, and climate-smart infrastructure; and 2) knowledge, skills and agency for climate resilience and action with a focus on foundational learning and education for sustainable development.

Malala Fund published their Gender-Equal Green Learning Agenda in 2021 to assist leaders in addressing the climate crisis through education based on research by Christina Kwauk and Olivia Casey for the Brookings Institution. It consists of four pillars. These are 1) access to education and getting all girls in school for 12 years; 2) teaching girls an expanded vision of green skills; 3) promoting sustainable values through climate education; and 4) empowering students to take action on climate action.

Commissioned by Global Partnership for Education, Fumiyo Kagawa and David Selby have developed a Climate-Responsive and Nature-Positive Framework for Education System of Lower-Income Countries. It consists of seven dimensions: 1) Policy and planning; 2) Finance; 3) Physical infrastructure; 4) Curriculum, learning and teaching; 5) School and community linkages; 6) Coordination and partnerships; and 7) Data and evidence. These should be seen as intersecting while it is important that 'policy and planning' reflects all other dimensions.

B – Tools and handbooks

The Inter-Agency Network for Education in Emergencies (INEE) have developed a handbook with set of minimum standards for education relating to Preparedness, Response, and Recovery. It is designed to give governments and humanitarian workers the necessary tools to address both local and global goals within Education in Emergencies. The minimum standards aim to 1) enhance the quality of educational preparedness, response and recovery; 2) increase access to safe and relevant learning opportunities for all learners; and 3) to ensure accountability and coordination in the provision of Education in Emergencies. The handbook is currently being updated with new findings and recommendations that make over 60

references to climate change issues in EiE (GGHEE, Leveraging Education in Emergencies for Climate Action – no time to lose: Commit to resilience and learning now, 2023).

INEE have also developed a Psychosocial Support (PSS) and Social and Emotional Learning (SEL) Toolbox to enable crisis-affected children and young people recover from their experiences and engage with learning more constructively.

Global Partnership for Education and Save the Children have constructed the Climate and Environment Intervention Matrix (see page 27-29 in the report) that summarises relevant climate-smart interventions in the education sector. The matrix is designed to help governments, development partners, civil society and other education stakeholders kick start a conversation on building a climate-smart education system.

The World Bank and Global Facility for Disaster Reduction and Recovery have developed the Roadmap for Safer and Resilient Schools which is intended to support governments in developing countries exposed to climate disasters. The handbook focuses on design of intervention strategies and investment plans to make schools safer and resilient at scale.

Save the Children developed a Climate Resilient Programming in Education Tool. The tool provides education stakeholders with a practical process for making their education programming climate resilient and promotes more comprehensive, holistic, and collaborative programming.

UNESCO has developed a Roadmap for Education for Sustainable Development, which clearly sets out what Member States must do within each action area (*policy*, *education and training settings*, *building capacities of educators*, *focus on youth*, and *local-level action*) to strengthen their efforts in Education for Sustainable Development.

Global Partnership for Education and UNICEF have a virtual reality film on climate change and education showcasing the challenges that climate change poses to children's education in Mozambique.

UNICEF have created a Resource Manual for Climate Change Adaptation and Disaster Risk Reduction in the Education Sector. The manual provides guidance on policy a planning for sustainable development throughout the education sector. It is intended for use as an evidence-based policy advocacy and capacity development tool by ministries of education and their partners.

C – Best practice

The Department of Education in the Philippines, in partnership with Save the Children and the Prudence Foundation, launched a set of digital tools to inform planning and decision-making at the national, sub-national, and school levels. The Rapid Assessment of Damages Report app is used to report school-level post-disaster damage and needs assessments. It enables the Department of Education to make timely interventions that help to ensure learning continuity. Additionally, a student-led School Watching Application was developed as a school hazard mapping checklist. The Comprehensive School Safety Monitoring Tool enables schools to conduct ongoing self-monitoring and receive customised guidance (GGHEE, Leveraging

Education in Emergencies for Climate Action – no time to lose: Commit to resilience and learning now, 2023).

Global Centre on Adaptation published the report 'Case Studies on Adaptation and Climate Resilience in Schools and Educational Settings' in 2022 in which they bring case studies on how schools and education can be used to increase local resilience and adaptation measures. Find it here.

UNICEF reports on several projects that aims at empowering children and young people to become agents of change in Southeast Asia. For instance, in Mongolia, the Children's Solutions on Climate Change programme included a mobile edutainment system to deliver knowledge of environmental issues. In addition, it implemented an Eco Passport programme, whereby students assessed their local area and identified possible impacts and solutions that could be implemented with small grants of 50,000 MNT (approximately US$19). The final component included the development of the Children's Report on Climate Change, which highlighted several strategies for climate change mitigation and adaptation that could be led by young people. A similar approach is found in Cambodia through eco-schools where students lead the committee and recruit fellow students as members. The committees of the eco-schools manage a budget of US$400 to run the club and fund small-scale activities such as bio-gardens, resilient farming, installing water containers, renovating toilets, planting trees, creating small forest demonstrations and recycling waste, among others. These initiatives can provide an avenue for children to become agents of change. However, several of them are project-based and are not continued once the funding is terminated (UNICEF, 2019).

Annex 5 – The CC-EDU intersection: Africa Focus

Introduction

Throughout the main report, it has been mentioned that Africa is more vulnerable on several parameters considered. This annex provides additional information on the CC-EDU intersection, including a collection of maps that illustrate the challenges.

