

# The Need for Climate-Smart Education Financing:

A review of the evidence and new costing framework



**Save the  
Children**

**GPE**  **Transforming  
Education**

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Cover Photo: A child writing at a school run by Save the Children and Partners in South Surma, Sylhetm Bangladesh. Tom Merilion/Save the Children

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## **Credits**

This paper was produced by Save the Children and Global Partnership for Education and led by Carly Munnelly, Anna-Maria Tammi and Raphaelle Martinez.

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# EXECUTIVE SUMMARY



Children at school in Pujehun district, Sierra Leone  
Tom Maguire/Save the Children

# Introduction

The purpose of this report is to review the literature on the bidirectional relationship between the climate crisis and funding for education and present a new tool – the Climate and Environment Intervention Matrix (CEIM) – to help governments and donors understand the cost implications of building climate-smart education systems.

## Defining climate-smart education systems

This report defines ‘climate-smart education systems’ as education systems that work to achieve three interrelated goals:

1. Protecting and advancing quality, relevant and equitable education;
2. Protecting the planet’s life systems;
3. Promoting climate justice.

The CEIM is the first attempt to map the different cost implications of building climate-smart education systems. The next step is to include country-specific costing data that responds to the types of hazards that a given country is facing and reflects the local costs of the associated interventions. Publishing this data will help governments and donors prioritise impactful climate-smart interventions in their education systems. Save the Children and the Global Partnership for Education are planning to work with country partners to publish granular costing data for some of the interventions outlined in the CEIM to help start building this evidence base.

## The relationship between the climate crisis and education

Children and communities around the world, particularly in low- and middle-income countries, are already dealing with the catastrophic impacts of the climate crisis and environmental degradation. A child born in 2020 will experience on average up to seven times more heatwaves in their lifetime compared to their grandparents.<sup>i1</sup> Climate and weather-related disasters have increased 5-fold over the last 50 years from 1970-2019.<sup>2</sup> The climate crisis is already threatening every aspect of socio-economic development, including education, and putting children’s rights and futures at risk around the world.

Climate-induced disasters and slow onset events can directly and indirectly impact children’s education. Direct effects include deaths, serious injuries, and health hazards to students and staff, damage to schools and surrounding infrastructure and access, and hotter classrooms. As a result, students’ access

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<sup>i</sup> According to Save the Children, a child born in 2020 will, on average, experience 2 times as many wildfires, 2.8 times the exposure to crop failure, 2.6 times as many drought events, 2.8 times as many river floods, and 6.8 times more heatwaves across their lifetimes compared to a child born in 1960. These figures are global averages and are higher across many lower income countries.

to education is disrupted and their academic achievement can be affected. More funding for education is needed to address and mitigate these negative impacts, including to adapt or rebuild infrastructure in a way that is safer and more resilient, support preparedness activities and ensure learning continuity by planning and delivering alternative locations and modes of instruction.

There are also more indirect ways that the climate crisis is impacting education systems. This includes the increasing prevalence of drought, and water-borne and vector-borne diseases, which can threaten livelihoods and contribute to increased food, water, and energy insecurity. These indirect impacts all have knock-on effects on student absenteeism, dropouts, and learning outcomes. Further, increasing trends of climate-induced migration and displacement both within and between countries can have serious implications on access to quality, safe education, particularly when education resources are insufficient for accommodating additional students.

On the flip side, education is a critical pillar of climate action, adaptive capacity and environmental sustainability. Higher levels of education can result in increased resilience to adverse climate impacts as well as increased levels of innovation and leadership that can support both adaptation and mitigation efforts. In the longer-term, investing in education reduces future costs – both financial and in terms of human development - by improving students and communities' capacity to assess, reduce and respond to risks, as well as fostering the long-term skills necessary to contribute to adaptation, mitigation, and environmental sustainability efforts. A population with access to quality education is better equipped to overcome the challenges presented by the climate crisis and contribute to the future green and sustainable economy.

That is not to say that investment in education is only necessary in the context of climate action - access to education is a fundamental child right as outlined Article 28 of the UN Convention on the Rights of the Child. The annual funding gap of USD 97 billion per year for low and middle-income countries threatens the ability to realise this right for children around the world and therefore investment in education is essential regardless.<sup>3</sup> The climate crisis will exacerbate the financing gap and is an additional threat to the realisation of children's right to safe education.

## **Gaps in the data**

Despite growing evidence on the impacts of the climate crisis on access to education and learning outcomes, there is a clear gap in identifying the additional costs the climate crisis imposes on education systems. Further, there is little evidence demonstrating the financial and socio-economic returns on specific climate-smart investment in education. While there is a large body of evidence highlighting the returns to disaster risk reduction (DRR) investments literature and data for the

climate context specifically has been largely restricted to individual case studies that offer rich empirical and context-specific insights but cannot be generalised.

The danger is that this lack of information has led governments and donors to allocate insufficient funds to adapt education systems to climate change and safeguard children's right to education in their wider climate efforts. This is not only true for education, but for critical children's services more broadly, including health, nutrition and child protection. Only 2.4% of climate finance disbursed between 2006-2023 from four key multilateral climate funds has been found to support projects incorporating child-responsive<sup>ii</sup> activities, with education-specific projects being negligible.<sup>4</sup> Some funders have recently acknowledged this gap, for example the Green Climate Fund is actively working with partners to bridge child-focused climate finance particularly in the areas of health and education.

1.3 billion school-aged children around the world are currently experiencing at least one extreme climate event per year, and 90% of these children live in low- and middle-income countries. Therefore, governments and donors cannot afford to wait to understand the full impact of the climate crisis on education financing in each specific context.<sup>5</sup>

## A review of the literature

To help address this research gap, Part 1 of this report explores the current data and literature with the goal of collating key findings, identifying gaps, and crowding-in further research.

The literature review explores the evidence to test a few key assumptions:

- 1. Already stretched funding for education is being further strained due to the impacts of the climate crisis.** Responding to and addressing the impacts of the climate crisis is placing an additional financial burden on education systems. These additional costs include restoring and upgrading climate-smart education infrastructure, as well as integrating climate considerations into risk management, safety, and learning continuity throughout education sector planning and decision-making.
- 2. Investment in education is a key tool in the fight against the climate crisis.** Education is essential for strengthening the resilience of students and communities, providing the skills

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<sup>ii</sup> Child- responsive climate finance supports interventions that uphold the rights of children in all their diversity, including by: 1. Addressing the distinct and heightened susceptibility of children to climate change-related impacts, and the importance of essential social services most vital for their survival, development and health. 2. Empowering children in all their diversity as agents of change and facilitating their meaningful participation.

and knowledge to help protect household income and safeguard wellbeing against the impacts of the climate crisis. Quality, safe education supported by green curricula is also essential for developing the skills necessary to contribute to adaptation and environmental sustainability efforts and for student to become agents of change in addressing the climate crisis and in the green economies of the future.

- 3. Despite the above, education is not currently seen as an obvious investment for tackling the climate crisis** by governments and donors, which therefore results in insufficient funding flowing into the sector.

The assumptions above were tested through a few specific research questions which are outlined in Part 1. The key findings of the literature review were:

- 1. Data and evidence on the additional costs of the climate crisis to education beyond individual case studies are lacking.** There is a substantial body of evidence on the costs of hazards more widely, but the review did not identify any regional or global estimates for the additional costs presented by the climate crisis on education systems.
- 2. While there is a strong body of evidence on the savings realised from implementing DRR interventions and preparedness more broadly, there is a gap in the evidence for the cost of different climate-smart investments in education and their relative benefits.** The evidence suggests that the negative impacts from not investing in preparedness interventions are greater for girls and children facing intersecting forms of inequality and discrimination.
- 3. There is a substantial amount of data highlighting that climate and education strategies and investment are not well integrated.** While there has been progress in recent years to integrate education and climate strategies, the depth of this integration remains inadequate.

