

# EXTREME HEAT

## AND CHILDREN'S

## DEVELOPMENT AND WELLBEING



**Save the  
Children**



# Summary

- The climate crisis is increasing the intensity, frequency and duration of heatwaves.
- Heatwaves are impacting children's rights to health, education, nutrition, among others. The impacts are worse for children most affected by inequality and discrimination.
- A record 766 million children—one-third of the global child population—were exposed to extreme heatwaves in the twelve months from July 2023 to June 2024, according to new analysis by Save the Children.
- Incidents of school closures for weeks, heat-related illness among children and exacerbation of the hunger crisis in some parts of the world have been the direct impacts of heatwaves in the 12 months.
- World leaders must demonstrate that they are willing to take bold action to protect children from heatwaves and other climate-related events.
- In 2024, world leaders must:
  - Agree on an ambitious New Collective Quantified Goal on climate finance (NCQG) at COP29 that can deliver child- and gender-responsive outcomes at the scale required.
  - Commit at COP29 to phase out fossil fuels rapidly, fully and equitably, with historical emitters pledging to put an immediate end to fossil fuel expansion.
  - Revise their Nationally Determined Contributions to be ambitious, 1.5°C aligned and child-sensitive.
  - Support a bigger and better IDA21 to maximise the effectiveness of the World Bank's concessional lending arm in building children's resilience to the climate crisis.
- Beyond 2024, governments, climate finance providers, private sector and multilateral agencies should:
  - Develop child-centred climate services and child-responsive heat action plans.
  - Strengthen the resilience of children's services to cope with heatwaves.
  - Strengthen anticipatory action and social protection measures to mitigate heatwave impacts.



Luz, 14, and her mother Cenaída, 50, members of the Wayúú community, carry water from the 'jaguey' for their home in La Guajira, Colombia.



# Introduction

Heatwaves are becoming more frequent, intense, and longer because of human-induced climate change.<sup>1</sup> Compared to the 1980s, it's now six times more likely that multiple regions are suffering heatwaves at the same time.<sup>2</sup>

UNICEF estimates that almost every child in the world – nearly 2.2 billion children – will be exposed to frequent heatwaves by 2050.<sup>3</sup> While research by Save the Children and Vrije Universiteit Brussels reveals that children born in 2020 are expected to experience, on average globally, seven times more heatwaves than their grandparents, the situation is worse in certain countries, such as Afghanistan, where children could face 18 times more heatwaves than their grandparents.<sup>4</sup>

Children are most at risk during heatwaves, with potential for short- and long-term impacts on their health and wellbeing. Children have higher metabolic rates, find it harder to regulate their body temperature, spend more time outside, and rely on adults to care for them – making them disproportionately vulnerable. Heatwaves also hurt children's rights; their education, access to nutritious food, recreation and a healthy environment.

