Núcleo Ciência Pela Infância

WORKING PAPER

Early Childhood at the Heart of Tackling the Climate Crisis

SCIENTIFIC COMMITTEE
NÚCLEO CIÊNCIA PELA PRIMEIRA INFÂNCIA (NCPI)

STUDY

14

Van Leer FOUNDATION
Harvard University David Rockefeller Center For Latin American Studies Brazil Office
Fundação Maria Cecilia Souto Vidigal
Insper

THIS DOCUMENT WAS PREPARED BY BRAZILIAN RESEARCHERS FROM DIVERSE ACADEMIC DISCIPLINES AT THE INVITATION OF THE SCIENTIFIC COMMITTEE OF THE NÚCLEO CIÊNCIA PELA INFÂNCIA (NCPI). IT IS THE **FOURTEENTH** STUDY IN A SERIES THAT ADDRESSES TOPICS RELEVANT TO EARLY CHILDHOOD DEVELOPMENT.

Núcleo Ciência Pela Infância

The **NÚCLEO CIÊNCIA PELA INFÂNCIA** (NCPI) is a collaborative initiative dedicated to producing and disseminating scientific knowledge on early childhood development. Its mission is to strengthen and enhance public programs and policies, with a particular focus on addressing the inequalities that affect Brazilian children up to the age of six.

The NCPI is composed of four institutions: the Van Leer Foundation, the David Rockefeller Center for Latin American Studies at Harvard University, the Maria Cecilia Souto Vidigal Foundation, and Insper.

The NCPI operates through five main initiatives:

SCIENTIFIC COMMITTEE: A multidisciplinary group of researchers committed to bringing scientific knowledge on early childhood development to decision-makers across all sectors, beyond partisan divides. Grounded in an evidence-based approach, the Committee aims to build a robust knowledge base that recognizes the shared responsibility of families, communities, the private sector, civil society, and government in promoting the well-being of children aged 0 to 6.

EXECUTIVE LEADERSHIP PROGRAM IN EARLY CHILDHOOD DEVELOPMENT: A training program designed to raise awareness, develop skills, and mobilize public policymakers, government officials, and social leaders to advance the full development of early childhood.

CHILD DEVELOPMENT LEADERSHIP COMMUNITY: A strategy to strengthen connections among participants of the Executive Leadership Program, keeping them engaged and informed about policy developments and the latest scientific evidence related to early childhood development.

INTERNATIONAL SYMPOSIUM ON EARLY CHILDHOOD DEVELOPMENT: An event that brings together Brazilian and international experts to discuss key issues and practices in the formulation of programs and policies targeting children up to the age of six.

SCIENCE FOR EARLY CHILDHOOD AWARD: An award that recognizes researchers and values scientific research focused on early childhood. It aims to support the dissemination of research findings and contribute to the design and implementation of early childhood public policies across diverse Brazilian contexts.

Van Leer Foundation

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The NCPI Scientific Committee is composed of researchers from a range of disciplines, including medicine, nursing, neuroscience, psychology, economics, public policy, and education.

The group's primary objective is to identify the issues that have the greatest impact on children's holistic development and to synthesize, analyze, and generate scientific knowledge that supports the formulation, advancement, and improvement of policies and programs benefiting children.

Its members are also committed to promoting a national research agenda that addresses gaps and underexplored areas in the field. Researchers from outside the NCPI are occasionally invited to contribute papers on their areas of expertise, as is the case with this fourteenth working paper, which explores early childhood at the heart of tackling the climate crisis.

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- **Study 12:** *"Desigualdades em saúde de crianças indígenas"* ("Inequalities in the Health of Indigenous Children")
- **Study 13:** *"Intersetorialidade nas políticas públicas para a primeira infância: desafios e oportunidades"* ("Intersectoral Collaboration in Public Policies for Early Childhood: Challenges and opportunities")

NOTES

- The content of this study is the sole responsibility of the authors and does not necessarily reflect the views of the member organizations of the *Núcleo Ciência Pela Infância* (NCPI).
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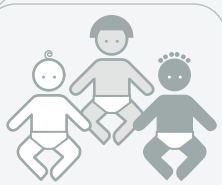


18.1

MILLION

babies and young children live in Brazil — 8.9% of the national population[1]

6.8

TIMES MORE HEATWAVES

is what children born in 2020 are expected to face compared to those born in 1960[2]

The climate crisis refers to a set of natural events whose effects are intensified by human activity, threatening biodiversity and disproportionately affecting people in vulnerable situations.

CLIMATE CRISIS IN BRAZIL

*Extreme weather events have **tripled in the past 20 years***

NORTH

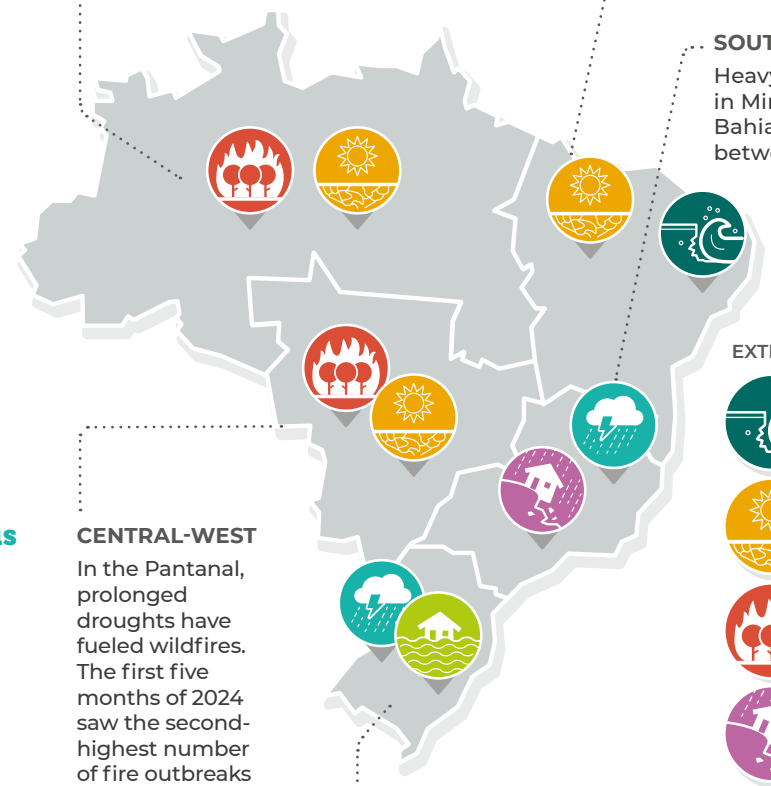
In 2023, a heatwave worsened the Amazon drought. Along with a drastic drop in river levels, 22,061 fire outbreaks were recorded[4]

