



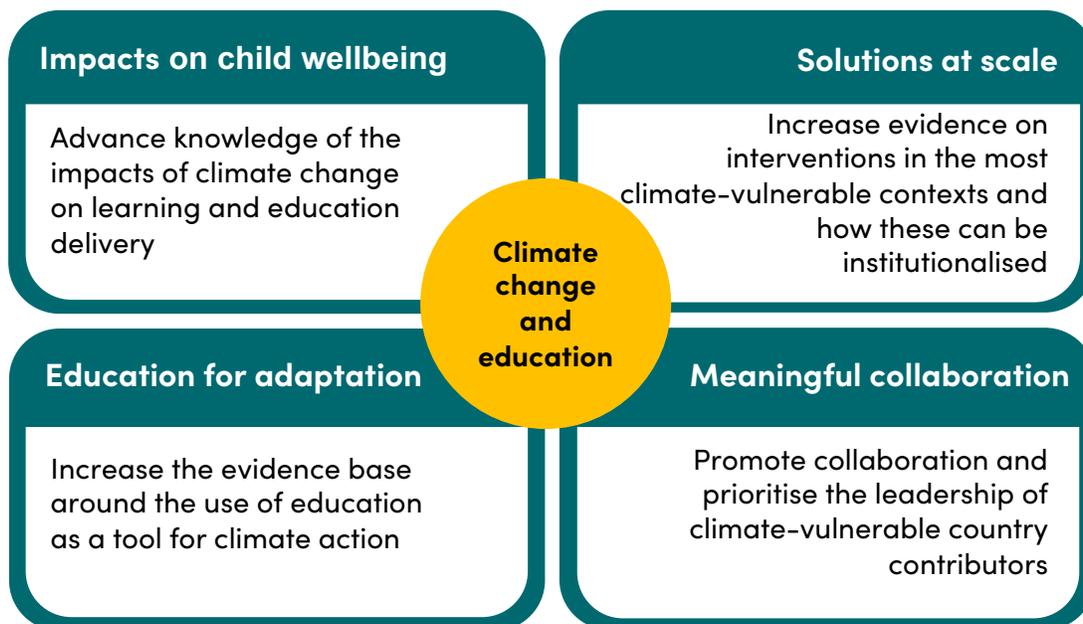
Climate Change and Education: Building Momentum through a Shared Research Agenda

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The intersection of education and climate change raises two pivotal questions: What impact is climate change having on education? And what role can or should education play in the face of imminent climate change? On the first, it is clear that education delivery (especially its quality and equity) is being affected by climate change, but we need to know more about the specific impacts (where, how, on who) and how to mitigate them. Better and more targeted research is needed to ensure all children continue to receive education as the effects of climate change intensify. On the second, education could play a role in building resilience among populations in the face of climate change, but we have very limited evidence for this and how it might work.

Here, we—a group of researchers, activists, donors, and policymakers—have come together to outline a research agenda to protect children’s education in the face of a deepening climate crisis. We aim to align the academic, policy and practitioner community around this set of shared research goals to better understand the impacts of climate change on education and the role education could play in driving a more resilient future generation.

Building blocks for a research agenda on climate change and education



1. Advance knowledge of the impacts of climate change on learning and wellbeing

Acute climate shocks and long-term climate change, as well as environmental crises (like wildfires or earthquakes), are having a negative impact on learning. Rising temperatures have adverse effects on students' wellbeing and academic performance. Floods, droughts, and cyclones affect families' income and their ability to invest in their children's education, as well as children's long-term cognitive development. Higher pollution levels from increased greenhouse emissions or natural and manmade emergencies (like wildfires and conflict) reduce executive function and academic ability. All this raises the likelihood of children leaving school early, including for marriage or work. When climate shocks lead to additional domestic work, the burden invariably falls on girls, further reducing available time to study. The loss of life, injury, food insecurity, material losses and forced displacement which can result from an extreme disaster have profound impacts on children's mental health and ability to return to schooling. The adverse effects of climate shocks can transmit from mother's to their children, with intergenerational impacts on children's long-term skills development. Exposure to an extreme weather event when children are young has compound impacts on wellbeing, educational attainment and economic opportunity in the future. Repeat exposure to shocks worsens these outcomes, especially when schools close for long periods, but can also incentivise families to desire more education for their children. Recent research has shown

that children born in LMICs in recent years will face significantly more environmental disasters throughout their lifetimes compared with older cohorts. And disruptions from extreme events are [chipping away at hard won gains](#) in education access and learning outcomes.