**Zain, 13, washes his face from a hand pump, inside his family's climate resilient home in Pakistan.**





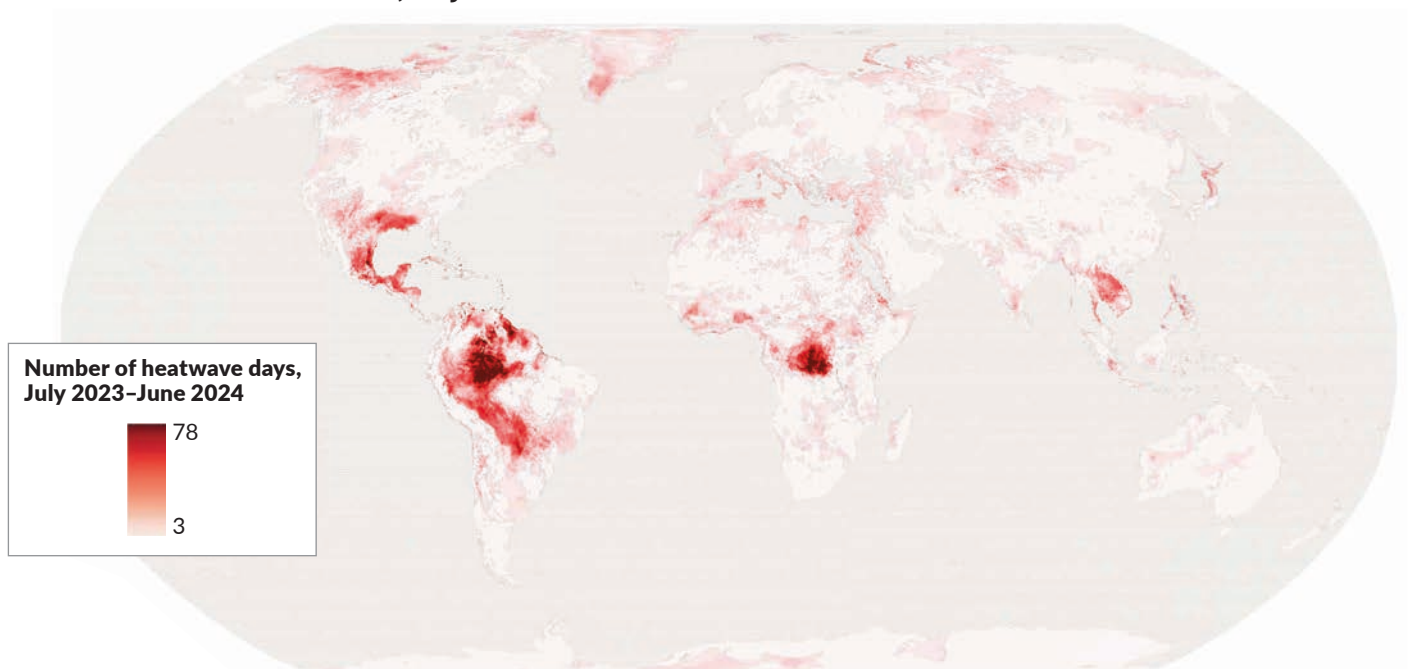
# The year that broke records

In the 12 months between July 2023 and June 2024, heatwaves happened in almost every corner of the globe. 2023 was the hottest year on record; a new highest average monthly temperature record was broken every month. While El Niño-driven weather patterns influenced heatwaves in some regions, scientists found human-induced climate change to be a key driver of the extreme heat.<sup>5</sup>

## New research by Save the Children shows that:

- Between July 2023 and June 2024, an estimated 766 million children experienced extreme heatwaves globally. This represents a third of the world's child population.
- In the same period, 344 million children experienced the highest temperature recorded in their location since at least 1980.
- The number of children affected by extreme heatwaves almost doubled from 2022/23 to 2023/24. The latest annual figure was more than 300 million higher than this century's previous record, set in 2015/16.
- Regional hotspots: Latin America and the Caribbean, and West and Central Africa saw the average number of heatwave days more than doubled compared to the previous 12 months.
- Most affected countries:
  - Andorra, San Marino and Albania saw 100% of children affected. In Thailand it was 97.5%, 97.2% in Cambodia, and 88.7% of children in Syria.
  - As the world's most populous country, India saw the highest number of children experiencing heatwaves, with 170 million (39.5% of total child population), followed by Bangladesh with 38 million (71.5%) and Nigeria with 37 million (34%).
- Newly available data showed that in July 2024 alone, 170 million children experienced heatwaves. The same month also saw unprecedented heat globally, including the hottest day ever on record.

## The distribution of heatwaves, July 2023–June 2024



## What is a heatwave?

Heatwaves are periods of “abnormally hot weather that can last from a few days to months where the maximum and minimum temperatures are unusually high to a location,”<sup>6</sup> though many countries adopt their own standards.

The UK Meteorological Office, for example, defines a heatwave as when a location records at least three consecutive days with maximum temperatures meeting or exceeding the heatwave temperature threshold.<sup>7</sup>

The Indian Meteorological Department, on the other hand, defines a heatwave as temperatures increasing by at least 5–6°C above the ‘normal temperature’ for at least two consecutive days.<sup>8</sup>

For the purpose of our analysis, we defined a heatwave as a period of at least three consecutive days with both the minimum and maximum of the daily surface air temperature exceeding the heatwave temperature threshold. This threshold was determined by the 99th percentile of temperatures observed in a specific location over the 1991–2020 reference period. In other words: a specific location experiences a heatwave if, for at least three consecutive days, the temperature is above the hottest 1% of temperatures measured in the previous 30 years.<sup>9</sup>

While we've focussed on heatwaves and how they affect children, we know heat isn't just a problem during heatwave events. Heat that is neither “extreme” nor occurs in “spikes” also has huge impacts, particularly when people's livelihoods are vulnerable to changes in temperature.<sup>10</sup>

Labourers work at a brick factory on a hot summer day during a heatwave in Dadu, Pakistan in June 2024.