NORTHEAST

Rising sea levels and coastal erosion affect 35% of Brazil's coastline, especially in the North and Northeast[6]

SOUTHEAST

Heavy rains caused destruction in Minas Gerais, Rio de Janeiro, Bahia, and Pernambuco between 2022 and 2023[6]



CENTRAL-WEST

In the Pantanal, prolonged droughts have fueled wildfires. The first five months of 2024 saw the second-highest number of fire outbreaks since 2009[5]

SOUTH

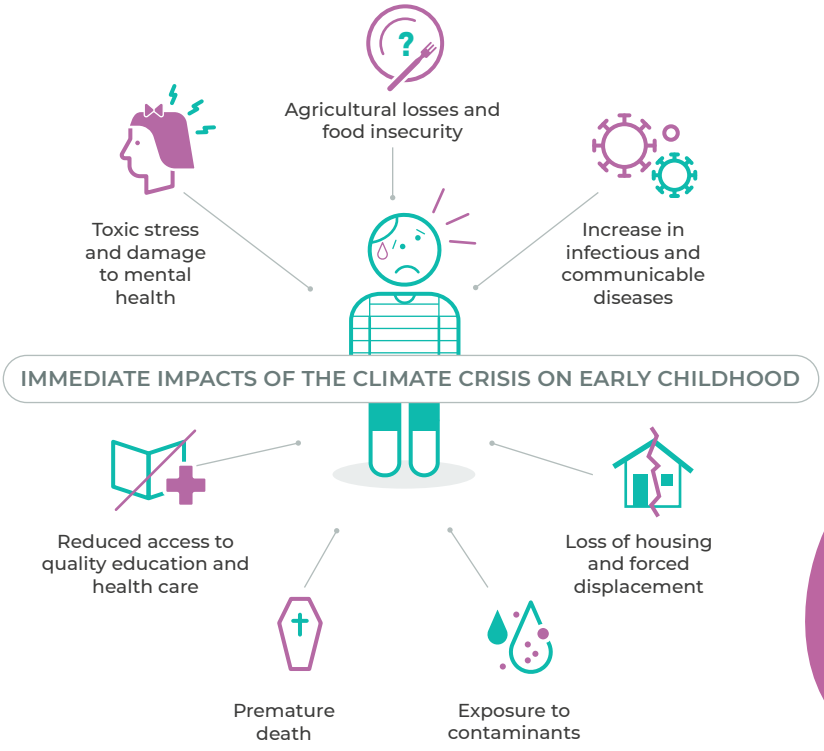
Torrential rains caused flooding and landslides in Rio Grande do Sul in both 2023 and 2024[5]

EXTREME WEATHER EVENTS:

Sources: (1) FMCSV, 2024; (2) Save the Children, 2021; (3) Fiocruz, 2024; (4) ONU News, 2023; (5) World Wildlife Fund, 2024; (6) Coelho et al., 2024.

HOW THE ENVIRONMENT AFFECTS CHILD DEVELOPMENT

*Nearly **1 billion children** worldwide are exposed to extreme climate risks[7]. These events lead to heat stress, forced migration, and food insecurity, creating conditions that **weaken the bond between children** and their caregivers and **undermine their overall development**.*



The year 2024 was the hottest in recorded history, with temperatures reaching **1.55 °C** above pre-industrial levels[8]

Children from **Indigenous and Black communities** are especially vulnerable to the effects of the climate crisis, as extreme weather events deepen **structural inequalities** — from pregnancy through adulthood

HEALTH AND HUMAN DEVELOPMENT

IMPACTS ON **PREGNANCY**

- Maternal stress and depression
- Chronic diseases (diabetes, hypertension)
- Complications in childbirth
- Premature birth and low birth weight
- Maternal and neonatal mortality

IMPACTS ON **EARLY CHILDHOOD**

- Neurological, respiratory, and infectious diseases and malnutrition
- Caregiver stress leads to less attention for the child
- Fewer opportunities to play, socialize, and learn
- Difficulties in regulating body temperature
- Increased infant mortality

IMPACTS ON **ADULT LIFE**

- Chronic diseases
- Long-lasting impacts on mental health
- Social marginalization
- Cognitive and academic deficits
- Economic instability

Sources: (7) Unicef, 2021; (8) WMO, 2025.

SYSTEMIC IMPACTS

*The climate crisis cuts across **multiple dimensions** of social life. To address its **effects on early childhood**, we must understand this complexity.*

ECONOMY

- Global losses could reach US$ 38 trillion per year by 2050 — six times the cost of limiting global warming to 2°C[9]
- Low-income countries, particularly in tropical regions, will be among the most affected.[9] One example is Brazil, which already reports annual losses of approximately R$ 13 billion[10]
- Yet, only 2.4% of global emergency funds are allocated to early childhood[11]

HUNGER AND MALNUTRITION

- The production of staple foods has been impacted, with reductions in rice and corn harvests[12]
- One in four children worldwide lives in severe food poverty, driven by inequality, conflict, and climate changes[13]
- One in three Brazilian children aged 0 to 4 faces food insecurity[14]; Among them, 5% experience chronic malnutrition, and 18.28% are at risk of overweight[15]

EDUCATION

- In 2024, approximately 1.18 million children and adolescents in Brazil had classes suspended, mainly due to flooding[16]
- Extreme heat affects concentration and academic performance[17]; Climate events also damage school infrastructure, increasing the risk of school dropout.[18]
- 43.5% of early childhood education schools in Brazil's capital cities lack green spaces[19]

CITIES AND MIGRATION

- Between 2016 and 2021, more than 43 million children worldwide were forced to leave their homes due to climate-related disasters[20]
- Displacement and temporary migration can separate children from parents or caregivers, reducing caregiving time[20]
- In such situations, children face up to 34% higher rates of diarrheal diseases and are 2.5 times more likely to suffer from malnutrition, due to interrupted access to healthcare and adequate nutrition[21]

Sources: (9) Kotz et al., 2024; (10) World Bank Group, 2023; (11) ONU, 2023; (12) IPCC, 2022; (13) Unicef, 2024; (14) Pnad contínua, 2023; (15) Sistema de Vigilância Alimentar e Nutricional, 2024; (16) Unicef, 2025; (17) Park et al., 2020; (18) Clark et al., 2020; (19) Escola + Natureza, Instituto Alana, 2024; (20) Unicef, 2023; (21) Saha et al., 2024.