Climate Hazards, exposure and vulnerability in Africa

African countries are poorer and less prepared to deal with the impacts of climate change in general, including those at the intersection of climate change and education. According to the World Bank, there are 22 low-income countries on the African continent, all in Sub-Saharan Africa. A further 23 countries are Low-Middle Income, 19 of which are in Sub-Saharan Africa and 4 in North Africa (see Map A below). These countries are all bottom-end performers on the Notre Dame Global Adaptation Initiative (ND-GAIN) country ranking index (see Map B below). Africa stands out as the continent, with most countries ranking at the most worrisome end of the Children's Climate Risk Index (UNICEF, 2021). This underscores that the climate crisis is a child's rights crisis that includes a right to education crisis (See Map C).

The African continent has suffered the greatest economic impact from climate-related disasters, with losses equivalent to 12.3% of its total GDP in reporting years (UN General Assembly, 2023). Africa is vulnerable to climate change as the frequency and intensity of climate change hazards and low capacity for adaptation lead to high exposure and vulnerability. It is estimated that close to an additional 40 million people in Africa will fall back into extreme poverty by 2030 (GCA, 2022). Climate change acts as a risk multiplier, amplifying the intensity of extreme weather events, increasing unpredictability, and exacerbating vulnerabilities. Temperatures are increasing across all regions of Africa, and the continent is warming faster than the global average over both land and sea. Africa's vulnerability to climate change is due to its economic reliance on climate-related activities and products and its low capacity to adapt. Currently, approximately 460 million Africans are exposed to one or more physical hazards related to climate. In a 1.5°C warming scenario, 500 million people in Africa would be severely and moderately exposed to climate hazards. This number would increase to 900 million by 2050 in case of a 2°C increase in average world temperature (GCA, 2022). (see Map D below).

African food systems are particularly vulnerable to climate extremes and shifts in weather patterns, as food production is largely dependent on rainfed agriculture and pastoralism. Overall, the livestock sector accounts for 55% of the household income in pastoral systems across Africa. Between 2011 and 2020, the disasters that have affected Africa have mostly involved droughts and floods. In North Africa, the greatest impacts were from floods and wildfires. On average, approximately 13 million people per year were impacted by droughts over that period, and 3.5 million were impacted by floods. A 2°C of global warming would cause the productivity of rangeland in West Africa to decline by 42% by 2050, and the catch

potential of the coast of West Africa and the Horn of Africa would decline by 10% to 30% (GCA, 2022)(see Map E).

The populations of major cities in Africa, especially the capital cities, are growing rapidly because of migration from rural areas and small towns and natural population growth. Of the 100 fastest-growing cities in the world, 79 are in Africa (GCA, 2022). Rapid urbanisation is exacerbating the impacts of climate change in Africa and many African cities now are seen as being at "extreme risk" of climate hazards, especially because of large informal settlements that are particularly vulnerable to flooding, heatwaves, droughts, and (in coastal cities) sea level rise (GCA, 2022). Coastal erosion rates in some North African countries, mainly Morocco and Egypt, exceed the global average by up to 10 times. Rapid urbanisation is linked to internal climate migration on the African continent. Climate change impacts are changing the attractiveness of livelihood and resource conditions in rural, coastal, and urban systems. In North Africa, changes in water availability are a main driver of internal climate migration to urban centres (World Bank, 2021). The World Bank estimates that by 2050, Sub-Saharan Africa could see as many as 85.7 million internal climate migrants (4.2% of the total population), while in North Africa, 9% of the total population (19.3 million internal climate migrants are projected.

Education

Today, the continent has half a billion children ages zero to 14, and this number is expected to reach 580 million in 2030 (The Brookings Institution, 2023). More African children have access to education than before, but they do not receive the foundational quality education that they should. (UNESCO; UNICEF; World Bank, 2021) In sub-Saharan Africa, although 80% of primary-aged children are enrolled in school, only 62% graduate on time (UN, 2023).

Africa is experiencing a crisis in education. Sub-Saharan Africa has the highest rates of education exclusion. An 80% enrolment rate means that 1 in 5 of children between the ages of about 6 and 11 are out of school, followed by 1 in 3 of youth between the ages of about 12 and 14. More than 1 in 2 (almost 60%) of youth between the ages of about 15 and 17 are not in school.[112] Ensuring girls gain basic literacy by the end of primary school leads to impacts on fertility, child mortality, empowerment, and financial practices that are three to five times greater than completion of primary alone (e.g., 36% reduction in fertility rate, compared with 9.7%) (FCDO, 2022). If current trends continue, it will take 100 years to reach universal primary education, and another 235 and 280 years to reach universal lower secondary and universal upper secondary education (GCA, 2022)

Even without the effects of climate change, learning poverty rates (a proxy for the lack of quality education) on the African continent are high. In Sub-Saharan Africa, the learning poverty rate stands at 86%, with learning poverty in North Africa between 65% and 70%, exceeding the global average of 57% (World Bank, 2024b).[113] [114] (see Map F). Only 23% of all 15–24-year-olds have basic secondary literacy and numeracy skills (GCA, 2022). This illustrates that quality education remains incomplete and inequitable. Without foundational learning, other benefits of education are severely undermined. (FCDO, 2022) (World Bank, 2022b).

In **Côte d'Ivoire**, 1.6 million children are out of school. Insufficient and overcrowded classrooms are significant obstacles in ensuring quality learning opportunities for all children. It is estimated that 15,000 classrooms are required to provide out-of-school children with a place to learn. (Kagawa F., 2022) In **Niger,** nearly 47% of school infrastructure stock continues to rely on temporary structures made of straw, which are built based on demand and are dismantled annually during the rainy season, leaving millions of children and youth without access to school (World Bank, 2024b).