Despite this growing body of evidence, there are large knowledge gaps about the direct and indirect impacts of climate change on young people's lives. Are children most affected through household-level impact (like increased poverty and ill health) and subsequent challenges like malnutrition? Or are the inhospitable teaching and learning conditions caused by slow-onset climate change or climate shocks a more serious driver of impact? Across which pathways are these impacts most profound, and which policy levers are most effective? How can we project the long-term impacts of exposure to climate shocks and incremental climate change, across generations?

Potential pathways of impact on children's learning and well-being from climate change

Society / governments

- Low economic and structural resilience of government programs (like food assistance or cash transfers) that directly affect children's health, wellbeing, school retention, and learning
- Households' level of access to existing poverty alleviation support and insurance systems in the event of acute and chronic climate shocks

Household

- Shocks resulting in increased household poverty, leading to dropout, early marriage, child labour, forced migration
- Impact on parents' mental and physical health impacting students

School

- Limited access to schools and health risks from infrastructure damage or other emergencies
- High temperatures limiting ability to concentrate
- Impacts on teachers' abilities to provide quality education affecting students' learning

Child

- Lower cognition and attendance due to poor nutrition and ill health
- Increased exposure to events leading to higher rates of disorders like anxiety and depression among
- Leaving school due to early / forced marriage, migration or work, or due to insufficient WASH facilities and SRHR protections during emergencies

These interactions are complex and [require a systematic approach](#) for effective practice, research and policy in these areas. While we are not starting from zero, we lack rigorous evidence in upper- and middle-income settings where research is relatively easier to conduct. For the contexts where the need is greatest and more urgent—for example, across low-income countries and fragile and conflict affected states—robust research and evidence is nearly non-existent. This needs to change.

An important starting point for this research agenda is to acknowledge that the impacts of climate change on vulnerable children, families, and communities do not exist in isolation from the disadvantages of intergenerational poverty, nutrition deficits, health system and education access disparities, displacement, conflict, and structural and systemic inequalities. Research should examine how these intersecting challenges impact children’s access to education, learning outcomes, mental and physical well-being, and overall development, and what can be done to better support coordinated cross-sectoral adaptation and mitigation strategies (including through [social protection programmes](#)). Research should disaggregate data and evidence by gender, wealth, ability, and other relevant identities of marginalisation. Longitudinal research would help us to understand changing trends over time and the impacts of specific climate shocks in different countries and social contexts.

2. Increase evidence on interventions in the most climate-vulnerable contexts and how these can be institutionalised

We need more evidence on which interventions can support teachers, learners, schools and education systems when faced with immediate and incremental climate change, and how to pay for them. This includes testing both large scale solutions as well as smaller scale programmes to inform the discussion on innovative programming that could be taken to scale. What can education systems do to respond to the changing climate in a way that maximises quality learning? What resources are needed to prepare to implement these responses for affected populations promptly? It is important to understand what works at scale in the most climate-vulnerable contexts, as well as where finance for effective programmes will come from.

CGD’s [preliminary work](#) shows that, in South Asia, schools often close in the event of shocks, rather than implementing other measures that might mitigate impacts. [Physical damage to school buildings](#) is becoming more common during climate shocks, and schools are [often repurposed](#) as emergency shelters during crises, both of which result in delays in children returning to school. Schools that are in poorer and more vulnerable communities face the harshest consequences and [longest disruptions](#) from a shock. The [promise of remote learning has yet to be realised](#), particularly in poorer contexts where school systems [still struggle to provide technological pedagogies](#) and tools equitably. CGD [research](#) also reveals that most immediate support and adaptation efforts, such as temporary learning centres and catch-up programmes, are typically implemented by non-state actors (such as civil society organisations or international NGOs), even in areas where climate shocks are common. Governments should be prepared with a suite of responses that have been tested at scale in their contexts, and can be reliably adapted when faced with emergencies.