The literature review concluded that although education is vulnerable to negative impacts of climate change and is an important tool for climate action, there is a significant lack of evidence on the scale and type of additional costs that the climate crisis may impose on education systems. Further, there is no common understanding of the types of interventions that should be supported to build climate-smart education systems, including what these interventions might cost and the savings they might provide. It is clear that education is not being prioritised in climate action to date, but questions remain around how to prioritise it- what are climate-smart interventions in education and how can governments and donors share information on what works and at what cost?



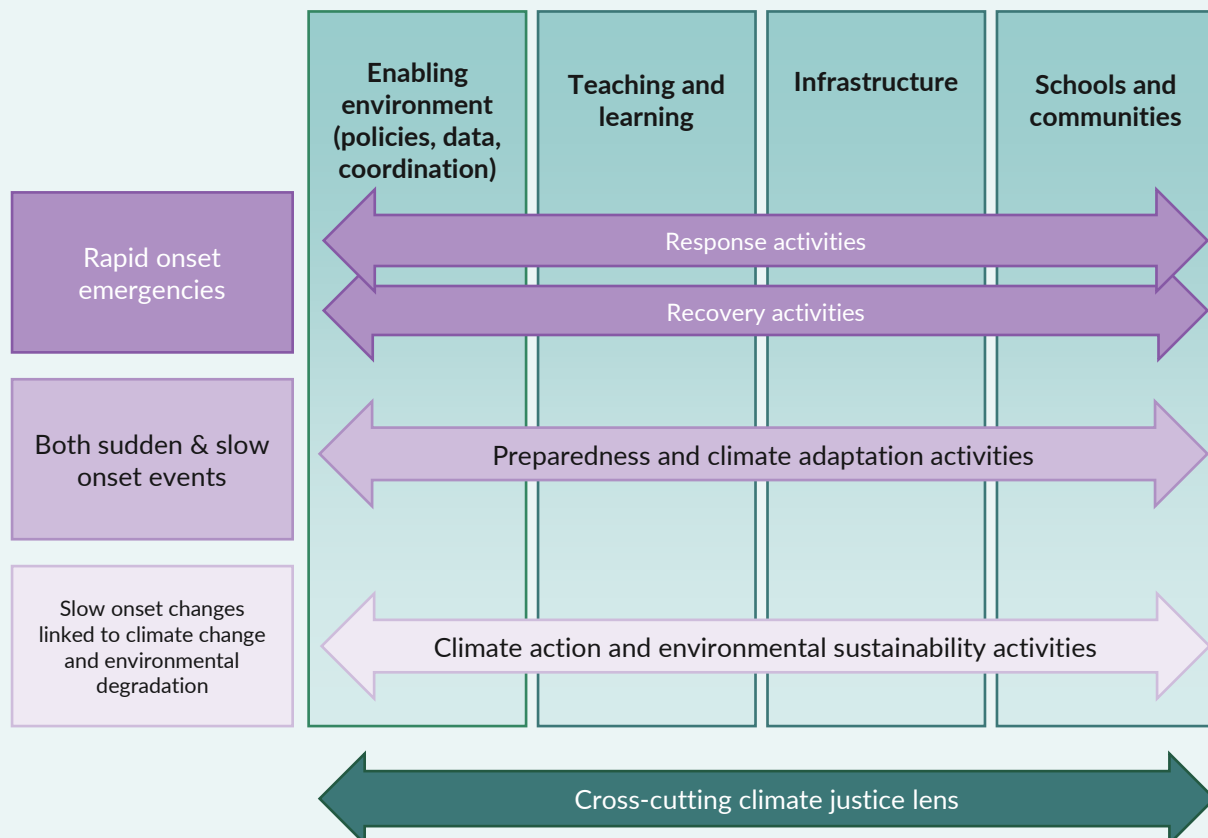
# Introducing the Climate and Environment Intervention Matrix

To support efforts to build climate-smart education systems across the world, Part 2 of this paper proposes a Climate and Environment Intervention Matrix (CEIM), a tool intended for policymakers, planners, donors and other education stakeholders that can be used to understand the cost implications of building climate-smart education systems. It is built on a review of the existing literature that discusses the relative costs and data of different interventions that would support the development of climate-smart education systems.

The CEIM breaks down the potential types of activities associated with developing climate-smart education systems into four distinct categories: (i) response, (ii) recovery, (iii) preparedness and adaptation, and (iv) climate action and environmental sustainability. A cross-cutting element is climate justice, namely the consideration of gender-responsive approaches, interventions that tackle intersectional marginalization, and promote the use of indigenous knowledge.

The costs of different interventions vary widely by both the type of climate hazards as well as within countries and across them. While the CEIM gives an overview of the types of measures that could be taken, populating it with country-specific costing data that responds to the types of hazards that a given country is facing and reflects the local costs of the associated interventions would be a first step to prioritizing investment decisions.

**Figure 1. The Climate and Environment Intervention Matrix – Summary version**



# Considerations for key climate and education stakeholders

In order to advance the implementation of climate-smart education systems, governments and their education sector partners should consider:

1. **Populating the Climate and Environment Intervention Matrix** with local costs and in response to the types of hazards faced by the country.
2. **Integrating climate and education strategies and actions plans by:**
  - a. **Reinforcing the education components of Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs).** This includes ensuring education is included in climate planning and informed by a climate change risk assessment of the education sector.
  - b. **Developing education sector plans that are climate-smart.** Making education sector planning climate-smart will support more resilient education systems with more sustainable footprints. Climate-smart education sector plans should integrate the Comprehensive School Safety Framework, ensure gender equality and be costed.
3. **Increasing climate-related investments in education** to maximise the co-benefits from investment in both sectors, including by:
  - a. Raising sufficient funding for the implementation of costed integrated climate and education strategies through both domestic and international sources.
  - b. Pursuing innovative financing across the two sectors to support co-benefits towards building a greener and more resilient society.
  - c. Advocating for the new loss and damage fund to include education.
4. **Better integrating the safe and meaningful participation of youth and children** - in all their diversity<sup>iii</sup> - in climate and education decision-making processes at all levels.

Meanwhile, the wider research community should consider filling the priority data gaps, including:

1. What additional costs have the climate crisis imposed on education systems at country and regional levels?
2. What is the funding that is needed for preparedness and adaptation interventions in a given country?
3. What are the specific costs, impacts, and returns to climate-smart and gender-responsive interventions in education?

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<sup>iii</sup> This includes but is not limited to, girls and children discriminated against on the basis of their sexual orientations, gender identities and expression (SOGIE), Indigenous children, children with disabilities, displaced children, and those who experience intersecting and compounding forms of inequality and discrimination.