RECOMMENDATIONS FOR PUBLIC POLICY

*Protecting children's rights and promoting their holistic development require that early childhood be **prioritized in public budgets and climate policies** — with meaningful engagement of families and the implementation of intersectoral actions responsive to the **diverse realities of Brazil's young children***

HEALTH AND SOCIAL ASSISTANCE

- **Strengthen primary healthcare** with a focus on monitoring and rapid response to heatwaves and floods, preventing outbreaks of vector-borne diseases such as dengue, Zika, malaria, and diarrhea.
- **Expand access to child mental health services**, providing appropriate psychosocial support to children and their families, especially in climate-vulnerable regions.
- **Train community health workers** to guide families on caregiving during extreme heat, air pollution, and water insecurity.
- **Ensure food and nutrition security** by promoting access to healthy meals, such as through the National School Feeding Program (PNAE).

EARLY CHILDHOOD EDUCATION

- **Provide adequate climate control** in schools and daycare centers, including proper ventilation, green areas, and shaded spaces to protect children during extremely hot days.
- **Develop playful and accessible educational materials** that reflect the country's cultural diversity and help children understand climate change.
- **Train teachers and caregivers** to become multipliers of sustainable practices in the school environment.
- **Create protocols** to ensure continuity of early childhood education services (daycares and preschools) soon after climate-related disasters.

URBAN PLANNING

- **Ensure safe and green public play spaces,** with native vegetation, shaded areas, and flood-resilient infrastructure.
- **Develop policies that promote** the use of safe and sustainable building materials in affordable housing.
- **Prioritize the dignified relocation** of families with young children living in areas at imminent risk of landslides, flooding, or urban heat islands.
- **Install community systems** for rainwater harvesting, such as cisterns, in regions facing water scarcity.

01

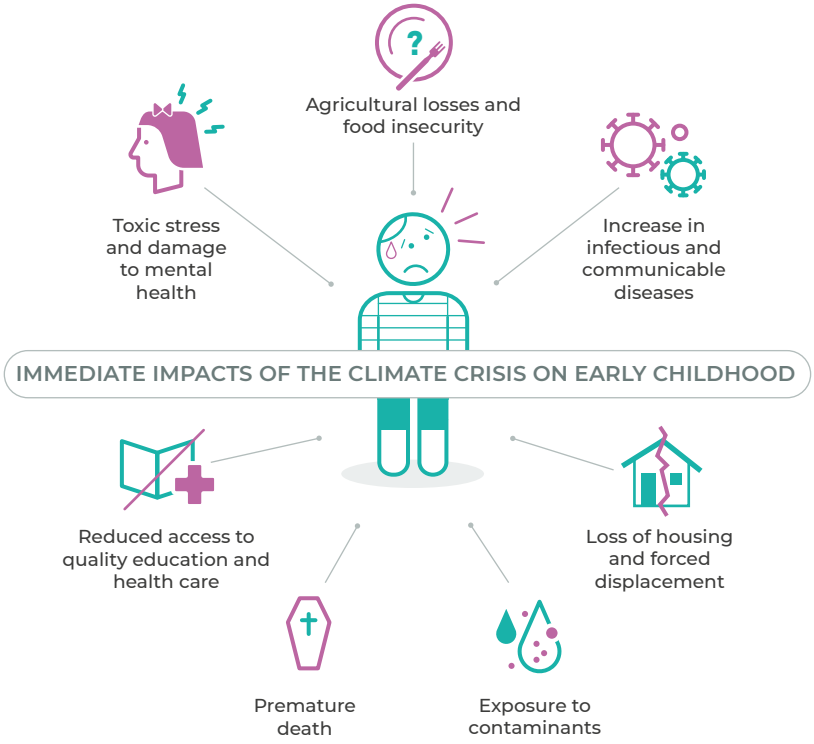
INTRODUCTION

THE CLIMATE CRISIS HAS A PROFOUND IMPACT ON EARLY CHILDHOOD. THIS PUBLICATION COMPILES EVIDENCE ON THE EFFECTS OF EXTREME EVENTS ON CHILDREN'S DEVELOPMENT AND PROVIDES GUIDANCE FOR THE FORMULATION OF PUBLIC POLICIES TO SAFEGUARD CHILDREN FROM THESE RISKS.

EARLY CHILDHOOD, THE PERIOD FROM BIRTH TO 6 YEARS OF AGE, IS A DECISIVE PHASE FOR THE PHYSICAL, COGNITIVE, AND SOCIO-EMOTIONAL DEVELOPMENT OF BABIES AND YOUNG CHILDREN. At this stage of life, boys and girls are profoundly influenced by the environment around them. Climate change can impact their health, nutrition, learning, and well-being, with effects that can last a lifetime.[1–3] These effects are even worse when compounded by social and economic factors such as poverty, environmental racism, and lack of access to essential services.[4]