We don't have enough knowledge of what works at a small scale, so we need innovation and testing of promising actions to better inform the design of large-scale actions. Research should aim to identify which interventions would be best suited and how to build education systems, school, and teacher capacity to deliver these interventions, especially in settings that often experience climate shocks. Of course, we cannot ask governments to wait until we have all the evidence, so we have to start thinking of large-scale actions now (even with the lack of evidence at small scale and in controlled settings).

A related knowledge gap is how much preparing to implement these interventions would cost and who should pay. Education is yet to have a seat at the table in global climate finance negotiations. Education budgets are already constrained, with many competing priorities. The \$700 million [climate loss and damage fund](#), committed to at COP28, does not even mention education. This might be because, for starters, we don't know how much it costs to help schools adapt to climate change at scale. [Recent efforts](#) to remedy this have run into issues with insufficient evidence base or country-specific data. Improved understanding of the needs of systems to build resilience for continued education delivery will enable access to the required funding from international and domestic climate finance pools. This includes exploring the flexibility, adaptability, and efficacy of administrative structures in facilitating timely responses to climate shocks and slow onset climate change. Data to help target efforts and investment, including predictive analysis on [areas most affected](#) by a shock, would also streamline these claims. Second, guidance on [returns from disaster risk reduction \(DRR\)](#) investment for climate change doesn't currently include education. [Recent efforts](#) to bridge this gap through investments in education from climate financing and associated support to governments are a step in the right direction, and should be underpinned by evaluation and evidence to make the findings translatable and ensure funding is used for programmes that provide actual benefits to all people in the communities served.

3. Increase the evidence base around the use of education as a tool for climate action

A range of actors within the global education sector are prioritising the other key part of the two-way relationship between education and climate change: enabling and empower young people to be better prepared for climate change, and to lead climate change initiatives through greater understanding and acquired "green skills" that could potentially transform communities from the grassroots. The United Nations Framework Convention on Climate Change Article 6 represents a commitment to this agenda through teacher training and introducing climate change curricula across education levels, and recently a [new indicator](#) has been proposed to track the inclusion of related content in curricula. Efforts to mainstream "[climate smart education systems](#)" i.e. education systems that are more resilient, inclusive, and climate-conscious, are gaining momentum. This includes both increasing children's scientific knowledge of climate change through the formal curriculum and fostering behaviour change to influence climate action and awareness. Some emphasis has also been placed on creating young climate leaders/advocates, but this unfairly burdens children and risks their efforts being tokenised in systems not engineered to accommodate their opinions.

However, these efforts lack rigorous evaluation and evidence of impact on either adaptation or mitigation efforts. There is also little coherent differentiation in existing frameworks between skills acquisition for green livelihoods and behavioural change that supports climate action. Higher levels of education are correlated with higher levels of emissions, which makes the mitigation link appear even more tenuous. So, what are environmental and climate education's most effective entry points for real impact and for which outcomes? Which elements of this framework are most central to effective resilience and response? We should learn more about whether and how these interventions work, so that efforts to tackle climate change within and beyond education don't burden children in poor countries with a problem not of their making.

There is some evidence we can draw on. Curricular change is [extremely difficult to implement](#), especially for the subject of climate change, which depends on [teachers' own knowledge of climate change](#), prevailing misconceptions among [students](#), and their parents' opinions, all of which affect both delivery and take-up. These dependencies may differ widely based on [geographical context and existing pedagogical approaches](#). But research on the effective introduction of climate change curricula is lacking, especially in developing countries, and ought to be explored further. Further, evidence is still lacking on not only the impact of introducing climate change curricula but also on the mechanisms through which this impact is achieved. While some argue that climate change education can empower and enable children to be [powerful agents of change](#), others find that attitudes and behaviours of children are unaffected by current instructional approaches to climate change education. There is very little existing evidence on the effectiveness of these approaches, and so we suggest this is an area where rigorous research could be most useful.