# PART I

# A REVIEW OF THE EVIDENCE



*A teacher instructs the classroom on crop rotation, Bidi Bidi, Uganda  
Louis Leeson/Save the Children*

## The problem

1.3 billion school-aged children live in areas that are highly vulnerable to climate impacts, 90% of which are in low- and middle-income countries.<sup>6</sup> The climate crisis threatens all aspects of children's lives, including their health, nutrition, protection, and education.<sup>7</sup> For education specifically, the direct impacts of the climate crisis are becoming increasingly visible, from damage to school infrastructure<sup>8</sup> to reduced learning outcomes due to rising temperatures.<sup>9</sup> Furthermore, the climate crisis has various indirect impacts on education. For example, climate-induced disasters can damage homes and threaten livelihoods – particularly for agropastoral communities – raising costs and reducing income for households which can lead to entry into child labour<sup>10</sup> or early and forced marriage.<sup>11</sup> The climate crisis also exacerbates risks to physical<sup>12</sup> and mental health,<sup>13</sup> nutrition,<sup>14</sup> and access to clean water<sup>15</sup>, all of which have knock-on effects on student absenteeism and learning outcomes.<sup>16</sup>

Although the data is scarce, it is also clear that the climate crisis creates additional and growing costs for education systems in several ways. When proper preparedness, contingency, and adaptation plans are not well established, climate-induced disasters can lead to expensive infrastructure repairs and costly emergency efforts to ensure learning continuity. These costs to education will only exacerbate the existing estimated USD 97 billion annual financing gap to achieve national SDG4 benchmarks.<sup>17</sup> However, in the long-term governments can minimize these costs through climate-smart investments to make school infrastructure safer and greener and ensure learning continuity. These interventions will require upfront costs but can provide long-term savings by reducing impacts on infrastructure and learning outcomes during future climate-induced disasters and slow onset events.

But education in turn presents an opportunity for accelerating climate action across both mitigation and adaptation. This means investing in education can support progress towards achieving both education and climate goals. Higher levels of education result in increased resilience to adverse climate impacts as well as increased levels of innovation that can support both adaptation and mitigation efforts, including pro-environmental behaviour. Robust education systems can boost the resilience of students and their communities to adapt and respond to the climate crisis and can empower them to act as agents of change. There is already early evidence of schools becoming more carbon-neutral and acting as nodal points in driving community climate resilience.<sup>18</sup> Similarly, curriculum redesign and associated teacher training, practical pedagogies, and student assessment, which can give children and youth the skills to support adaptation efforts and environmental sustainability, is also increasingly being seen as a key lever to help countries meet their climate goals.

The reality is that governments cannot meet either their climate or education goals without making progress on the other: a generation that lacks a quality education will be unfit to adapt to, mitigate, or cope with the losses and damages of the climate crisis. Equally, an education system that is not resilient in the context of the climate crisis will fail to provide a quality education to children in the future.

Governments and donors must therefore shift their thinking and investment strategies to focus on the synergies between education and climate and mobilise funding that helps tackle both priorities together.

## Uncovering the evidence

The climate crisis will create significant additional costs for the education sector and its negative impacts on learning outcomes could have wider socio-economic implications, such as reduced household income and higher economic inequality.<sup>19</sup> But by investing now in climate-smart education systems, governments can avoid many of the future costs of the climate crisis by equipping a generation with the skills and knowledge to contribute to adaptation and environmental sustainability, and address the losses and damages that arise from the climate crisis.

Despite this reality, the intersection of climate change and education financing is not well understood today. There is substantial organized literature on the financial requirements to climate-proof investment projects, such as roads and power plants. However, evidence to substantiate increased education financing for climate adaptation, mitigation, and addressing loss and damage is lacking. Similarly, data and analyses on the trends in climate-related education spending by governments and donors is limited.

To better understand the current evidence base around the relationship between the climate crisis and education financing, a review of the literature was conducted across several research questions. Table 1 outlines our assumptions, research questions and summary findings.



*Students at the Sway Teab Primary School in Kampong Cham province, Cambodia*

*Redd Barna/Hanne Bjustad*

**Table 1. Summary of research questions and results**

\* Key: *red* = very limited evidence; *amber* = some evidence; *green* = good evidence

Assumption	Research questions	Level of available literature & data*	Summary results
Already stretched funding for education is being further strained by the impacts of the climate crisis	Are there estimates for the existing costs of climate impacts (both rapid and slow onset) on education?	Amber	There is a significant body of evidence on the cost implications of hazards more widely on education, however no cost estimates were found for climate impacts specifically at the regional or global level. There are some individual case studies, but the costs are extremely context dependent.
	Are there estimates for the funding needed to adapt education systems to the climate crisis?	Red	There are some cost estimates for adaptation interventions in education, however they are extremely context dependent and vary widely across different interventions and locations.
	Are there estimates for the funding needed to leverage education systems to contribute to mitigation efforts?	Red	This review explored two key ways that education systems can contribute to mitigation efforts: 1. by building the necessary skills in students and communities, including through 'green' curricula <sup>iv</sup> ; 2. by reducing the carbon footprint of education systems themselves. There were no cost estimates found for developing and implementing 'green' curricula or for wider capacity building to build skills to support mitigation efforts in students and communities. There are some estimates for costs to reduce the carbon footprint of education systems themselves, however these vary widely and are extremely context dependent.

<sup>iv</sup> The term 'green' curricula in this report refers to curricula that incorporates key sustainability and climate change-related issues into teaching and learning.

Investment in education is a key tool in the fight against the climate crisis	Are higher levels of education correlated with better climate outcomes both in adaptation and mitigation?		This review uncovered a relatively large body of evidence that higher levels of education result in increased resilience to adverse climate impacts as well as increased levels of innovation that can support mitigation efforts.
	Are there estimates for the savings that can be realised from urgent investment in making education systems climate-smart?		There is a large body of evidence on the cost savings from DRR and preparedness more broadly, which can be used as a proxy for climate-induced disasters to a certain extent. For example, USD 1 in DRR can save up to USD 15 in post-disaster recovery. However, this review did not find evidence for climate-specific investments in education.
Education is not currently seen as an obvious investment for tackling the climate crisis	Is education embedded in national climate plans and vice versa?		There is a relatively large body of evidence suggesting that education is not well embedded in climate plans and activities, and that climate plans are not meaningfully embedded in education plans and activities. It is positive, however that wider DRR frameworks are being increasingly embedded in education plans and activities, including the Comprehensive School Safety Framework.
	Is education a key area of investment for climate finance?		Some evidence was found to support the hypothesis that education is not a key area of investment for climate finance, with one estimate suggesting the sector receives only 0.03% of all climate finance. Further, only 1 out of 591 projects across four key multilateral climate funds between 2006-2023 had education as its principal objective. Overall, it is difficult to determine robust estimates for climate-related investment in education because national level data is not readily available and global climate finance flows are often not disaggregated to account for education related interventions.



## Assumption 1: Already stretched funding for education is being further strained by the impacts of the climate crisis

### Research question 1.1 Are there estimates for the existing costs of climate impacts (both rapid and slow onset) on education?

There is data on the impact of the climate crisis on access to education, with estimates that around 35 million children's education was disrupted due to the climate crisis threats in 2018.<sup>20</sup> It is also clear in the literature that there are disproportionate impacts on girls, who are less likely to continue learning throughout climate-induced disasters,<sup>21</sup> or re-enrol in schools afterwards.<sup>22</sup> However, evidence on the cost implications of these events is largely missing from the literature.