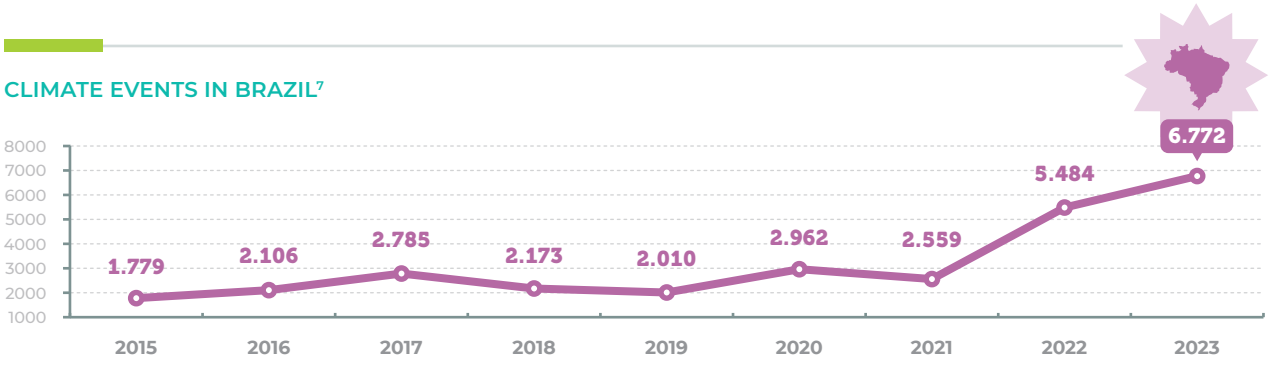
The scenario is alarming, as extreme events—such as heat waves, torrential rains, prolonged droughts, and forest fires—are becoming increasingly frequent, intense, and unpredictable, threatening areas where nearly 1 billion boys and girls live around the world.1 The excessive burning of fossil fuels is largely responsible for this worsening situation, as it intensifies the greenhouse effect, warms the planet, and alters the water cycle, contributing to the melting of the polar ice caps.

IMMEDIATE IMPACTS OF THE CLIMATE CRISIS ON EARLY CHILDHOOD[1]



In Brazil, the 0–6 age group comprises 18.1 million people, accounting for 8.9% of the population. Among low-income families, with a monthly per capita income of up to half a minimum wage, the proportion in early childhood rises to 15.9%.[4] However, climate change affects a far greater share of the population. It is estimated that 40 million Brazilian children and adolescents face at least one type of climate-related risk, with 1.1 million experiencing water scarcity.[5]

CLIMATE EVENTS IN BRAZIL[7]



Like Brazil, low and middle-income countries suffer from greater fragility in their health, education, and social protection systems. In these contexts, climate change and environmental degradation exacerbate social inequalities by disproportionately affecting already vulnerable populations.[4] Such situations increase the risks of malnutrition, infectious diseases, interrupted education, and forced displacement.[8,9]

The climate crisis intensifies vulnerabilities and affects family relationships, compromising child development.

The Sixth Report of the Intergovernmental Panel on Climate Change (IPCC), released in 2022, confirms that human activity is a significant contributor to the intensification of these phenomena.[10] Ten critical thresholds have already been exceeded, including the often irreversible loss of biodiversity.

CHILDREN BORN IN 2020 WILL EXPERIENCE MORE CLIMATE DISASTERS THAN THOSE BORN IN 1960[11]

Throughout their lives, they will face, on average:

2
times more forest fires

2.8
times more exposure to crop losses

2.6
times more droughts

2.8
times more river flooding

6.8
times more heat waves

Disorganized urban growth further exacerbates these challenges, particularly in the outskirts of large cities, where the occupation of disaster-prone areas, environmental degradation, and the lack of green spaces amplify the effects of heat waves, floods, and landslides[10].

In addition to its environmental and social consequences, the climate crisis results in substantial economic losses. A study published in *Nature* estimates that, by 2050, global income could decrease by an average of 19%, amounting to losses of US$38 trillion annually, a figure six times greater than the investment required to limit global warming to 2°C.[12]

Low-income countries, especially those in tropical regions, will be disproportionately affected. In these areas, extreme events may increase economic losses by up to 50%. In Brazil, the World Bank estimates that climate-related damages total R$13 billion annually—the equivalent of 0.1% of the country's GDP in 2022.[13]

All of this directly impacts early childhood, exposing babies and young children to unhealthy, unsafe, and unstable living conditions. The consequences go beyond physical health, affecting children's opportunities to play, interact, and grow in secure and stimulating environments. Chronic stress experienced by families facing food and economic insecurity and homelessness also undermines the quality of adult-child interactions, a critical factor in healthy development.[14]

CLIMATE GLOSSARY[15]

Global warming	An increase in the average temperature of the Earth's surface, primarily caused by the high concentration of greenhouse gases in the atmosphere.
Climate change	Long-term changes in the Earth's climate patterns, including global warming and other shifts in ecosystems, ocean behavior, and atmospheric conditions.
Climate crisis	The critical stage of climate change, characterized by the intensification of extreme events (such as droughts, floods, and wildfires), with severe socio-environmental impacts, rising sea levels, loss of biodiversity, water and food insecurity, health risks, economic disruption, displacement, and even conflict.

Meanwhile, policies and legislation intended to protect children's health and well-being remain outdated in light of the rapid pace of environmental change, exacerbating the impacts on early childhood.[16] A report by the World Meteorological Organization revealed that 2024 was the hottest year

Paris Agreement

International treaty approved by 194 countries during the 21st Conference of the Parties (COP21), in 2015. Its goal is to keep the global average temperature increase below 2 °C above pre-industrial levels, and to pursue efforts to limit that increase to 1.5 °C.

on record, with an average temperature 1.55°C above the pre-industrial baseline (1850–1900).[17] This figure surpasses the 1.5°C threshold established by the **Paris Agreement**[18] and the IPCC. Meeting this target will therefore require far-reaching transformations in the planet's economic, political, and social systems.

To achieve this, it is essential to consider the specific needs of babies and young children, with cross-sector collaboration to develop integrated solutions that strengthen primary health care, support resilient urban planning, and promote green and safe environments for child development. For these actions to be effective, they must be coordinated and supported by dedicated funding across education, housing, sanitation, food security, and social protection programs.

Accordingly, climate policies must incorporate the protection of children's rights and ensure mechanisms for families and communities to engage meaningfully in decision-making processes. A collaborative and equity-driven approach offers a viable pathway for addressing the climate emergency while safeguarding children's development.

This working paper seeks to address this reality. Its purpose is to compile national and international references on the impacts of the climate crisis on child development. In addition to presenting scientific evidence, the paper aims to organize and translate this information to make it accessible to public administrators and decision-makers. In doing so, it provides technical support for evidence-informed policy formulation and evaluation, helping to guide effective actions that protect children from the adverse effects of extreme weather events and promote a more equitable and sustainable present and future.