EXAMPLES OF INITIATIVES PROMOTING GREEN SKILLS FOR CLIMATE CHANGE ADAPTATION

1. The [ReWired Summit](#) at COP28 celebrated the launch of the Green Rising initiative to support and empower the grassroots mobilisation of young people through the three pillars of volunteerism, advocacy and skills, jobs and entrepreneurship.
2. UNESCO's [Greening Education Partnership](#) emphasises equipping young learners with the skills to tackle climate change and promote sustainable development
3. The UK's [Climate Change Education Partnership](#) details plans to include climate change education in curricula to enhance young people's understanding of climate change and effective actions to combat climate change.
4. [African Union's Climate Change and Resilient Development Strategy and Action Plan \(2022–2032\)](#) names formal and informal climate change literacy as a priority intervention and suggests action
5. According to the [Report on the 2022 United Nations Transforming Education Summit](#), over 80 countries plan to include climate education in their national curricula.
6. [Green Generation](#) is an educational model for schools that combines Save the Children's expertise in education and WWF's knowledge in conservation and environmental sustainability to engage children in environmental learning and projects.

[Increasing educational attainment](#) makes students, [especially girls](#), more resilient and adaptive to shocks. Generating credible evidence of the real pathways through which green education can transform future generations' livelihood and wellbeing outcomes can inform the direction and implementation of these initiatives, while ensuring that other education priorities are not left behind.

4. Prioritise climate-vulnerable country contributors

Researchers from climate-vulnerable countries and populations possess first-hand knowledge of the immediate challenges and nuances related to climate change and education in their settings. Yet these researchers face persistent funding and opportunity barriers. Fostering collaboration between researchers in climate-vulnerable countries with those in the global north, creating networks with indigenous researchers across the global north and south, and south-south collaboration is crucial to ensure that research is embedded in specific local and country context. This would improve the relevance of research questions and outcomes, enrich the understanding of climate impacts and ensure that context-specific evidence reaches a broader audience.

There are examples of this type of collaboration in the climate sector that those of us working on education should learn from. [Nationally Determined Contributions \(NDCs\)](#) are a way to ensure that developing country partners exercise ownership of climate change adaptation and mitigation strategies and integrate it into their own national action and finance plans. During COP28 the “Teachers for the Planet” initiative showcased outstanding teacher-led climate education solutions from over 60 countries. It is important that this collaborative approach also be adopted in research on education and climate change. As well as being the right thing to do, collaboration with local actors improves the likelihood of evidence influencing national policies and informing local programming.

Research should focus on identifying existing networks of research-and-policy partnerships that have been successful at sparking system-level change relevant for the education sector. Rigorous data collection, monitoring, and evaluation methodologies would be integrated in ongoing and emerging climate strategies to provide empirical evidence of the impact of interventions on schooling and learning in the short and long term. Emphasis would also be placed on assessing the effectiveness of interventions aimed at enhancing the capacity of stakeholders (students, teachers, parents, and administrators) to understand, respond to, and mitigate the effects of climate change.

Forging the path forward

At COP28, the latest [Global Tipping Points report](#) noted society's proximity to a domino of devastating tipping points that could severely damage whole ecosystems, “with societal impacts including mass displacement, political instability and financial collapse”. Even in the best-case scenario, the frequency and severity of climate shocks is predicted to worsen, with the poorest communities often the most vulnerable. Without targeted action, the climate crisis is likely to further exacerbate educational inequalities, leaving many children from disadvantaged backgrounds behind, just as we

witnessed from the COVID-19 pandemic. Looking forward to COP29, [efforts](#) are underway to centre education in climate change dialogues and provide a platform for exploring the challenges and opportunities for the education sector.

We hope that this research agenda can align actors behind a core set of research priorities to guide the education sector's role in climate change dialogues. Education must be part of the response to climate change and cross-sectoral collaboration is key to responding to the climate crisis. It is critical to ensuring that we invest in policies and interventions that are both best for children and best for the planet.

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