Many reports tie extreme weather events like flooding, heatwaves, and extreme rainfall to the direct destruction of education infrastructure or rendering existing education infrastructure inaccessible or inhabitable. For example, over 27,000 schools were damaged in the catastrophic floods in Pakistan in 2022, disrupting learning for more than 2 million children.<sup>23</sup> While consolidated estimates are missing, one-off reports, often by government departments or on-ground NGOs, provide insight into the likely cost for replacing destroyed education infrastructure in the aftermath of major climate-induced disasters. Punjab Education Department, for example, estimated it required USD 954 million for rebuilding 18,000 destroyed school, or approximately USD 54,000 per school.<sup>24</sup>

However, there are no global estimates on damage caused to education infrastructure due to climate-induced disasters specifically. Multiple datasets and reports do capture the overall economic losses incurred during disasters in general (not necessarily climate-driven), including World Bank estimates that they cause overall infrastructure damage of up to USD 647 billion a year across low- and middle-income countries.<sup>25</sup> Further, the annual global adaptation needs are estimated to be USD 160-340 billion by 2030 and USD 315-565 billion by 2050, and the international adaptation finance flows to lower income countries are currently 5-10 times below estimated needs.<sup>26</sup> The annual losses and damages incurred for lower income countries is estimated at between USD 447-894 billion by 2030 and USD 1.7 and 2.6 trillion by 2050.<sup>27</sup> While helpful for illustrating the scale of infrastructure investment needs, it is not possible to disaggregate the needs for the education sector specifically from this data.

The literature also recognizes that apart from climate-induced disasters, slow onset events – such as gradually increasing temperatures, changing rainfall pattern, desertification, ocean acidification, loss of biodiversity and more – can affect livelihoods, threaten the nutritional security of children, and drive-up incidences of disease. These phenomena, in turn, can result in increased absenteeism, impede physical and cognitive development in children, and lead to poorer academic performance over the long-term.<sup>28</sup> Similarly, studies show the detrimental negative impact of excess heat on test scores, causing up to a 1% drop in learning achievement with every 0.55°C increase in temperature.<sup>29</sup> Similar observations have

been made in lower income countries as well - such as Afghanistan, Bangladesh, Nepal and Sri Lanka - where excessively hot and uncomfortable classroom conditions have led to lower student academic performance in recent years.<sup>30</sup>

### **Research question 1.2 Are there estimates for the funding needed to adapt education systems to the climate crisis?**

Many education systems around the world currently lack sufficient green and safe infrastructure, learning continuity plans, or wider preparedness systems to respond to climate-induced disasters. For example, a 2021 assessment of over 6,000 school buildings across Samoa, Tonga, and Vanuatu, found that between 50% to 90% of buildings may not withstand a strong cyclone or earthquake.<sup>31</sup> Literature also indicates that over 200 million children reside in countries with below-average remote learning facilities and that there is limited funding to improve the quality of schools - and roads near schools - to withstand the effects of the climate crisis over the short- and long-term.<sup>32</sup> Therefore, it is clear that additional funding will be needed to ensure education systems can adapt to the climate crisis.

Despite this reality, there is little evidence on what investments should be made to make schools more resilient to the impacts of climate-induced disasters specifically (though there is some evidence for hazards more widely<sup>33</sup>). For example, the cost benefit analysis of strapping roofs down, painting roofs in white, insulating, naturally shading and ventilating buildings for resilience against climate-induced impacts is missing from the literature outside of individual case studies. A few case studies and reports provide directional cost estimates for specific interventions to improve climate resilience. For example, a United States agency – Government Accountability Office (GAO) - estimated the cost of upgrading to modern ventilation systems, for maintaining indoor air quality and regulating temperature, to be USD 1 million per school building across the US.<sup>34</sup> This review did not find similar estimates for lower income countries, however, these costs are likely to be different in these contexts. For example, it has been argued that the costs of adapting school infrastructure to be more climate-resilient would vary depending on the design<sup>35</sup> and procurement<sup>36</sup> approaches that are employed.

Available literature suggests that various programmes aimed at supporting learning continuity during times of distress – such as remedial classes, psycho-social support, nutrition programs, attendance reward incentives, and teacher training for inclusive learning environments – can be effective.<sup>37</sup> Remote learning interventions can also be effective when they allow two-way interactions between teachers and students, are tailored to the local technological capacities and supported by teacher training. Interventions like blended learning solutions, which combine in-classroom and at-home learning, can minimize schooling disruptions, and school health and nutrition programmes can mitigate potential cognitive development challenges.<sup>38</sup>

A study of a learning continuity intervention in Botswana evaluated the efficacy of low-tech interventions such as SMS text messages and direct phone calls to support at-home learning during the Covid-19 pandemic, showed a 24% improvement in numerical skills.<sup>39</sup> Further, results from randomized trials in five countries demonstrate the effectiveness of phone call tutorials, which had large effects on learning and were highly cost-effective, delivering up to four years of high-quality instruction per USD100 spent.<sup>40</sup> A study conducted in 2017-18 in Ethiopian schools showed that school feeding programs resulted in beneficiaries being six times less likely to drop out and two times less likely to miss classes as compared with non-beneficiaries.<sup>41</sup> Similarly, the School Meals Coalition, an initiative comprising of 60 countries aiming to provide nutrition to every child, noted 9 to 12 percent increases in enrolment due to provision of meals.<sup>42</sup> However, it is worth noting that school feeding can be effective but costly. Further, logistical challenges in delivering school meals can make them less applicable in distressed contexts.<sup>43</sup>

However, publicly available estimates for the costs of interventions to support learning continuity were found to be restricted to consolidated estimates for refugee and displaced children and individual case studies and reports documenting the cost of implementing a specific intervention.<sup>44</sup> Some costing estimates for learning continuity interventions can be found in Humanitarian Response Plans, which are published after disasters hit. However, further analysis would be required to understand the financing needs in climate contexts specifically, as these plans span all emergency settings, including conflict and other non-climate induced hazards, such as earthquakes.

Another important tool to help education systems adapt is through building enabling systems and policies to increase preparedness and response capacity. This can be done, for example, through improved coordination, data collection, and contingency planning so that when disaster strikes, education systems can respond more efficiently and effectively. However, this review did not identify publicly available costing data for these types of interventions in the education sector. Several organizations, including GPE itself, fund system strengthening on data and evidence, planning, and sector coordination, and could undertake more thorough assessments to determine the additional costs associated with embedding climate considerations in system strengthening interventions and the cost of any climate-specific interventions, e.g. early warning systems or projecting impacts of climate hazards on education.

Despite lacking a precise costing figure, the available literature recognizes that the amount currently invested and pledged for climate proofing education outcomes is most likely to be insufficient.<sup>45</sup>

**Research question 1.3 Are there estimates for the funding needed to leverage education systems to contribute to mitigation efforts?**

The two main ways that education systems could contribute to mitigation that were researched in this review were:

1. Building the skills and capacity of students and communities to contribute to mitigation efforts, using green curricula as a proxy;
2. Reducing the carbon footprint of education systems themselves.

Available literature suggests that comprehensive curriculum reform are needed to equip students and community with the knowledge and skills needed to contribute to mitigation efforts. There are ongoing efforts by governments and non-government actors to design climate change education materials and build system capacity. Middle-income countries such as Indonesia and Colombia, for example, have made notable efforts towards integrating climate change into education and UN CC:Learn partnered with several low-income countries to support the development of national climate change learning strategies and improving learning and skills development for climate change.<sup>46</sup> The costs of curriculum reform can vary depending on the context, but large scale reforms tend to be costly and time-consuming. Some studies have shown that despite the high costs, these reforms can be a cost-effective way to improve learning.<sup>47</sup> Literature documenting the likely costs of climate-related curriculum reforms specifically is largely missing.