# Impacts of heatwaves on children's rights and wellbeing

Heatwaves impact children's health, education, nutrition, environment, and wellbeing in different ways. Preexisting disparities between high- and low-income groups intensify the effects of heatwaves on children, especially those most affected by inequality and discrimination.

For example, women and girls face increased risks of gender-based violence after prolonged periods of extreme heat,<sup>11</sup> as hot weather increases discomfort, frustration, impulsivity, and aggression.<sup>12</sup>

Similarly, children living in conflict zones face a deadly combination of human-made crises that exacerbate one another. Heatwaves intensify the humanitarian impacts of conflict, while the destruction of infrastructure and access to services make it harder for children to cope with heatwaves and other climate shocks.

## Health

Extreme temperatures and heatwaves have both direct and indirect impacts on children's health. Heatwaves have been directly linked with a range of issues including increased stillbirths, low birth rates and preterm births, exacerbations of asthma to increased cardiovascular and heart failure mortality and poor mental health.<sup>13,14</sup>

Research from Brazil found a strong association between heatwaves and the number of children in hospital – with rates of hospitalisation increasing by 11% in children up to 9 years of age during periods of extreme heat.<sup>15</sup>

Heatwaves are also linked to indirect risks to children's health; from increased malnutrition, stunting, increases in domestic violence to even a heightened chance of being bitten by dogs.<sup>16,17</sup> Additionally, heatwaves interact with other risks such as air pollution which exacerbates health and environmental impacts.<sup>18</sup> These increased risks place a growing burden on health systems and are linked to economic and social vulnerability.<sup>19</sup>

- In Gaza, where close to 1.9 million people have been displaced and forced to live in refugee camps and nylon tents that trap heat, children have died from the deadly heatwaves that struck the Middle East in May 2024.<sup>20</sup> As well as the widespread destruction of health infrastructure by bombardment, the siege imposed by the Government of Israel has denied children and families access to sufficient water and medicines, compounding the health risks and hardships they face.
- In India, the record-breaking heatwave in 2024 has killed more than 100 people.<sup>21</sup> Doctors reported increased cases of heat exhaustion among newborns and children up to 2 years of age. Cases of urinary tract infections, heat boils and skin infections among older children were also found which doctors attribute to extreme heat.<sup>22</sup>

Summary of health consequences for children from heat<sup>23</sup>

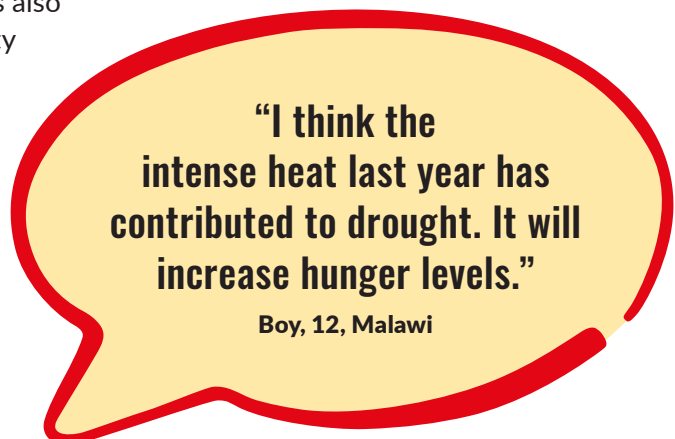
<p><b>Pulmonary/Respiratory</b></p> <ul style="list-style-type: none"> <li>• Asthma exacerbations, hospitalisations</li> </ul>	<p><b>Gastrointestinal</b></p> <ul style="list-style-type: none"> <li>• Infectious gastroenteritis</li> <li>• Flares of inflammatory bowel disease</li> <li>• Pancreatitis (especially with comorbidity, e.g. cystic fibrosis)</li> </ul>	<p><b>Cardiovascular</b></p> <ul style="list-style-type: none"> <li>• Cardiovascular mortality</li> <li>• Heart failure mortality</li> <li>• Prevalence of congenital heart disease</li> </ul>	<p><b>Neonatal</b></p> <ul style="list-style-type: none"> <li>• Stillbirths</li> <li>• Preterm births</li> <li>• Congenital differences</li> </ul>
<p><b>Renal</b></p> <ul style="list-style-type: none"> <li>• Acute kidney injury</li> <li>• Nephrolithiasis</li> <li>• Urinary tract infections</li> <li>• Electrolyte derangements</li> </ul>	<p><b>Infectious disease</b></p> <ul style="list-style-type: none"> <li>• Outbreaks of infectious diseases like dengue, malaria, cholera</li> <li>• Outbreaks of new diseases like COVID-19</li> <li>• Decreased vaccination rates and other measures to prevent disease transmission</li> </ul>	<p><b>Neurological/Psychiatric/Behavioural</b></p> <ul style="list-style-type: none"> <li>• Seizure burden, especially in complex disorders, e.g. Dravet syndrome</li> <li>• Worsening of mental health</li> <li>• Self-inflicted injury or suicide</li> <li>• Worse educational and achievement outcomes</li> </ul>	