The impact of climate change on education

Climate-related disruptions to the education sector have far-reaching negative effects on the adaptive capacity of climate-vulnerable populations in Africa. As many as 25 of the 33 countries where children shoulder extremely high vulnerability. At the same, climate change increases the size of the education challenge. Many schools cannot cope with impacts like heat waves, water scarcity, or extreme weather. (GCA, 2022). In 2019 Cyclone Idai hit southeast Africa. In **Mozambique** alone, 3,400 classrooms were destroyed, and 305,000 children were left without a place to learn. The damage ranged from the complete collapse of school buildings to the destruction of teaching and learning materials. Moreover, school premises that withstood the cyclone provided shelter to 142,000 displaced people, which prolonged the time children were left without spaces for learning and increased dropout rates, especially among girls. In **Zimbabwe,** the total cost of educational infrastructure destruction reached nearly USD 7 million (GCA, 2022). In **Malawi**, 620 schools were damaged during tropical Cyclone Freddy in 2023, and nearly 5% of students faced school closures (Care Denmark & Danish Red Cross, 2023) (World Bank, 2024b). The cost of the recovery of the education sector following Cyclone Idai in Malawi, Zimbabwe, Mozambique, and the Comoros was estimated at USD 122 million (Sims, 2021).

Extreme heat directly and indirectly affects learning and learning outcomes. While there is some variation in the precise temperature level, exceeding specific temperature thresholds compromises learning outcomes (World Bank, 2024b). Poorly ventilated spaces, including school buildings, have been reported to present desperate conditions during extreme heat and common sandstorms in **North Africa**, resulting in children missing class days, but exact numbers are unclear, as countries do not appear to be proactively tracking such data (GCA, 2022)

In urban areas, the "urban heat island" effect occurs when temperatures exceed those in surrounding rural areas due to greater heat absorption by built-up surfaces and densely constructed buildings (see Map G). For instance, a study of excess heat in Nairobi's informal settlements revealed that poor ventilation contributed to high mortality for older adults and more respiratory illnesses for young children. Classroom heat affects learning outcomes (Lala & Hagashima, 2023) (World Bank, 2024b). Robust studies on the complex interplay of extreme heat, urban heat islands and (urban and rural) classroom heat on the African continent are rare. However, in Ethiopia, the World Bank provided strong evidence on the impacts of extreme heat on learning at universities (World Bank, 2024).

Drought is another major challenge directly impacting education in Africa by stressing water, sanitation, and hygiene (WASH) infrastructure that is already unevenly developed. This is especially the case in poorer urban areas and in rural areas. Nearly 295 million children in Sub-Saharan Africa lack access to water for drinking and hand washing at school and hygiene care at school, affecting pupils, and menstruating learners and teachers (GCA, 2022). Drought-affected households without access to credit facilities are especially at risk of withdrawing their children, especially girls, from school – some to engage in income-generating activities and others to be married off (GCA, 2022).

Climate-induced mobility and displacement

About half (46%) of the 68.3 million persons displaced by conflict and violence and 7.7 million displaced by disasters live in Sub-Saharan Africa.[115] Education Cannot Wait found that in Sub-Saharan Africa, internally displaced children are 1.7 times more likely to be out of primary school than their non-displaced peers (Education Cannot Wait, 2023). The sub-Saharan countries with the highest numbers of school-age internally displaced children are the **Democratic Republic of the Congo** (DRC), **Somalia**, **Nigeria**, **Ethiopia**, **Sudan** and **South Sudan** (IDMC, 2020). Leal Filho et al. found climate-related events to be among the top drivers of migration in **Kenya** and **Ethiopia** (Leal Filho, et al., 2023b).

Areas in Africa affected by extreme heat cover the regions on the continent that host most internally displaced persons (see Map H below). More than 4.4 million children of primary and lower secondary school age (between 5 and 14 years old) are at risk of having their education affected by internal displacement in sub-Saharan Africa (IDMC, 2020). At least three million children internally displaced by conflict or violence are at risk of being out of school across 13 sub-Saharan African countries because they are not receiving educational support. (IDMC, 2020).

Climate-induced displacement also constitutes an adaptation strategy. The World Bank estimates that by 2050 the number of internal climate migrants in Sub-Saharan Africa could reach 86 million (World Bank, 2018). Increased urbanisation can result in a stronger workforce and economy. However rural-urban movement can impede children's right to education. Rural-urban migration in Africa will increase settlements in slums, which can further marginalise children and limit their access to quality education (UNESCO, 2020). The UN projects that by 2050, the slum population in Sub-Saharan Africa will be 230 million (UN, 2023).

The impact of education on climate change

Africa's education crisis is making people more vulnerable to the impacts of climate change and prevents them from becoming a much-needed and critical part of climate solutions. In Africa, like elsewhere, more education–specifically at the upper secondary and tertiary levels–is associated with higher adaptive capacity (GCA, 2022). The lack of foundational quality and related low rates of secondary and tertiary education needs to be addressed. However, national action lags: out of the 43 African countries that had submitted their updated, revised, or new National Determined Contributions, 16 mentioned climate change education. (GCA, 2022).