Further, the literature shows that the upfront costs for potential solutions to lower the carbon footprint of school infrastructure can vary widely, however many solutions have been found to generate net cost savings in addition to reducing emissions in the long run. For example, increasing use of recycled paper and a reduction in food waste come with minimal upfront costs while also generating significant carbon savings.<sup>48</sup> Switching to LED lights comes with relatively low upfront costs which in the long-run can result in net savings for schools.<sup>49</sup>

More extensive retrofitting, however, comes with higher upfront costs but often generate savings in the long run. For example, retrofitting school buildings can be more energy efficient in Hong Kong has been found to cost upwards of USD 60,000 per school.<sup>50</sup> Several research papers conducting cost-benefit analysis of residential insulation suggest that insulation delivers meaningful cost savings.<sup>51</sup> Setting up rooftop solar panel systems also require significant upfront investment but have been found to generate cost savings in several countries. For example, academic research from Thailand and Croatia shows that rooftop solar panels in residential settings generate cost savings in the long run with the breakeven period varying between 6 and 13 years.<sup>52</sup> Switching to solar energy is cheaper per kWh than other energy sources in most contexts, making it a long-term cost saving investment as well as reducing greenhouse gas (GHG) emissions, offering solar shading, and requiring low maintenance costs.<sup>53</sup>



## Assumption 2: Investment in education is a key tool in the fight against the climate crisis

### Research question 2.1 Are higher levels of education correlated with better climate outcomes both in adaptation and mitigation?

Multiple empirical studies set in diverse geographic, socioeconomic, cultural and hazard contexts provide consistent and robust evidence on the positive impact of formal education on vulnerability reduction. Highly educated individuals and societies are reported to have better preparedness and response to disasters, suffer lower negative impacts, and are able to recover faster.<sup>54</sup> For example, in a study of 125 countries, researchers found that the death toll from floods, droughts, wildfires, extreme temperature events, and other extreme weather events could be 60% lower by 2050 if 70% of women were able to achieve at least a secondary-school education.<sup>55</sup> In Nigeria, it was found that households with higher levels of educational attainment have greater capacity to adapt in situ to rising temperatures and variations and rainfall rather than migrate due to existing skills and learning or adaptive capacity.<sup>56</sup>

The Global Center on Adaptation's State and Trends of Adaptation Report of 2022 highlighted education as a key strategy for climate adaptation for the first time. The 'education' chapter of the report highlights the strong correlation between countries' resilience and ability to adapt and their levels of education and advocates for allocating money to education as a means to improve countries' climate resilience.<sup>57</sup>

Education has strong links to innovation which are also critical for advancing adaptation and mitigation efforts.<sup>58</sup> Education supports local populations to develop their own local climate solutions: from a biolatrline in Uganda that reduces women's time searching for water by using treated human waste for agricultural irrigation,<sup>59</sup> to building a whole house from plastic in Ghana, to using waste food oil for transport in Zambia and replacing aluminium roofs with more robust, insulating alternatives made from plastic waste.<sup>60</sup> Education also provides the technical skills necessary to support a just transition and participate in many emerging green jobs, for example in establishing and monitoring early warning systems and supporting the expansion of renewable energy generation.

However, when looking at the relationship between education and mitigation it is worth noting that evidence suggests higher levels of education are correlated with higher GHG emissions. On a macro scale, this reflects the fact that education contributes to economic growth, which has tended to bring about higher GHG emissions in the absence of a transformational energy supply shift towards renewables.<sup>61</sup> However, on a micro scale, there is also evidence educating individuals with key sustainability and mitigation strategies can result in individuals reducing their own carbon footprint<sup>62</sup> and are more likely to vote for political parties with green policies.<sup>63</sup>

### **Research question 2.2 Are there estimates for the savings that can be realised from urgent investment in making education systems climate-smart?**

The literature review explored whether climate-smart education systems can lead to future savings by supporting adaptation efforts, which improve preparedness, resilience, and response capacity during climate-induced disasters and slow onset events.

There are some lessons that can be learned from the wider disaster risk reduction (DRR) literature, where there is a large body of evidence that early investment in DRR does equate to long term savings.<sup>64</sup> Some estimates suggest investing USD 1 in DRR can save between USD 4-7 in recovery efforts.<sup>65</sup> However, these estimates do not reference education investment specifically and are not specific to climate-induced disasters and slow onset events. So, while these are useful proxies, there is still a gap in the literature estimating the returns from early adaptation and preparedness spending in education with respect to climate-induced disasters and slow onset events.

### **Assumption 3: Education is not currently seen as an obvious investment for tackling the climate crisis**

#### **Research question 3.1 Is education embedded in national climate plans and vice versa?**

The climate adaptation needs of the education sector have long been overlooked and generally, there is a lack of integration of education in national climate priorities. In a 2021 analysis of 103 new and updated Nationally Determined Contributions (NDCs), UNICEF found that only 59% of NDCs include commitments in the education sector specifically – this is lower than health (76%), water (86%), food security and nutrition (79%) and social protection (61%).<sup>66</sup> An in-depth look into NDCs by Education International found that as of October 2022, only 16 of 140 NDCs or 11% articulated the need to make education infrastructure “greener” and more resilient to the effects of the climate crisis.<sup>67</sup> Further research is required to understand whether aspects of education may be included in other sectors (e.g. infrastructure).

There was less research identified on the integration of education into National Adaptation Plans (NAPs). A 2020 UNICEF review of 13 NAPs found that education was referenced in 12 out of the 13 NAPs reviewed, although it was generally restricted to referencing the resilience of physical buildings against extreme weather events.<sup>68</sup> Further research in this area is needed.

There is also a lack of meaningful integration of climate considerations in education plans and materials. According to a 2021 UNESCO study of a geographically diverse group of 46 countries, 92 percent of education sector plans and national curriculum frameworks included at least one reference to environment-related keywords (for example, environmental, ecosystem, biodiversity, the climate crisis,

sustainable development) but the “depth of inclusion was very low on average.”<sup>69</sup> UNESCO found that of 100 countries reviewed, only 53% of the world’s national education curricula make any reference to the climate crisis.<sup>70</sup> Teachers participating in a global survey led by UNESCO and Education International suggested the ‘lack of a comprehensive curriculum’ was the key systemic barrier to greater climate education in classrooms.<sup>71</sup>

Further, the 2023 Global Education Monitoring (GEM) report highlights an analysis of 50 countries which finds that even though countries are mainstreaming climate change in the curricula, only 39% have a national law, policy or strategy focused on climate change education. Further, only 63% of teacher training plans include a focus on climate change.<sup>72</sup>

There has been some progress in implementing wider school safety strategies and plans, for example dozens of countries (>70) have endorsed and are implementing the Comprehensive School Safety Framework (CSSF)<sup>73</sup> including 19 countries which have adopted the Caribbean Safe Schools Initiative (CSSI).<sup>74</sup> While this is welcome, the depth of school safety policies for many countries remain surface level. For example, a survey of seven Pacific Island countries found that four had emergency and disaster management policies that referred to education, but these were only in the form of a single section or paragraph.<sup>75</sup>

### **Research question 3.2 Is education a key area of investment for climate finance?**

Climate finance for crucial children’s services across the board – including education – is severely underfunded. A recent analysis of climate finance delivered through four key multilateral climate funds found that only 2.4% of climate finance goes towards supporting child-responsive activities. This analysis further found that only one project (out of 591 from 2006 to 2023) had education as its principal objective.<sup>76</sup> Some funders have acknowledged this gap, for example the Green Climate Fund is actively working with its partners to bridge child-focused climate finance particularly in the areas of health and education.