**Food and nutritional security**

Heatwaves reduce crop yields<sup>24</sup> and can lead to food price inflation.<sup>25</sup> Rising food prices make it difficult for families to put food on the table and are linked to severe wasting and stunting risks and micronutrient deficiencies among children.<sup>26</sup> Food is also more likely to spoil in high heat, which can result in acute malnutrition.<sup>27</sup>

Climate change is also exacerbating the occurrence of concurrent drought and heatwave events<sup>28</sup> with implications for food security.<sup>29</sup> Families are more likely to lose income if hot periods lead to the death of earning members, disrupt their business or impact their health and productivity,<sup>30</sup> thereby reducing their ability to purchase food.<sup>31</sup> These effects are pronounced for lower-income households that are more likely to be dependent on outdoor jobs. High temperatures also make breastfeeding uncomfortable, causing irritability and exhaustion among mothers and children.<sup>32</sup>

- Heatwaves are reported to be exacerbating the hunger crises in South Sudan and Pakistan.<sup>33,34</sup>
- Heatwaves in Europe in the summer of 2023 added 0.67% to food price inflation.<sup>35</sup>





## Education

Heatwaves can disrupt children's access to learning due to school closures during extremely hot days. School closures can increase the risk of dropouts and negatively impact the development of human capital. Children from low-income families may be disadvantaged in accessing reliable internet and computers if schools shift to remote learning to cope with extreme heat.

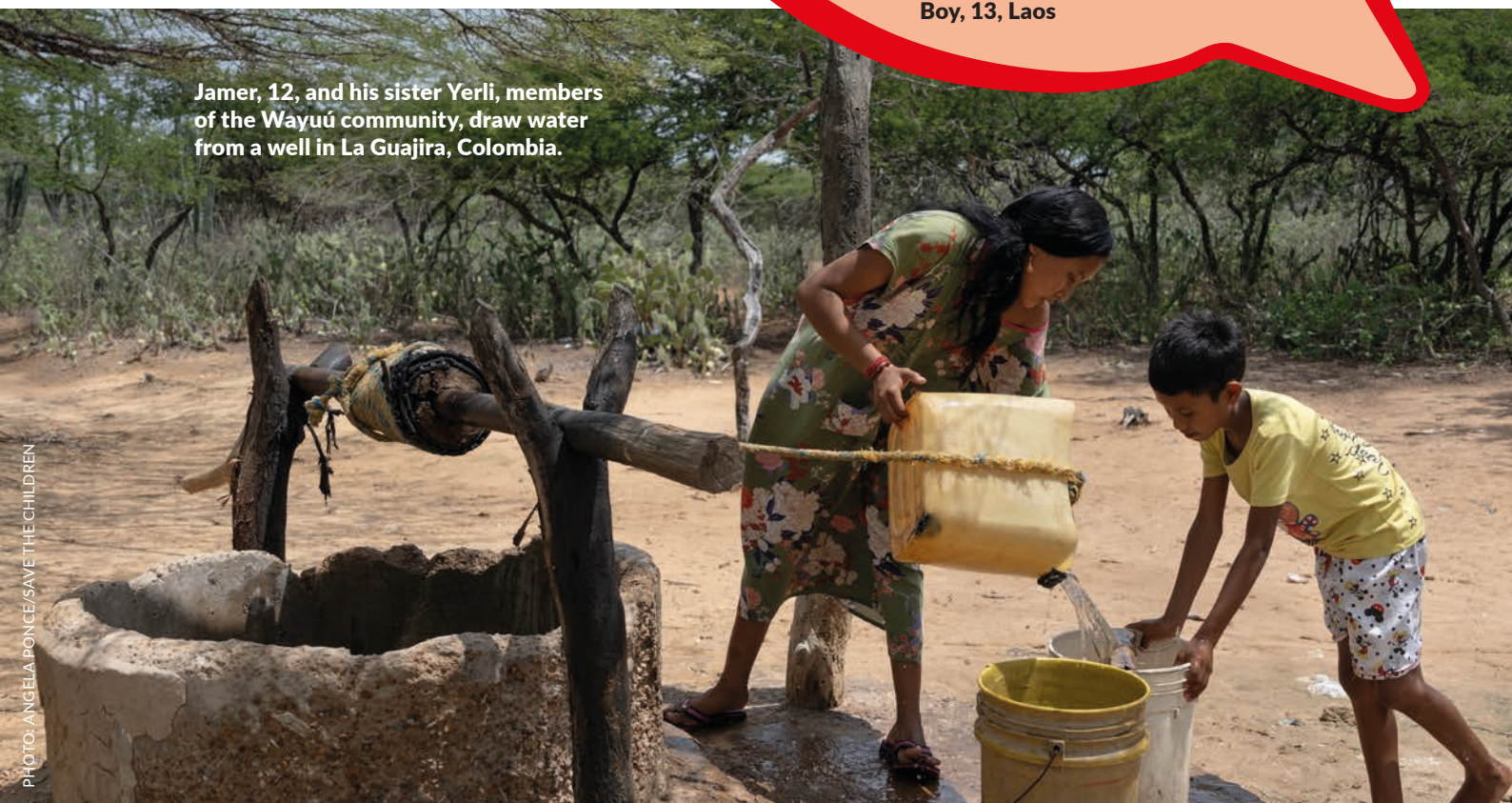
High temperatures are also known to affect children's ability to concentrate which, in turn, can impact learning outcomes. A 2024 study in Ethiopia found that more hot days during a school year reduced the amount that students learnt, with 10 additional hot days during a school year leading to a 2.28% drop in exam performance.<sup>36</sup> Another US-based study found that hotter school days reduce learning, with extreme heat being especially harmful, with a more significant impact on low-income and minority students.<sup>37</sup>