Any action to mitigate the climate crisis must center the specific needs of babies and young children.

02

INTERSECTIONAL EFFECTS OF CLIMATE CHANGE ON EARLY CHILDHOOD

POVERTY EXACERBATES THE IMPACTS OF EXTREME EVENTS ON THE HEALTH, NUTRITION, AND WELL-BEING OF CHILDREN, **PARTICULARLY BLACK AND INDIGENOUS CHILDREN, AS WELL AS THOSE LIVING IN BRAZIL'S NORTH AND NORTHEAST REGIONS**. ADDRESSING THESE INTERSECTING VULNERABILITIES DEMANDS URGENT ACTION FOCUSED ON ADAPTATION, PREVENTION, AND ENVIRONMENTAL JUSTICE.

Environmental racism
This occurs when the negative impacts of political, economic, or urban decisions—inadequate sanitation, pollution exposure, or heightened climate risks—disproportionately affect Black, Indigenous, and underserved populations, even in the absence of explicit discriminatory intent.

Heat stress
Condition in which the body is unable to regulate its internal temperature due to extreme heat. This can lead to dehydration, heat exhaustion, heatstroke, and even organ failure. Babies are especially vulnerable, as they rely on adults to remain adequately hydrated.

IN BRAZIL, APPROXIMATELY 8.1 MILLION CHILDREN AGED 0 TO 6 LIVE IN POVERTY OR EXTREME POVERTY, defined as a monthly per capita family income of up to R$218. Of these, 33.6% belong to single-parent households headed by Black women without secondary education.[19]

This underscores how vulnerabilities experienced by specific populations are compounded by intersecting factors such as race and ethnicity, socioeconomic status, housing conditions, and access to health care and education services. Black and Indigenous children in the North and Northeast regions are among the most affected by the climate crisis and food insecurity 5, an expression of **environmental racism**.[20]

In urban areas, unregulated growth further intensifies these challenges. Densely populated neighborhoods often have the least access to green spaces, disproportionately affecting low-income families. These families have fewer opportunities to benefit from nature's positive effects on physical and mental health and are more exposed to the consequences of the climate crisis. Inadequate housing and high population density in these areas also increase their susceptibility to urban heat islands, where temperatures can be up to 5°C higher than in tree-covered regions. This temperature increase raises the risk of dehydration, respiratory illness, and **heat stress**[2], particularly for babies.[5]

Furthermore, the absence of green areas limits opportunities for psychomotor development and meaningful contact with nature, both of which are essential elements in early childhood.[16] More inclusive and sustainable urban planning can help mitigate rising temperatures, reduce energy consumption, and strengthen community resilience.[3]

There is substantial evidence underscoring the importance of contact with nature for the holistic development of children and adolescents across cognitive, emotional, social, spiritual, and physical dimensions. Regular exposure to green spaces promotes physical activity, reduces stress, lowers the risk of allergies, enhances cognitive functioning, and strengthens environmental bonds.[24]

Evidence shows that contact with nature contributes to the holistic development of children and adolescents, promoting health, learning, and well-being.

At the same time that the benefits of nature are well-documented, a growing body of research has highlighted the risks that climate change poses to early childhood. Between 2014 and 2025, studies published globally have highlighted the direct and indirect effects of exposure to extreme weather events during pregnancy and the first years of life.

IMPACTS OF THE CLIMATE CRISIS ON HEALTH AND HUMAN DEVELOPMENT

IMPACTS ON **PREGNANCY**

- Maternal stress and depression
- Chronic diseases (diabetes, hypertension)
- Complications in childbirth
- Premature birth and low birth weight
- Maternal and neonatal mortality

IMPACTS ON **EARLY CHILDHOOD**

- Neurological, respiratory, and infectious diseases and malnutrition
- Caregiver stress leads to less attention for the child
- Fewer opportunities to play, socialize, and learn
- Difficulties in regulating body temperature
- Increased infant mortality

IMPACTS ON **ADULT LIFE**

- Chronic diseases
- Long-lasting impacts on mental health
- Social marginalization
- Cognitive and academic deficits
- Economic instability

Accelerated by human activity, these climatic transformations are unfolding more rapidly and with greater intensity than previously anticipated, producing devastating consequences. Floods, cyclones, and droughts[10,21] threaten agriculture, undermine food security, limit access to drinking water and health services, and destroy housing, schools, health care facilities, and other essential infrastructure.

The impacts of these events are both profound and interdependent. From pregnancy through the early years of life, babies, young children, and their families are exposed to risks ranging from food insecurity to deteriorating mental health.[6] The severity of these effects depends on the degree of social vulnerability, length of exposure, and the resilience capacity of the affected communities.[1]

DOMAINS OF THE NURTURING CARE AFFECTED BY CLIMATE EVENTS AND ANTHROPOGENIC FACTORS

	IMPACT OF EXPOSURE																
CLIMATE EVENTS AND EXTREME ANTHROPOGENIC FACTORS	School absenteeism	Limited access to health services	Congenital anomalies	Increased infant mortality	Increased hospital admissions	Increase in respiratory problems	Increase in infectious diseases	Increase in non-communicable diseases	Delayed child development	Low birth weight	Worsening maternal and neonatal health	Food insecurity and malnutrition	Water insecurity	Greater social vulnerability	Worsening gestational conditions	Prematurity	Stillbirths	Reduced breastfeeding duration
Cyclones		■							■		■	■						
Heavy rains and floods		■		■			■		■	■	■	■		■				■
Droughts										■		■	■			■		
Heat waves	■		■	■	■	■		■		■	■	■	■		■	■	■	■
Fires				■		■				■						■		
Air pollution			■	■	■	■		■	■						■			
DOMAINS OF THE NURTURING CARE																		
Health		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Nutrition		■							■			■		■				■
Learning opportunities	■				■	■		■	■		■			■				
Responsive caregiving									■		■			■				
Safety and security														■				

Prepared by the authors

This compromise is particularly concerning, as it further undermines the nurturing care required during early childhood. A survey of studies conducted between 2014 and 2025 reveals that extreme events affect mothers, babies, and young children in multiple ways: they increase maternal and infant mortality—which can lead to orphanhood—raise the risks of infectious diseases, malnutrition, mental health issues, and respiratory illnesses.