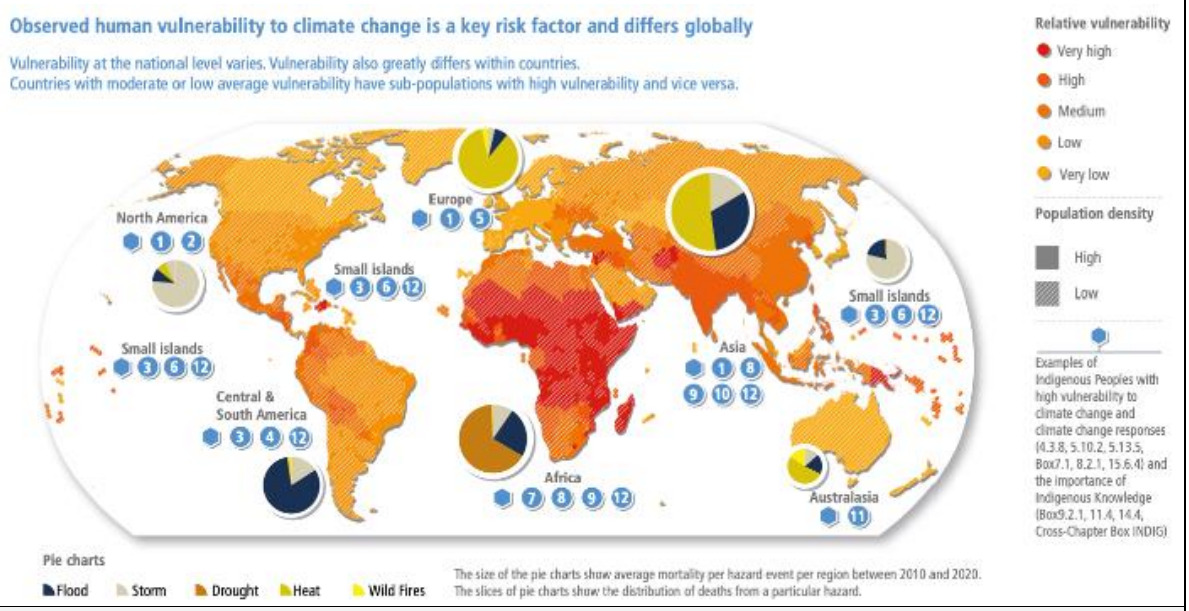
Knowledge and data gaps

Africa-specific findings corroborate that the impacts of climate change on education and education on climate action are insufficiently understood due to a lack of consistent and reliable data and research on interlinkages between climate and education. Additionally, the concentration of poorer countries in Africa further disadvantages the continent in generating context-specific knowledge on the bi-directional interlinkages between climate change and education. This includes data on the direct impacts of extreme storms leading to the destruction of infrastructure, of extreme heat leading to degradation of the learning environment and of droughts or famines stressing essential water, sanitation, and hygiene facilities critical for school attendance and retention. It also includes missing data on the indirect impacts through household coping responses in the face of loss of income and livelihoods or displacement, leading households to withdraw children (especially girls) from schooling. Climate change also impacts the health and well-being of educators and learners, reducing their readiness to teach and learn. These vulnerabilities are further compounded by systemic challenges in society such as gender and structural inequalities (GCA, 2022). (See Map I)

Africa CC-EDU map collection

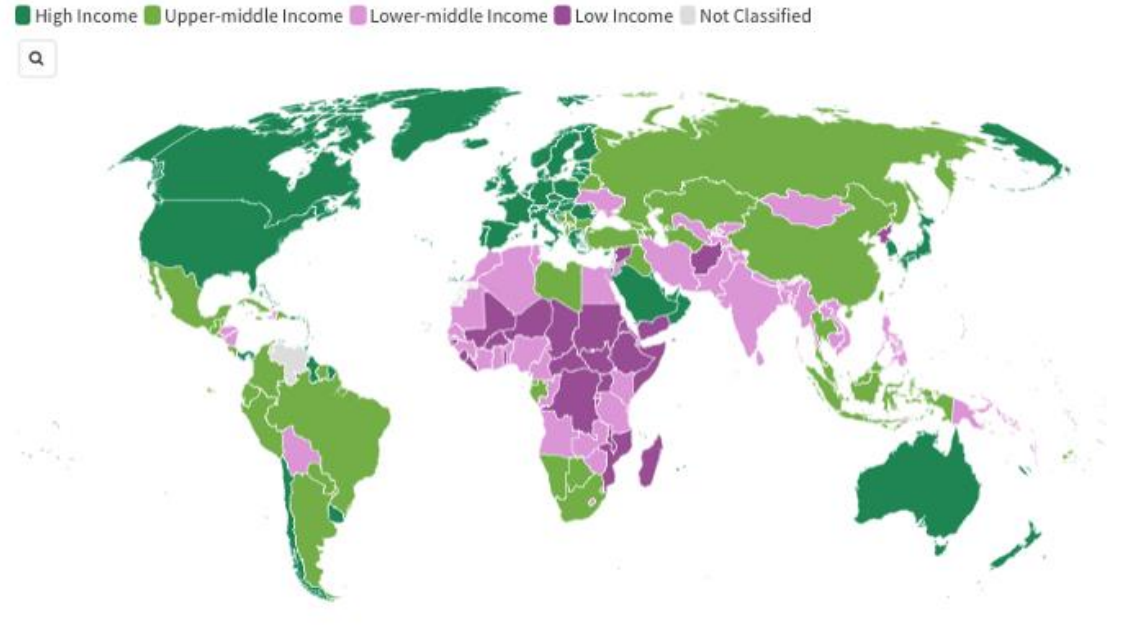
Map A – Human vulnerability to climate change
Source: IPCC 2022 Poverty, Livelihoods, and Sustainable Development

The severity of the types of climates – induced hazards vary globally with darker red colours in the IPCC map below showing that relative human vulnerability to climate change is 'high' to 'very high' across much of the African Continent, where drought is the main hazard, followed by floods and storms.