- Across South Asia and Southeast Asia, heatwaves forced thousands of schools to close down in 2024, keeping millions of children out of school for weeks.<sup>38</sup> In Bangladesh, all schools were closed for at least two weeks, forcing 33 million children out of school.<sup>39</sup> At least 26 million children in Pakistan's most populous province, Punjab – or 52% of the country's school students – were out of school from 25 to 31 May.<sup>40</sup> The prolonged heatwave in the Philippines forced thousands of schools to suspend in-person classes and switch to remote learning.<sup>41</sup>
- In South Sudan, where millions of children already face severe disruption from conflict and displacement, schools were closed for two weeks over March and April 2024 because of extreme heat.<sup>42</sup>

**“The extreme high temperatures totally disturbed our focus on studying because there is no fan in our classroom. I hadn't realized before that hot weather could make us lose our concentration this much. If this extreme hot weather continues in the next few years, it could affect our overall academic performance and wellbeing.”**

Boy, 13, Laos

Jamer, 12, and his sister Yerli, members of the Wayuú community, draw water from a well in La Guajira, Colombia.

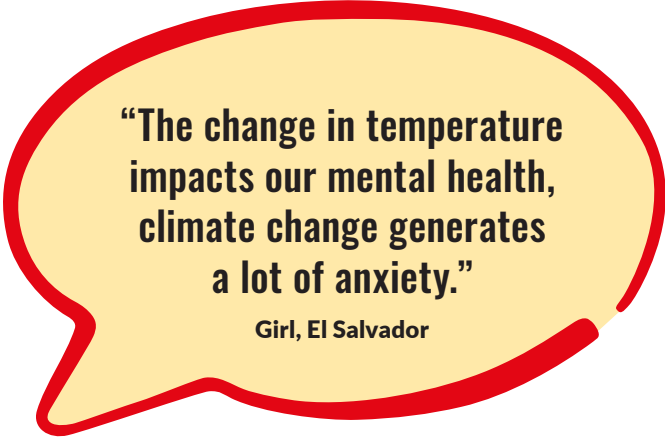




## Psychological wellbeing

Hot summer days drive up the number of people experiencing mental health emergencies.<sup>43</sup> A 2024 US-based study found that during heatwaves, admissions for mood disorders among children and young people were up 29%, with those in lower-income areas and densely populated cities at higher risk.<sup>44</sup> Another 2024 UK study found that climate disruptions such as heatwaves create occasional or ongoing sleep disruptions that can leave infants vulnerable and unprepared for learning.<sup>45</sup>