Studies from 2014 to 2025 show that extreme weather events impact mothers, babies, and young children, increasing maternal and child mortality, the risk of orphanhood, infectious diseases, malnutrition, respiratory and mental health problems.

Ensuring the full development and well-being of children requires actions that address structural causes, with a focus on three central pillars:

a) Immediate protection, through early warning systems that mitigate the impacts of extreme weather events.

b) Adaptation of existing resources, by strengthening services and infrastructure to make them more resilient to such events and their consequences.

c) Prevention of global warming, through investments in reducing fossil fuel emissions and expanding the use of renewable energy sources.

03

EARLY CHILDHOOD EDUCATION AND CLIMATE RESILIENCE: CHALLENGES AND RESPONSES

FOR MANY CHILDREN, **SCHOOL** IS THEIR ONLY CONNECTION TO NATURE. THERE IS AN URGENT NEED TO **ADAPT INFRASTRUCTURE AND REVISE CURRICULA** TO ENSURE THAT EDUCATION SYSTEMS ARE MORE RESILIENT AND INCLUSIVE IN THE FACE OF THE CLIMATE CRISIS.

THE RISE IN TEMPERATURES HAS ALREADY BEEN SHOWN TO IMPAIR CHILDREN'S CONCENTRATION AND COGNITIVE PERFORMANCE, CONTRIBUTING TO LEARNING DIFFICULTIES. In cases of extreme weather phenomena—such as floods or severe storms—the damage becomes even more apparent: the destruction of school buildings, the loss of teaching materials, and the prolonged interruption of activities compromise the continuity of learning and deny children their fundamental right to education. This was the case, for instance, during the 2024 floods in Rio Grande do Sul, when many schools had to be converted into temporary shelters, making regular classes impossible.[22]

As observed in that state, regions that rely heavily on agriculture and are more exposed to severe droughts, floods, and heat waves face heightened vulnerabilities. Economic instability resulting from crop losses and job insecurity, combined with rising food insecurity and precarious living conditions, directly affects educational access and continuity, particularly for young children. In many cases, the loss of household income, forced displacement, and the deterioration of essential service infrastructure make consistent school attendance in early childhood even more difficult.[23]

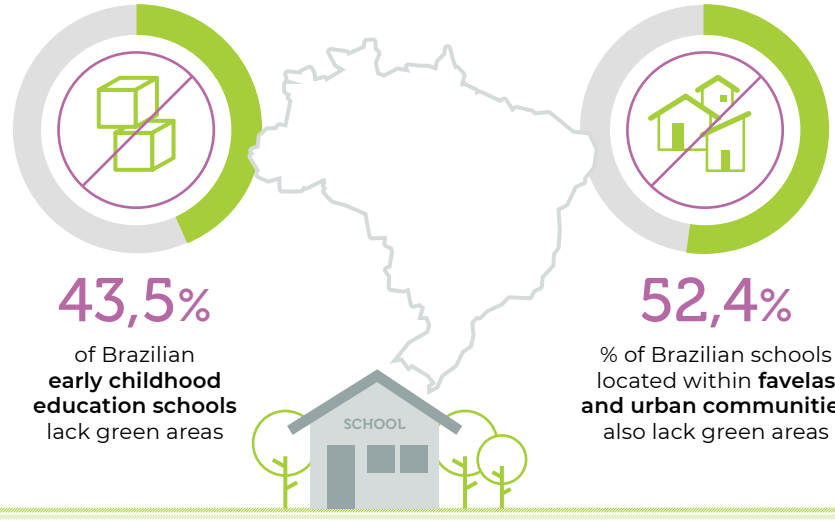
Among the most concerning effects of climate change in the field of education is involuntary migration. Relocation to new areas imposes linguistic, cultural, and social barriers, hindering children's ability to adapt to new school environments. This situation adversely affects holistic development and undermines the formation of human capital for an entire generation.[16] In many cases, forced displacement leads to the severing of

school ties, particularly for young children, for whom school also serves as a space for protection and socialization.

A study conducted by MapBiomas and the Alana Institute reveals that over one-third of schools in Brazil's capital cities lack green areas. This figure rises to 43.5% in early childhood education.[24] This situation is especially alarming given that approximately 80% of Brazilian children live in urban areas, where access to open and wooded spaces is profoundly unequal and severely limited. In schools located in favelas and urban communities, the issue is even more acute: 52.4% have no green areas at all.

For many children, school is their primary space for outdoor experiences, offering opportunities to play and learn in close contact with nature, experiences often absent from their daily routines. In this context, naturalizing school environments, promoting reforestation, and intentionally using outdoor areas in educational settings expand opportunities for engagement with nature. These experiences more closely resemble those that occur spontaneously in backyards, parks, and rural communities, contributing to children's cultural and cognitive development.

NATURE IN EDUCATION[24]



Adapting schools and educational systems to confront climate-related challenges is a key strategy for ensuring the continuity of learning during crises. This requires effective planning, from improving school infrastructure to integrating pedagogical practices and providing psychosocial support to children affected by climate migration and disasters.

One example of action in this direction is a school in Rio de Janeiro that redesigned its physical environment using sustainable measures, including the creation of green spaces and rain gardens, along with the installation of toys made from reforested wood. These changes created a healthier, climate-resilient learning environment better suited to high temperatures.[25]

Initiatives such as this demonstrate that it is possible to create safe educational environments that are better equipped to address climate change, functioning as centers of community resilience that provide both physical and emotional protection during times of crisis, while continuing to fulfill their essential role in child development.[9] International cooperation also plays a vital role in this process by financing the development of climate-resilient infrastructure.

Another important strategy to foster more environmentally conscious generations is the revision of early childhood education curricula to include content on climate change, adapted to the cognitive development of young children.

Lastly, the establishment of a national intersectoral pact that brings together the fields of education, the environment, and urban planning is essential to ensure that current and future generations are equipped to confront the challenges posed by climate change without compromising their right to education. Coordinated and integrated actions can transform schools into spaces that are prepared for environmental adversities, while simultaneously promoting awareness and fostering the development of environmentally responsible citizens.