The UNFCCC identified education as one of the most “high impact” interventions for addressing the climate crisis in both the UN Framework Convention on Climate Change<sup>77</sup> commencing in 1992 and the Paris Agreement of 2015,<sup>78</sup> yet investment has not followed. The proportion of climate finance internationally spent through education interventions has thus far been negligible, with one estimate suggesting that in 2018 a maximum of 0.03% of all climate finance (including from the private sector) was spent on education.<sup>79</sup>

Some studies in the past have suggested that aid to the education sector could be diverted to other sectors as a result of pressure to meet climate targets.<sup>80</sup> However, recent evidence<sup>81</sup> shows that increased climate official development assistance (ODA) has not been achieved by reducing social sector



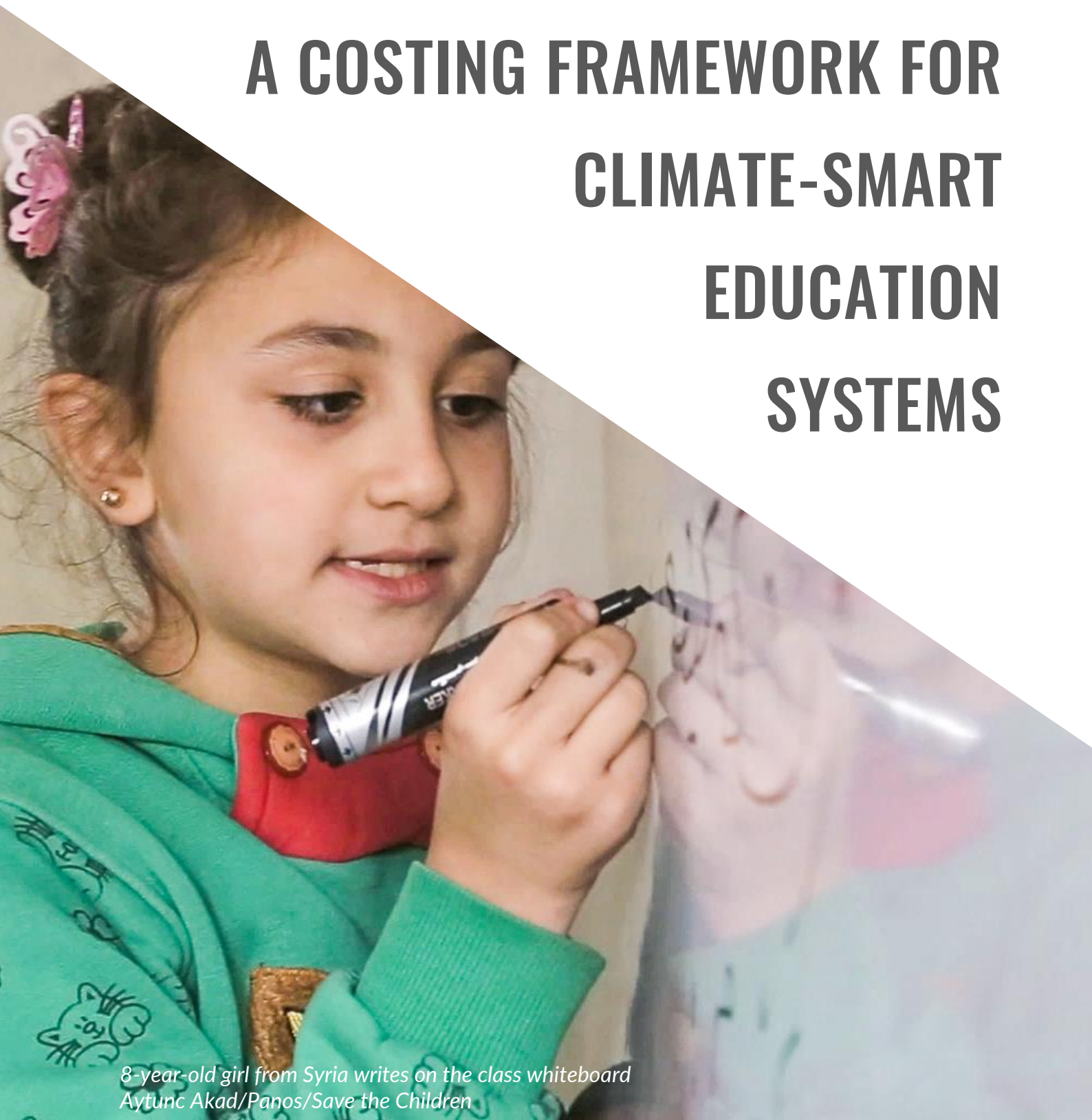
spending. Rather a number of existing transport and energy programs have been badged as climate-ODA, enabling a lift in climate spending without diverting funding from other sectors. Education ODA spending in the meantime has largely remained constant.<sup>82</sup> While this is better than education funding cuts, it does not factor in the costs of increasing school closures and reduced learning conditions due to the climate crisis, as evidenced in this report.



*Children studying at school in Somaliland. Marieke van der Velden/Save the Children*

## PART II

# A COSTING FRAMEWORK FOR CLIMATE-SMART EDUCATION SYSTEMS



*8-year-old girl from Syria writes on the class whiteboard  
Aytunc Akad/Panos/Save the Children*

The evidence examined in Part I shows the climate and environment crisis is already having serious impacts on access to education and learning outcomes, particularly in low- and middle-income countries. Importantly, the evidence also highlights the ways in which education can be a critical tool in building resilience and developing the green economies and societies of the future.

Despite these two realities, planning and funding for education and climate adaptation are not sufficiently integrated at the moment. For example, when education is included in NAPs 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. Similarly, education sector plans do not currently consider climate and environment adequately. This mismatch is in part due to the lack of shared understanding of what are climate-smart investments, lack of research examining the cost implications of making climate-smart investments in education as well as the lack of research showcasing the future savings from climate-related investments in education today.

This report proposes an intervention matrix that summarises some of what is known about relevant climate-smart interventions in education. The matrix is designed to help governments, development partners, civil society and other education stakeholders kick-start a conversation on the extent to which the collective efforts in each country are adding up to building climate-smart education systems and where any gaps may be. It can help Ministries of Education discuss with other line ministries and departments the ways in which interventions addressing rapid and slow-onset impacts of climate change come together and can be supported in a structured and intentional way across different budgets and financing instruments.

The Climate and Environment Intervention Matrix (CEIM) breaks down the potential types of activities associated with developing climate-smart education systems into four distinct categories: 1) response, 2) recovery, 3) preparedness and adaptation, and 4) climate action and environmental sustainability. The four categories are further set out in intervention groups against the seven dimensions of a climate-smart education system framework.<sup>83</sup> the enabling factors of data, policies and plans, coordination, and financing; teaching and learning; infrastructure; and interventions focused on engaging schools and communities. A final cross-cutting element is climate justice – the consideration of gender-responsive approaches, interventions that tackle intersectional marginalization, and include the use of Indigenous knowledge.

The matrix was developed by reviewing available literature and evidence on interventions as well as sourcing available costs. The research concluded that the nature and cost of responses will vary significantly depending on the context. Therefore, a limitation of the matrix is that it is an initial approach to identify the interventions that form climate-smart education systems, without being able to cost them

at an aggregate level. For example, countries that are facing regular or projected increases in extreme weather events will need to invest now in climate-proofing infrastructure in order to reduce future costs of repairing or rebuilding schools. However, factors such as geographical location of schools, the state of existing infrastructure, and local capacity and market prices play a role in determining the most appropriate and effective measures and the associated costs. Meanwhile, for countries whose main concern is rising temperatures, they may be able to adopt climate-appropriate building techniques without significant additional cost, for example by orienting school buildings in a way that promotes ventilation.