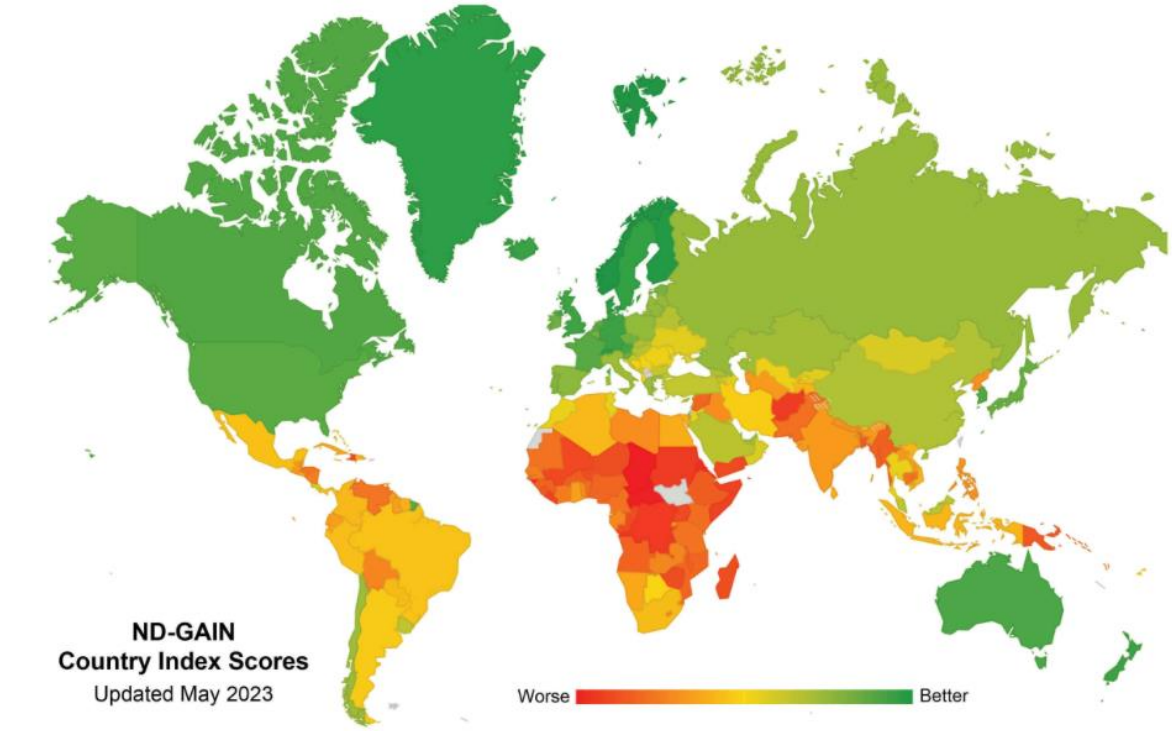
Map B – World Bank country classification (2024)
Source: World Bank (accessed April 2024)

This map shows the concentration of Low-Income counties in Sub Saharan Africa.



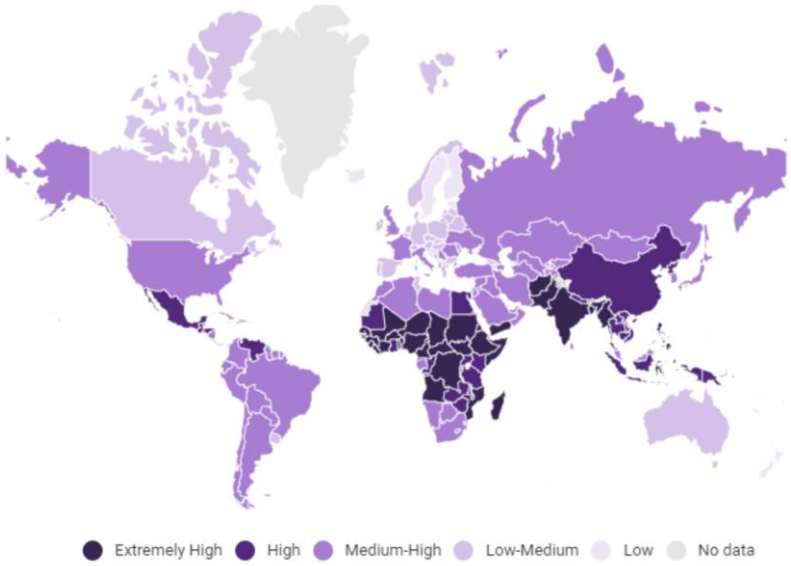
Map C – ND-GAIN Index Country Adaptation Capacity Rankings
Source: Notre Dame Global Adaptation Index

Note that these same Low-Income counties in Sub Saharan Africa also are the ones with low country Adaptation Index scores, which means that they are not well prepared to plan and govern national adaption action on climate change.



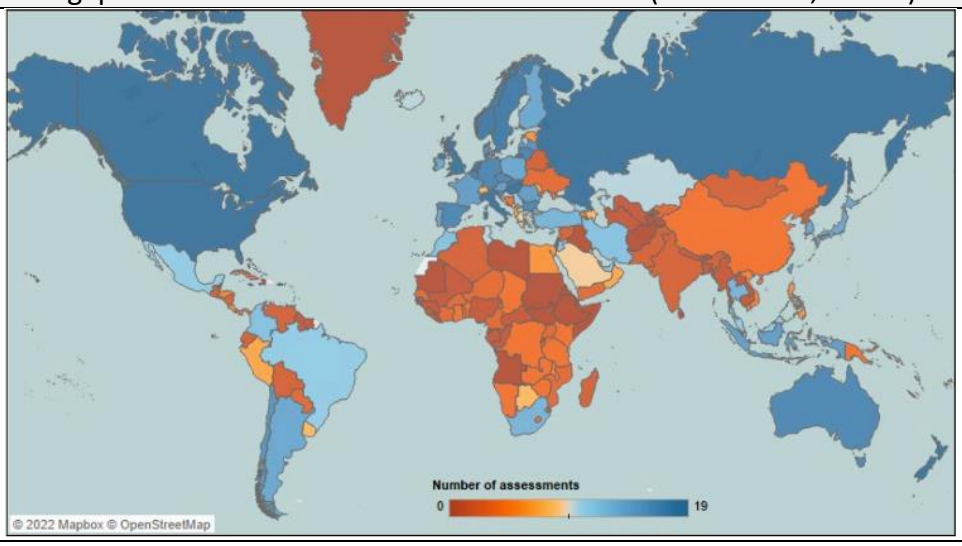
Map C – The Children's Climate Risk Index
Source: UNICEF