04

FOOD SECURITY AND SOCIAL PROTECTION IN TIMES OF CRISIS

THE PHYSICAL AND PSYCHOLOGICAL WELL-BEING OF CHILDREN IS ENDANGERED DURING **EXTREME WEATHER EVENTS. INTEGRATED MEASURES**, INCLUDING THE PROVISION OF SHELTER, PROMOTION OF SMALLHOLDER FARMING, IMPROVEMENTS IN SANITATION, AND FOOD EDUCATION, ARE EFFECTIVE STRATEGIES FOR MITIGATING THESE RISKS.

ACCORDING TO THE REPORT "DISASTER RISK FINANCING FOR CHILDREN", CHILDREN LIVING IN INFORMAL URBAN SETTLEMENTS AND COASTAL ZONES ARE DISPROPORTIONATELY AFFECTED BY CLIMATE-RELATED DISASTERS, facing heightened risks of violence, family separation, and exploitation.[26] The report underscores that, in the absence of dedicated funding mechanisms for child protection in emergencies, disaster response efforts frequently overlook children's needs, thereby increasing their vulnerability during the post-disaster period.

Research indicates that extreme weather events heighten the risks of physical, psychological, and sexual violence, particularly in temporary shelters lacking adequate protection infrastructure. In regions burdened by environmental stress, poverty, and the presence of organized crime, the risk of sexual exploitation of girls is further intensified. A study on the 2007 floods in Bangladesh also documented an increase in parental violence associated with the stress and economic hardship experienced by caregivers.[27]

The climate emergency also represents one of the most severe contemporary threats to food and nutrition security, with especially acute consequences for early childhood.[1] During this stage of life, malnutrition can lead to irreversible harm to holistic development, affecting physical, cognitive, and emotional health. UNICEF warns that malnourished children are more likely to experience permanent metabolic changes, chronic health conditions in adulthood, learning difficulties, poor academic performance, and social exclusion.[6]

According to Brazil's National Household Survey (PNAD), 37.4% of Brazilian children aged 0 to 4—one in three—live in a situation of food insecurity, the highest rate among all age groups. This finding underscores the heightened vulnerability of early childhood to the risk of hunger. In total, 5.4 million children under the age of 4 experience some degree of food insecurity, a condition that is being exacerbated by the impacts of climate change.[29]

Socio-environmental disasters reduce agricultural production, drive up food prices, and increase hunger, while the degradation of ecosystems and the scarcity of natural resources further undermine the resilience of affected communities.

The situation is particularly severe for low-income families, who frequently allocate a significant portion of their income to food. Projections suggest that a 1°C increase in the global average temperature could result in a 6% decrease in wheat production, a 3.2% decrease in rice production, and a 7.4% decrease in corn production.[10] In Brazil's Northeast, recurrent droughts have already caused losses totaling R$347.4 billion between 2013 and 2023, disproportionately impacting smallholder farmers.[7]

Paradoxically, the climate crisis is driving increases in both malnutrition and childhood obesity. As the cost of quality food rises, lower-income families are forced to rely more heavily on ultra-processed products.

The intersection of obesity, malnutrition, and climate change—three overlapping conditions that share social determinants and mutually reinforce one another—is referred to as the global syndemic.

In Brazil, data from the 'Sistema de Vigilância Alimentar e Nutricional' ('Brazil's Food and Nutrition Surveillance System' – Sisvan) show that the syndemic is also affecting children under the age of 4:[29]

- **5%** experience chronic malnutrition
- **7.97%** are overweight for their age
- **18.28%** are at risk of being overweight
- **5.90%** are affected by obesity (linked to excess body fat accumulation)

The convergence of poverty, social exclusion, and climate vulnerability underscores the urgent need for integrated public policies. However, less than 2.4% of global funds designated for climate emergencies are specifically allocated to child protection[30], thereby perpetuating cycles of vulnerability. The World Health Organization estimates that, in the absence of urgent interventions, climate change could result in an additional 24 million children suffering from chronic malnutrition by 2030.[31]

Investments in disaster early warning systems tailored to children's needs, as well as in community-based protection networks, have the potential to reduce the psychosocial impacts of disasters by up to 60%.[26]

RESPONSES TO FOOD INSECURITY IN THE FACE OF CLIMATE CHANGE

STRENGTHENING RESILIENT SMALLHOLDER FARMING

- Investment in agroecological techniques
- Efficient irrigation systems
- Adapted seed banks
- Agricultural climate insurance

SOCIAL PROTECTION PROGRAMS

- Expansion of income transfer programs
- School meals with local products
- Nutritional supplementation for pregnant women and children

WATER AND SANITATION INFRASTRUCTURE

- Sewage treatment plants in elevated areas
- Drainage networks with greater flow capacity
- Rainwater collection and storage systems
- Protection of wells from contamination
- Contingency plans and emergency maintenance

FOOD AND NUTRITION EDUCATION

- Promoting healthy eating habits
- Valuing traditional and regional foods
- Combating food waste

Some initiatives are already demonstrating promising results in addressing climate change. In Brazil's semi-arid region, plate cisterns—a type of reservoir used to capture and store rainwater—have benefited more than 1.3 million families, even during prolonged droughts.[32] The use of cisterns has also been associated with increased birth weight.[5] In Bangladesh, the implementation of an early warning system for floods has reduced agricultural losses in vulnerable communities by 60%.[33]

Another noteworthy initiative in Brazil is the *'Programa Nacional de Alimentação Escolar'* ('National School Meals Program' – PNAE), which allocates at least 30% of its resources to direct purchases from smallholder farmers, benefiting more than 40 million students across the country. Additionally, the 3rd National Food and Nutrition Security Plan, approved in February 2025, seeks to address national challenges in the fight against hunger by integrating federal government actions through intersectoral strategies to guarantee the human right to adequate food.[34]

Despite progress, significant challenges persist in Brazil, including:

- Insufficient funding allocated to child-sensitive projects[26]
- Fragmented policies, with limited integration between climate adaptation and social protection measures
- Regional disparities that create additional barriers for rural, Indigenous, and Quilombola populations in accessing public policies

To overcome these challenges, it is essential to:

- Expand investments in food and nutrition security
- Strengthen intersectoral governance
- Prioritize the most vulnerable populations in climate policies
- Promote community participation in the planning and implementation of solutions.