While the CEIM gives an initial overview of the types of measures that could be taken, populating it with country-specific costing data that responds to the types of hazards that a country is facing and the associated costs of interventions in that context would be a first step to prioritizing investment decisions.



*Girl paddling her wooden canoe to school in Pujehun district, Sierra Leone.*

*Jonathan Hymas/Save the Children*

**Table 2. Climate and Environment Intervention Matrix**

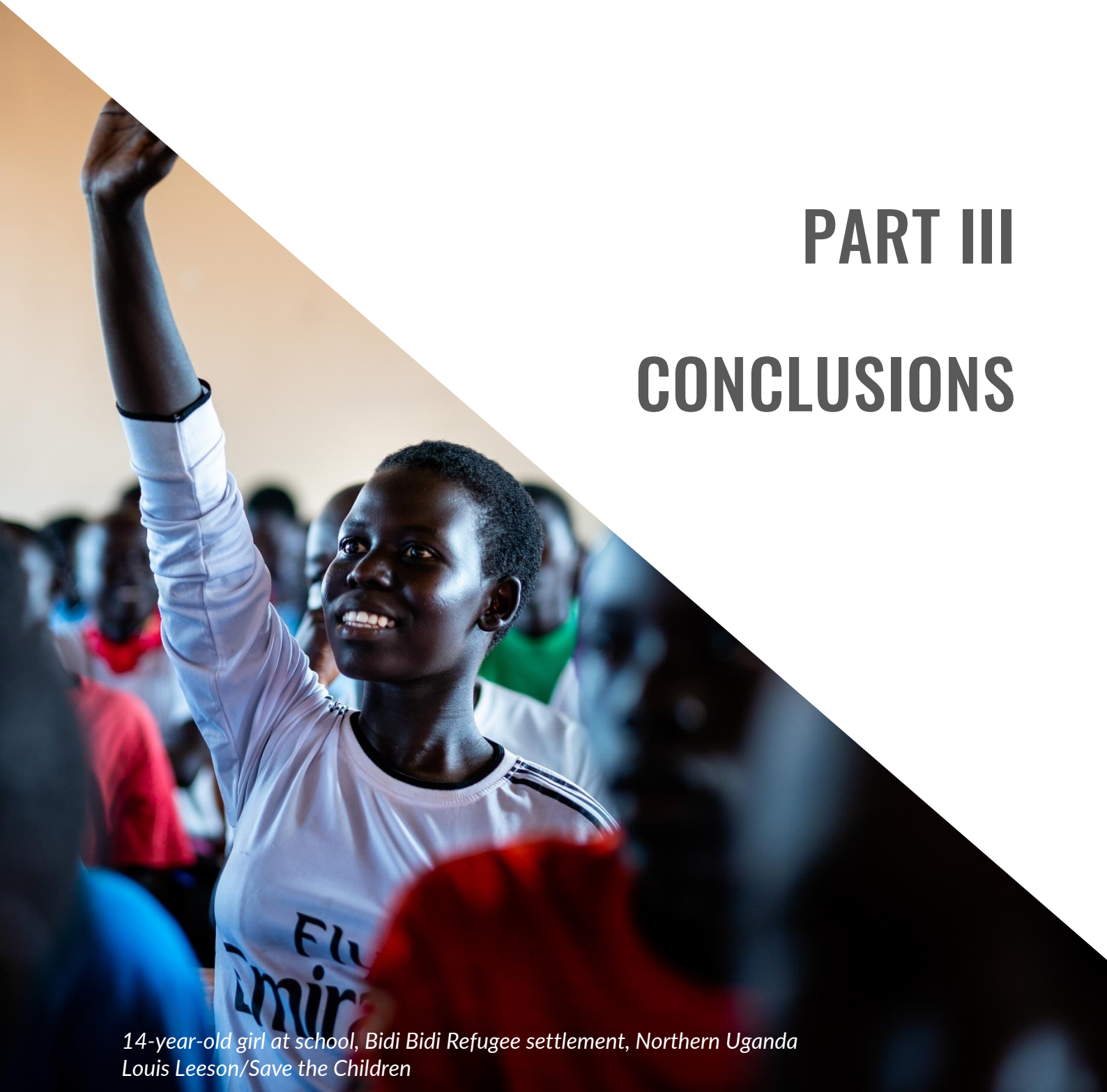
Nature of climate emergency	Type of intervention	Enabling environment (policies, data, coordination)	Teaching and learning	Infrastructure	Schools and communities	Climate justice
Rapid onset emergencies	Response	<ul style="list-style-type: none"> <li>➤ Rapid post-disaster damage and needs assessment</li> <li>➤ Coordinated response planning between MoE and DRM authorities; and between humanitarian-development partners</li> <li>➤ Anticipatory action (release of financing as per pre-agreed indicators)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Rapid training of teachers, including on psychosocial support and socio-emotional skills</li> <li>➤ Provision of learning materials</li> <li>➤ Use of distance learning modalities where necessary</li> </ul>	<ul style="list-style-type: none"> <li>➤ Provision of safe temporary learning spaces or tents</li> <li>➤ Provision of WASH facilities</li> </ul>	<ul style="list-style-type: none"> <li>➤ Community engagement for child protection and well-being, including early childhood development</li> <li>➤ Cross-sectoral interventions such as immunizations, school feeding</li> </ul>	<ul style="list-style-type: none"> <li>➤ Gender-responsive approaches and targeted interventions to support children affected by inequality and discrimination, such as cash transfers</li> </ul>

	Recovery	<ul style="list-style-type: none"> <li>➤ Coordination between humanitarian-development actors on transition phase</li> <li>➤ Updating national strategies to recover lost gains and keep children learning</li> </ul>	<ul style="list-style-type: none"> <li>➤ Catch up / remedial programs</li> <li>➤ Teacher training on student assessment and remedial education</li> </ul>	<ul style="list-style-type: none"> <li>➤ Rehabilitation of damaged buildings and facilities (e.g., WASH, school health facilities)</li> <li>➤ Construction of semi-permanent buildings and facilities</li> </ul>	<ul style="list-style-type: none"> <li>➤ Safe back to school campaigns</li> </ul>	
Both sudden and slow onset	Preparedness and climate adaptation	<ul style="list-style-type: none"> <li>➤ Revising sector plans to be attentive to rapid and slow-onset impacts of climate change</li> <li>➤ Improving EMIS to incorporate climate related data</li> <li>➤ Incorporating education into national DRR</li> </ul>	<ul style="list-style-type: none"> <li>➤ Investments that increase the quality of education overall, ensuring a breadth of skills for children and youth, including foundational learning, STEM, and socio-emotional learning</li> <li>➤ Risk and Resilience Education, including through:</li> <li>➤ Teacher professional</li> </ul>	<ul style="list-style-type: none"> <li>➤ Safer School infrastructure, including through:</li> <li>➤ Assessment and prioritization for retrofitting existing schools/relocation</li> <li>➤ Design and construction of new climate-resilient buildings in safe locations, including using techniques like</li> </ul>	<ul style="list-style-type: none"> <li>➤ School Safety and Educational Continuity Management, including through:</li> <li>➤ Risk assessment, Early warning systems, Risk reduction and response-preparedness</li> <li>➤ Adjustments to school timetable to adapt to heat and humidity</li> </ul>	<ul style="list-style-type: none"> <li>➤ Establishing mechanisms that allow meaningful participation of children affected by inequality and discrimination including girls, children with disabilities, Indigenous communities and other groups experiencing intersecting forms</li> </ul>