The Children's Climate Risk Index shows the compound exposure of children to climate change risk and related vulnerability. It is striking but not unexpected that children are more vulnerable in countries with high human vulnerability to climate change (Map A), countries that are poor (Map B) and are poorly prepared to implement adaptation measures (Map C). These compounding factors are present on the African Continent.



Map D – Learning Poverty & data gaps
Word Bank, The State of Global Learning Poverty: 2022 update

The climate change risk and low adaptation capacity shown in the previous maps exacerbate the already high learning poverty of 86% in Sub-Saharan Africa, meaning 9 out of 10 children cannot read and understand a basic text by age 10. Addressing learning poverty data gaps for African several countries is needed. (World Bank, 2024b).



[1] The report was prepared in accordance with the Terms of Reference of November 2023 and details agreed in the Inception Note of 16 January. The report was prepared by Anton Baaré and Isak Orry Ahlmann of Nordic Consulting Group Denmark (NCG Denmark) with support from the full consultant team consisting of Marianne Jacobsen Toftgaard (NCG Denmark) and Heather McMullen.
[2] Reference is made to the final Inception Note of 16 January 2024. These thematic priorities were identified based on a preliminary assessment of the literature and strategic reflection with the MFA team.
[3] Limitations include that financing was not part of the scope of the systematic review.
[4] For instance, see (Garcia A., 2022).
[5] (World Bank, 2024b) (FCDO, 2022).
[6] (IPCC, 2022); (OECD, 2024); (UNICEF, 2019); (World Bank, 2024b).
[7] (UNESCO, 2020); (UNESCO, 2023); (FCDO, 2022); (Education Cannot Wait, 2023); (World Bank, 2024b); (GPE & StC, 2023).
[8] (FCDO, 2022) (Pankhurst, 2022) (UNESCO, 2020) (UNICEF, 2022b) (UNICEF, 2019) (UNICEF, 2022) (UNICEF, 2021) (World Bank, 2024b) (World Bank, 2022b)
[9] See UNESCO SD4, accessed May 2024.
[10] See World Bank on leaning poverty, accessed May 2024.
[11] See World Bank on girls education, accessed May 2024.
[12] See GPE and Save The Children January 2023, accessed May 2024.
[13] See Young Lives 2021, accessed May 2024.
[14] Source: INFORM Climate Change Tool.
[15] (Sujaya, Abdul-Haq, & Imran, 2023); (Care Denmark & Danish Red Cross, 2023); (Sims, 2021); (UNOCHA, 2019) (GCA, 2022).
[16] (World Bank, 2024b).
[17] (GCA, 2022) (The Brookings Institution, 2023) (World Bank, 2024b) (OECD, 2024).
[18] See information on OECD's definition: Review education policies - Education GPS - OECD: Learning environment.
[19] See here for more information: School infrastructure - IIEP Policy Toolbox (unesco.org).
[20] Interview Global Partnership for Education, Interview Geneva Global Hub for Education in Emergencies, Interview Education Cannot Wait, Interview Save the Children, Interview UNICEF DK, Interview Oxfam DK, Interview Education Development Trust.
[21] (Lala & Hagashima, 2023); (GPE & StC, 2023); (Hanna & Oliva, 2016); (Chigwanda, Mutopo, & Mutanana, 2023); (Kutywayo, et al., 2022); (Bangay, 2021); (UNICEF, 2022); (GGHEE, 2023).
[22] (GCA, 2022) (Lala & Hagashima, 2023) (World Bank, 2024).
[23] Interview Education Cannot Wait, Interview Save the Children, Interview Global Partnership for Education.
[24] Interview Education Development Trust; Interview Geneva Global Hub for Education in Emergencies.
[25] Learning outcomes | UNESCO UIS.
[26] The convergence of evidence refers to how different and independent sources all support one conclusion over another. It is here used to discuss the robustness of the evidence presented in peer-reviewed academic and practitioner 'grey' sources used in the analysis, informing the key messages presented.
[27] (Tan-Soo, Li, & Qin, 2022). (World Bank, 2024b) (OECD, 2024).
[28] For instance, see (Kousky, 2016); (Pankhurst, 2022); (Sims, 2021).
[29] (GGHEE 2023).
[30] For instance, see (Pankhurst, 2022); (Sims, 2021); (GGHEE, 2023); (Yadav & Lal, 2017).
[31] Sources: (Tan-Soo, Li, & Qin, 2022); (Nor Diana, Zulkepli, Siwar, & Zainol, 2022); (Pankhurst, 2022); (Sims, 2021); (Yadav & Lal, 2017); (Drabo & Mbaye, 2015); (Chigwanda, Mutopo, & Mutanana, 2023); (Bangay, 2021); (Hoffmann & Muttarak, 2017); (THEIRWORLD, 2018); (Malala Fund, 2021); (GPE & StC, 2023).
[32] A pan-African research network. See Afrobarometer – Let the people have a say.
[33] (Hanna & Oliva, 2016); (Yadav & Lal, 2017); (GGHEE, Leveraging Education in Emergencies for Climate Action – no time to lose: Commit to resilience and learning now, 2023); (Sims, 2021) (Pankhurst, 2022); (Save The Children, 2021); (FCDO, 2022).
[34] (Codjoe & Adiglo, 2020); (Randell & Gray, 2016); (Hanna & Oliva, 2016); (Sims, 2021); (FCDO, 2022); (Pankhurst, 2022); (Kousky, 2016); (Yadav & Lal, 2017); (Chigwanda, Mutopo, & Mutanana, 2023); (Bangay, 2021); (THEIRWORLD, 2018); (Malala Fund, 2021); (GPE & StC, 2023).
[35] Interview Geneva Global Hub for Education in Emergencies; Interview Oxfam Denmark.
[36] See The "Peoples' Climate Vote" by the UNDP that covered a diverse range of 50 countries across the globe.