Prenatal exposure to heatwaves and other climate disasters raises a child's risk to a variety of behavioural and developmental issues including anxiety, depression and psychiatric issues. Scorching heatwaves can also fuel climate anxiety among children, leaving them with hopelessness about the planet's future.<sup>46</sup>

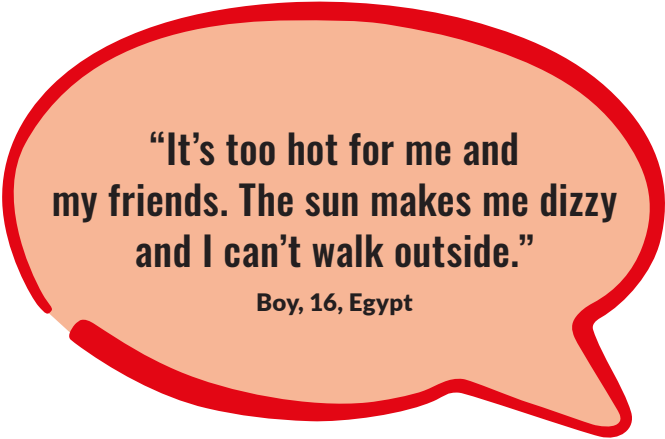


**“The change in temperature impacts our mental health, climate change generates a lot of anxiety.”**

**Girl, El Salvador**

## Right to play

Sweltering heatwaves make it difficult for children to play outdoors. As heatwaves become longer and cover larger areas, more children are likely to be lonely and unable to do activities that are important for their physical and mental wellbeing. Play is crucial for children's cognitive skills such as concentration, learning, memory, language and attention, fine and gross motor skills, as well as social and emotional skills. It can also support children in difficult circumstances explore emotions and experiences and communicate feelings and thoughts. Play deprivation – when children are restricted in their access to play – is known to have serious impacts on social, emotional, cognitive, and behavioural development into adulthood.<sup>47</sup>



**“It's too hot for me and my friends. The sun makes me dizzy and I can't walk outside.”**

**Boy, 16, Egypt**

# Existing measures aren't enough

Governments often issue alerts and advice to keep people safe from heatwaves. However, access to these warnings and guidance may not be equal across demographics and regions.

The lack of reliable data and comprehensive reporting on the impacts of heatwaves also make it hard to design effective responses and accurately estimate how much money countries will need to cope with them.<sup>48</sup> There are still gaps in the monitoring and forecasting of heatwaves in several lower-income countries.<sup>49</sup> Although some countries are successfully using climate information and services to predict and manage health risks, there are opportunities to go further.<sup>50</sup>

There are also gaps in the capacities of national meteorological agencies, as well as a disconnect in coordination and communication between these agencies and key sectors, particularly those most vital to children. For example, sector-specific advisories based on seasonal forecasts often exclude the education sector. While the Global and National Frameworks for Climate Services aim to address these gaps, the specific needs of children have not been considered. Similarly, the Early Warnings for All (EW4A) initiative<sup>51</sup> isn't child-centred. Yet children could play a key role in assessing, monitoring, communicating, preparing for, and acting on climate-related risks across all four pillars of the EW4A initiative.<sup>52</sup>

Save the Children has been taking steps to reduce the consequences of heatwaves through anticipatory action. In Bangladesh, for example, an Emergency Activation Plan was put in place in 2024, based on a pre-set temperature threshold, and assessment of the risk of heatwaves in rural and urban areas. In Bangladesh and Mexico, Save the Children worked with community volunteers to carry out awareness campaigns with children and parents, distributed child-focused information and education materials, installed safe drinking water points and equipped families in heatwave hotspots with solar protection kits.

While these measures are crucial to protect lives and reduce health risks from heatwaves, they are not always implemented at scale due to insufficient funding allocation and capacity of government agencies. Heat action plans are yet to be developed and adequately resourced in several vulnerable countries. Where they are, they often adopt simplistic and generalised approaches that lack local context<sup>53</sup> and leave out the bigger factors that drive higher exposure and vulnerability to extreme heat – such as urban planning structures and development patterns.<sup>54</sup> More importantly, these measures do not tackle the root cause of heatwaves: the record rise in global temperatures driven primarily by burning fossil fuels.