		<p>and climate adaptation plans; coordination of MoE with other line ministries</p>	<p>development on climate change, environment, and risk reduction topics</p> <ul style="list-style-type: none"> <li>➤ Pedagogical training to teach climate</li> </ul>	<p>building orientation</p> <ul style="list-style-type: none"> <li>➤ Construction of safe shelters for students and staff</li> </ul>		<p>of inequality and discrimination</p>
<p>Slow onset changes linked to climate change and environmental degradation</p>	<p>Climate action and environmental sustainability</p>	<ul style="list-style-type: none"> <li>➤ Revising sector plans to reflect the role of education in climate action and environmental sustainability</li> <li>➤ Incorporating education into Nationally Determined Contributions</li> </ul>	<ul style="list-style-type: none"> <li>➤ content in engaging ways and address climate anxiety</li> <li>➤ Incorporating climate change content across subjects, revising student assessment and learning materials</li> </ul>	<ul style="list-style-type: none"> <li>➤ Implementing low-carbon and energy-efficient practices, using sustainably sourced materials and renewable energy sources</li> <li>➤ Water conservation, e.g. rain harvesting</li> <li>➤ Planting trees for preventing desertification</li> <li>➤ Improving green spaces, vegetation, and sustainable landscaping</li> </ul>	<ul style="list-style-type: none"> <li>➤ Implement school-wide recycling and waste reduction and management programs</li> <li>➤ Establish school clubs on conservation and climate action</li> <li>➤ Establishing school gardens</li> <li>➤ Promote community engagement in school climate change initiatives</li> </ul>	<ul style="list-style-type: none"> <li>➤ Programs that support children affected by inequality and discrimination, particularly girls as peer educators</li> <li>➤ Interventions that promote the meaningful engagement of Indigenous communities and uptake of their knowledge</li> </ul>

# PART III

## CONCLUSIONS



*14-year-old girl at school, Bidi Bidi Refugee settlement, Northern Uganda  
Louis Leeson/Save the Children*



The climate crisis threatens every aspect of children's lives – from their physical and mental health to the quality of and access to education. The impacts of the climate crisis on children's access to education and the quality of their learning has become better understood in the literature over time, however, defining and quantifying the costs of these impacts is where literature is significantly lacking. There is a substantial body of evidence on the costs and savings associated with DRR more widely – but for the education sector specifically, and in the context of the climate crisis, a gap remains.

The lack of sufficient evidence on the additional climate-related costs to education, as well as the cost and savings estimates for climate-smart interventions in education have contributed to their slow and patchy implementation. In order to support the uptake of climate-smart investments, the Climate and Environment Intervention Matrix (CEIM) was developed to help governments identify the costs associated with different climate-smart interventions. Uptake of the CEIM will help governments identify promising interventions and spur investment in the right places while the literature and evidence-base continue to grow.

Building climate-smart education systems that are resilient in the context of the climate crisis requires additional upfront funding that in turn facilitates long-term savings. In order to raise that additional funding for education, climate and education actors must begin to work more closely together to better understand the synergies between the two sectors and identify investments that can help make progress on both priorities simultaneously.

In order to advance the implementation of climate-smart education systems, governments and their education sector partners should consider:

1. **Populating the Climate and Environment Intervention Matrix** with local costs and in response to the types of hazards faced by the country. This will help education partners understand the country-specific costs of building climate-smart education systems and prioritize between different climate-smart investments. Governments and their partners could also consider sharing this information with the global education community in order to help illustrate the costs – and benefits – to society, and spur action and investment.
2. **Integrating climate and education strategies and actions plans by:**
  - a. **Reinforcing the education components of Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs).** This includes ensuring education is included in climate planning and informed by a climate change risk assessment of the education sector.
  - b. **Developing education sector plans that are climate-smart.** Making education sector planning climate-smart will build more resilient education systems with more sustainable

footprints. Climate-smart education sector plans should integrate the Comprehensive School Safety Framework, ensure gender equality and be costed.

3. **Increasing climate-related investments in education to maximise the co-benefits from investment in both sectors, including by:**
  - a. **Raising sufficient funding for the implementation of costed integrated climate and education strategies through both domestic and international sources.** This would include the financing of curriculum adaptations, teacher training and reforms that advance knowledge, skills and competencies needed to tackle the climate crisis as well as for emergency preparedness planning at all levels of the education system. This requires strong cross-sectoral collaboration across climate and education sectors.
  - b. **Pursuing innovative financing** across the two sectors to support co-benefits towards building a greener and more resilient society.
  - c. **Advocating for the new loss and damage fund to include education.** Governments should ensure the inclusion of education systems as an eligible component of the new fund, with an explicit focus on children's rights (including their right to education), needs, voices and equity.
4. **Better integrating the safe and meaningful participation of youth and children** - in all their diversity<sup>v</sup> - in climate and education decision-making processes at all levels.

Meanwhile, the wider research community should consider filling the priority data gaps, including:

1. What additional costs have the climate crisis imposed on education systems at country and regional levels? Can we make credible estimates for how these costs might grow in the future given different assumptions around levels of investment in preparedness and resilience?
2. What is the funding that is needed for preparedness, adaptation, and mitigation interventions in a given country? How does this compare to the level of funding currently going towards response to and recovery from climate-induced disasters?
3. What are the specific costs, impacts, and returns to climate-smart and gender-responsive interventions in education? Which interventions have the greatest impact on girls' and boys' access to quality learning? Which interventions offer the highest long-term savings? How would we quantify returns and savings from investments in climate action and environmental sustainability?

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<sup>v</sup> This includes but is not limited to, girls and children discriminated against on the basis of their sexual orientations, gender identities and expression (SOGIE), Indigenous children, children with disabilities, displaced children, and those who experience intersecting and compounding forms of inequality and discrimination

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<sup>2</sup> UN News (2021) 'Climate and weather related disasters surge five-fold over 50 years, but early warnings save lives – WMO report'. Available at: [Climate and weather related disasters surge five-fold over 50 years, but early warnings save lives - WMO report | UN News](#)

<sup>3</sup> Global Education Monitoring Report Team (2023) Policy Paper 49: Can countries afford their national SDG 4 benchmarks? Available at: [Can countries afford their national SDG 4 benchmarks? - UNESCO Digital Library](#)

<sup>4</sup> Children's Environmental Rights Initiative (2023) Falling Short: Addressing the Climate Finance Gap for Children. Available at: <https://resourcecentre.savethechildren.net/pdf/Climate-Finance-Report-final.pdf/>

<sup>5</sup> Population estimates from the United Nations for 2023, children aged 6-17. Children experiencing at least one extreme climate event per year was estimated using methodology outlined in: Save the Children (2022) Methodological Note: Children Experiencing Climate Risk, Poverty and Conflict. Available at: [Children Experiencing Climate Risk, Poverty, and Conflict | Save the Children's Resource Centre](#). Children experiencing at least one extreme weather event per year are considered to live in a place at high risk of experiencing climate impacts.

<sup>6</sup> Ibid.

<sup>7</sup> Save the Children International (2021) Born into the Climate Crisis: Why we must act now to secure children's rights. Available at: <https://resourcecentre.savethechildren.net/document/born-climate-crisis-why-we-must-act-now-secure-childrens-rights/>

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