[37] Disaster-related anxiety needs to be distinguished from anxiety induced by learning about climate change (Tanner, Mazingi, & Muyambwa, 2022) (UNICEF, 2022) (GPE, 2022).
[38] (Hickman, et al., 2021); (Bangay, 2021); (Sims, 2021); (FCDO, 2022); (Lawrance, Thompson, Fontana, & Jennings, 2021); (THEIRWORLD, 2018); (UNICEF, 2019); (Pankhurst, 2022); (UNICEF, 2022b); (Care Denmark & Danish Red Cross, 2023); (GGHEE, Leveraging Education in Emergencies for Climate Action – no time to lose: Commit to resilience and learning now, 2023); (Education Cannot Wait, 2023); (GPE & StC, 2023).
[39] Intersectionality refers to how systems of inequality based on race, gender, class, disability, sexual orientation, and gender identity intersects. See what is intersectionality (intersectionaljustice.org).
[40] Interview Geneva Global Hub for Education in Emergencies; Interview UNICEF Danmark; Interview Global Partnership for Education; Interview Save the Children.
[41] See also GPE's analysis of data on children with disability and education in their partner countries: GPE Data on Disability Working Paper (globalpartnership.org).
[42] See for example (UNICEF, 2022) (OECD, 2024).
[43] See for instance, (Leal Filho, et al., 2023b) and (Drabo & Mbaye, 2015) (UNESCO, 2023) (UNICEF, 2022b).
[44] (GCA, 2022) (OECD, 2023) (UNICEF, 2022b) (World Bank, 2018) (World Bank, 2021) (World Bank, 2024b).
[45] (UNESCO, 2023).
[46] (Kagawa F., 2022) (UNESCO, 2023) (UNHCR, 2020).
[47] (IDMC, 2021) (UNESCO, 2020).
[48] IDMC accessed May 2024.
[49] IDMC accessed May 2024.
[50] i.e. the elements of the IPCC risk propellor.
[51] On the CCRI, also see section 3.5, INFORM RISK recently has added the INFORM Climate Change that was used in Figure 4 in section 3.1.
[52] (Chigwanda, Mutopo, & Mutanana, 2023); (Kutywayo, et al., 2022); (Nkoana, 2020); (Sims, 2021); (UNICEF, 2019); (Bangay, 2021); (Malala Fund, 2021); (Education Cannot Wait, 2023) (OECD, 2024)
[53] (World Bank, 2024b) (World Bank, 2024c) (UNESCO, 2023) (GPE, 2022) (GPE, 2023b) (FCDO, 2022)
[54] (Malala Fund, 2021) (UNICEF, 2022) (GPE, 2022) The Declaration on the common agenda for education and climate change at COP28.
[55] Source: desk study finding.
[56] (UNICEF, 2022b) (UNICEF, 2019) (UNICEF, 2021)
[57] (UNICEF, 2022b) (UNICEF, 2019) (UNICEF, 2021) (UN, 2023)
[58] (Chigwanda, Mutopo, & Mutanana, 2023); (Kutywayo, et al., 2022); (Nkoana, 2020); (Sims, 2021); (UNICEF, 2019); (Bangay, 2021); (Malala Fund, 2021); (Education Cannot Wait, 2023) (OECD, 2024)
[59] (UNICEF, 2019); (UNICEF, 2022); (FCDO, 2022); (Save The Children, 2021); (Malala Fund, 2021); (GPE, 2022); (GGHEE, 2023); (Sims, 2021) (OECD, 2024).
[60] See Youth leaders | Global Partnership for Education and UNICEF Youth Advocates | UNICEF.
[61] The use of the report at high-level events was highlighted in our interview with Save the Children.
[62] Greening Education Partnership | UNESCO.
[63] (Malala Fund, 2021) (UNICEF, 2022) (GPE, 2022) The Declaration on the common agenda for education and climate change at COP28.
[64] (Chigwanda, Mutopo, & Mutanana, 2023).
[65] (UNICEF, 2022) (UNICEF, 2019) (Save The Children, 2021) (GGHEE, 2023) (FCDO, 2022).
[66] Interview Global Partnership for Education; Interview Oxfam Denmark (specific gap on student clubs); Interview UNICEF Denmark; Interview Save the Children.
[67] Interview Save the Children. A report on the project in South Sudan is expected to be published soon.
[68] This point was triangulated with the Strategic Impact Evaluation Fund (SIEF).
[69] NCG review finding.
[70] (World Bank, 2024b) (OECD, 2024) (GCA, 2022) (The Brookings Institution, 2023) (Malala Fund, 2021) (GPE, 2023b) (Education Cannot Wait, 2023) (FCDO, 2022).
[71] For instance, see (Tan-Soo, Li, & Qin, 2022); (Nor Diana, Zulkepli, Siwar, & Zainol, 2022); (Hoffmann & Muttarak, 2017).
[72] (Pankhurst, 2022).
[73] Source: desk study finding.
[74] The ND-GAIN Index were developed by the Notre Dame Global Adaptation Initiative to measure vulnerability to climate-related disasters.
[75] The 3.2% is significant with a p-value of 0,001. However, the authors did not control for other variables such as quality of education, whether the countries are recipients of climate aid and others. For the original article, see here.