**“We get heat strokes and the children faint. One of my friends, Yasir, collapsed. He got a sudden fever and began to vomit. Then he was quickly taken to the hospital. Because of the intense heat, children get bouts of vomiting, fevers, and dizziness. I have become dizzy several times while sitting at my desk.”**

**Boy, 13, Pakistan**



# Recommendations

In 2023, the UN Committee on the Rights of the Child (UNCRC) issued the *General Comment 26 on children's rights and the environment with a special focus on climate change* which provides a comprehensive interpretation of State obligations and recognises children's rights to a clean, healthy and sustainable environment. Upholding this right requires, among other things, States to minimise the exposure of children to extreme heat and make sure children – especially those affected by inequality and discrimination – continue to enjoy their rights during and after heatwaves.

Save the Children calls on governments, climate finance providers, the private sector and multilateral agencies to implement the following recommendations.

## Urgently phase out the use and subsidy of fossil fuels

Limiting the temperature rise to 1.5°C will reduce the additional lifetime exposure of children born in 2020 to heatwaves by 45%.<sup>55</sup> To keep the goal of 1.5°C alive, the world must phase out the use and subsidies of fossil fuels rapidly, fully and equitably. As countries revise their Nationally Determined Contributions (NDC), they must ensure that the updated NDCs are ambitious, aligned with the 1.5°C temperature goal and child-sensitive. High-income countries and historical emitters must take the lead in phasing out their fossil fuels first and fast, including putting an immediate end to their fossil fuel expansion plans.

## Develop child-centred climate services and child-responsive heat action plans

Children are most vulnerable to heatwaves and other climate shocks. Heat warnings need to be developed to make sure they address the differing thresholds at which children and other vulnerable groups are impacted. Comprehensive heat action plans should be developed and strengthened in collaboration with children, parents, schools, healthcare providers and child rights organisations to identify their unique risks and find measures to protect them. Special consideration must be given to children most impacted by inequality and discrimination. Reporting on the impacts of heatwaves on vulnerable groups, including children, should be undertaken to make it easier to prepare for and respond to them.

## Strengthen the resilience of children's services to cope with heatwaves

Health systems should be adequately equipped to expand and absorb the increased demand for treatment following heatwaves. Climate-proofing<sup>56</sup> of health facilities should also be undertaken to ensure they don't trap heat and aggravate the impacts of heat on patients. Similarly, in order to support education systems' resilience and support continuity of learning, governments should endorse and implement the Comprehensive School Safety Framework, considering extreme heat across all three pillars<sup>57</sup> and the enabling policies that make up

the Framework. Food systems should also be made climate-resilient so children and their families can access nutritious food in periods of prolonged heat. Making these measures child-centred can go a long way in protecting children from heatwaves.

## Strengthen anticipatory action

Child-centred early warning systems should be designed to predict heatwaves and other climate hazards. Warning information should be informed by the risks children face. Early action protocols that help mitigate heatwave impacts especially for children should be put in place. Anticipatory actions like heatwave alerts, public awareness campaigns, distribution of information in local languages should be rolled out based on triggers and thresholds. Anticipatory action working in tandem with child-sensitive social protection measures can mitigate heatwave impacts.

## Scale up international climate finance

Implementing heat action plans and emergency responses in lower-income countries requires funding. High-income countries and historical emitters should contribute their fair share to international climate finance commitments, providing adequate climate finance to lower-income countries in an accessible, affordable, inclusive and predictable manner to support their climate actions including addressing losses and damages. This includes championing an ambitious New Collective Quantified Goal on climate finance, to be agreed at COP29, that incorporates specific funding windows dedicated to delivering child- and gender-responsive outcomes at the scale required. The NCQG should have sub-goals on mitigation, adaptation and loss and damage, provide 'new and additional funding' to existing Official Development Assistance flows and deliver primarily grant-based finance, particularly for adaptation and loss and damage. An ambitious replenishment of the World Bank's International Development Association (IDA) during the pledging moment in 2024 together with an improved IDA21 can also contribute to addressing the climate finance gap for children.



Luz (left), 14, and her mother Cenaída (right), 50, members of the Wayú community, carry water from the 'jaguey' for their home in La Guajira, Colombia.



## Endnotes

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