[76] (World Bank, 2024b) (OECD, 2024) (GCA, 2022) (The Brookings Institution, 2023) (Malala Fund, 2021) (GPE, 2023b) (Education Cannot Wait, 2023) (FCDO, 2022).
[77] (Tan-Soo, Li, & Qin, 2022); (Nor Diana, Zulkepli, Siwar, & Zainol, 2022); (Pankhurst, 2022); (Sims, 2021); (Yadav & Lal, 2017); (Drabo & Mbaye, 2015); (Chigwanda, Mutopo, & Mutanana, 2023); (Bangay, 2021); (Hoffmann & Muttarak, 2017); (THEIRWORLD, 2018); (Malala Fund, 2021); (GPE & StC, 2023).
[78] (Bangay, 2021); (Malala Fund, 2021); (Kwauk & Wyss, 2023); (FCDO, 2022); (Sims, 2021); (Yadav & Lal, 2017); (Chigwanda, Mutopo, & Mutanana, 2023); (Pankhurst, 2022).
[79] See for instance (Sims, 2021), (Bangay, 2021), (Pankhurst, 2022) or (Malala Fund, 2021).
[80] (Kwauk, Cooke, Hara, & Pegram, 2019); (Apollo & Mbah, 2021); (Mbah, Ajaps, & Molthan-Hill, 2021); (Ma & Chen, 2023); (GPE, 2022); (UNICEF, 2019); (UNICEF, 2022); (GGHEE, Leveraging Education in Emergencies for Climate Action – no time to lose: Commit to resilience and learning now, 2023); (Sims, 2021).
[81] See UNESCO Digital Library, accessed May 2024.
[82] (Apollo & Mbah, 2021); (Mbah, Ajaps, & Molthan-Hill, 2021).
[83] Limitations include that financing for education was not part of the systematic review's scope, and financing-related sources were not systematically identified. The outline of issues presented here draws on financing-relevant information included in the search criteria presented in Annex 2.
[84] (UNESCO, 2023b)
[85] (UNESCO, 2020) (UNESCO, 2023) (UNICEF, 2022b)
[86] The Adaptation Fund (AF), Green Climate Fund (GCF), and the Global Environment Facility's (GEF), Least Developed Countries Fund (LDCF) and Special Climate Change Fund (SCCF). (CERI, 2023).
[87] (GPE & StC, 2023) (CERI, 2023).
[88] (UN General Assembly, 2023).
[89] (UN General Assembly, 2023).
[90] (GGHEE, 2023).
[91] Interview Geneva Global Hub for Education in Emergencies, Interview Oxfam DK, Interview Global Partnership for Education, Interview Education Cannot Wait.
[92] Educational services are defined as 'critical infrastructure' along with health services in the Sendai Framework and is therefore central to Disaster Risk Reduction in this frame.
[93] The Adaptation Fund (AF), Green Climate Fund (GCF), and the Global Environment Facility's (GEF), Least Developed Countries Fund (LDCF) and Special Climate Change Fund (SCCF) (CERI, 2023).
[94] (World Bank, 2024b); (The Brookings Institution, 2023); (OECD, 2024); (GCA, 2022).
[95] See CC-EDU intersection framework in the Chapter 1.
[96] A donor-funded vertical global fund.
[97] A global alliance consisting of international NGOs, countries, and UN agencies.
[98] (GGHEE, 2023); (FCDO, 2022); (Sims, 2021); (Pankhurst, 2022); (Malala Fund, 2021)
[99] See WMO Climate change and heatwaves, accessed May 2024.
[100] See University of Geneva 2019, accessed May 2024.
[101] (Apollo & Mbah, 2021); (Mbah, Ajaps, & Molthan-Hill, 2021).
[102] See "How to communicate climate change with children - a handbook for educators and parents" developed by) The Eco-Anxiety Project in Africa, accessed May 2024.
[103] See UNESCO at COP 2028, Accessed May 2024.
[104] (GGHEE, 2023); (UNICEF, 2019); (GPE & StC, 2023).
[105] (GPE & StC, 2023); (GGHEE, 2023) (CERI, 2023).
[106] Interview Geneva Global Hub for Education in Emergencies; Interview Global Partnership for Education; Interview UNICEF Denmark; Interview Save the Children.
[107] (Sims, 2021); (UNICEF, 2019); (UNICEF, 2022); (UN, 2023) (Kwauk, Cooke, Hara, & Pegram, 2019).
[108] At COP 28, 39 countries including Denmark, signed the Declaration on the Common Agenda for Education and Climate Change.
[109] Se Education International, accessed May 2024.
[110] Interview Save the Children; Interview Education Development Trust, (World Bank, 2024b) (The Brookings Institution, 2023) (GCA, 2022) (GPE, 2023b).
[111] (UNICEF, 2022); (UNICEF, 2019).
[112] https://uis.unesco.org/en/topic/education-africa.
[113] North Africa figures World Bank, accessed May 2024. accessed May 2024.
[114] Around half of low-income countries do not have any learning poverty estimates at all. The lack of learning data is particularly acute in Sub-Saharan Africa where 24 countries lack any learning poverty estimates (World Bank 2022b).
[115] IDMC accessed May 2024.