Promoting well-being in early childhood requires that food security be adopted as a guiding principle of climate policy. The time has come for urgent, transformative action that recognizes adequate food as both a fundamental human right and a foundational pillar for building more just and sustainable societies.

05

ASSISTING CHILDREN IN THE OVERALL SITUATION OF FORCED DISPLACEMENT

THE LOSS OF SHELTER CAUSED BY CLIMATE CHANGE LEADS TO THE DISPLACEMENT OF FAMILIES. THIS PROCESS RESULTS IN DISRUPTIONS TO HEALTH CARE AND EDUCATION ACCESS, AS WELL AS PSYCHOLOGICAL TRAUMA, CONSEQUENCES THAT CAN BE **MITIGATED THROUGH RESILIENT INFRASTRUCTURE, PSYCHOSOCIAL SUPPORT, AND INTEGRATED PUBLIC POLICIES.**

CLIMATE CHANGE IS RESHAPING GLOBAL PATTERNS OF HUMAN DISPLACEMENT, creating a paradigm of vulnerability that disproportionately affects children. The phenomenon of climate refugees represents one of the most pressing humanitarian crises of our time.

Globally, UNICEF has identified that in 44 countries, climate-related disasters have led to the internal displacement of 43.1 million children—the equivalent of approximately 20,000 children a day being forced to leave their homes in search of safety.[6] Projections from the World Bank estimate that by 2050, roughly 216 million people could be displaced due to unsustainable environmental conditions.[35] Children are expected to comprise around 40% of this total.[30]

In Brazil, this reality is already alarmingly evident. Between 2013 and 2023, more than 4 million people were displaced by extreme weather events, with 925,000 left homeless and 2,667 deaths attributed to environmental disasters.[7] In Rio Grande do Sul alone, the 2024 floods displaced 580,000 people.[36]

Children in situations of forced migration are exposed to interconnected risks. In terms of physical health, the disruption of basic health care services, interrupted vaccination schedules, and precarious sanitation conditions at displacement sites contribute to alarming rates of morbidity and mortality. In internally displaced persons (IDP) camps—temporary shelters for people forced to flee their homes—the incidence of diarrheal diseases is 34% higher than the national average, and cases of acute malnutrition occur up to 2.5 times more frequently.[3]

By 2050, around **216 MILLION PEOPLE** could be forced to migrate for environmental reasons. Of this total, approximately **40% will be children**, the group most vulnerable to the impacts of the climate crisis

The mental health and psychosocial effects are equally profound and long-lasting. Research shows that migrant children frequently exhibit symptoms of anxiety, depression, and post-traumatic stress.[30] Without appropriate treatment, these conditions can cause lasting alterations in the developing architecture of the brain, with far-reaching consequences for cognitive and emotional functioning.[14] The traumatic experience of forced displacement—marked by the sudden loss of home, family separation, and exposure to violence—inflicts invisible wounds that require specialized and continuous care.[31]

To protect these children and their families, it is essential to invest in the construction of safe housing adapted to local contexts and resilient to extreme weather events. The adoption of sustainable building technologies, such as rainwater harvesting systems and the use of renewable energy sources, contributes to an improved quality of life and a reduction in socio-environmental vulnerability.[2] The transition to clean energy sources, such as solar and wind power, not only mitigates environmental impacts but also promotes healthier and safer environments for children, fostering long-term sustainability and energy security.

In the legal domain, although progress has been made, existing instruments for the protection of children in migratory contexts remain insufficient in light of the complexity of the climate crisis. At the international level, documents such as the UN Guiding Principles on Internal Displacement[38] and the Global Compact for Safe Migration[39] provide important guidelines—guarantees of comprehensive protection, access to education, health care, and psychosocial support, as well as the prevention of abuse and exploitation—but lack effective implementation mechanisms.[21] In Brazil, the Child and Adolescent Statute (Law 8069/1990)[40] and the Migration Act (Law 13445/2017)[41] offer relevant legal frameworks, but their application in climate-related emergencies remains uneven and fragmented across different regions of the country.[6]

06

FAMILIES AND CHILDCARE: SHARED RESPONSIBILITIES

CLIMATE CHANGE INCREASES THE **LIKELIHOOD THAT CAREGIVERS WILL HAVE LESS TIME TO SPEND WITH THEIR CHILDREN**. COMMUNITY SUPPORT NETWORKS, INTEGRATED WITH PUBLIC POLICIES SUCH AS THE **FAMILY HEALTH STRATEGY**, ARE ESSENTIAL TO PROMOTING RESILIENCE, EQUITY, AND SUSTAINABILITY AMONG THESE POPULATIONS.

ENVIRONMENTAL CHANGES ARE PROFOUNDLY RESHAPING THE FAMILY AND COMMUNITY ENVIRONMENTS IN WHICH YOUNG CHILDREN GROW AND DEVELOP, generating new challenges for parenting and caregiving. These impacts begin as early as the prenatal period, influencing development from the earliest stages of life.

In farming families, for example, the need to spend long hours fetching water or cultivating land under increasingly adverse conditions significantly reduces the time available for direct childcare.[30] In addition, the occasional migration of one or both parents in search of employment—a common adaptation strategy in response to the effects of climate change—weakens traditional family caregiving arrangements.

In light of this complex scenario, family and community adaptation strategies are emerging that warrant recognition and support. In various regions of the country, the spontaneous formation of collective care networks can be observed, in which families organize to share childcare responsibilities during periods of crisis.[30] Resilient community gardens, home-based rainwater harvesting systems, and cooling techniques that make use of natural environments are examples of local solutions that, when adequately supported, enhance families' adaptive capacities.

Across different parts of the world, communities are already implementing effective, context-specific solutions. Initiatives such as tree planting have helped to mitigate flooding, improve air quality, and consequently strengthen children's immune systems and mental health.[3] These actions demonstrate the feasibility of integrating nature-based solutions with child-sensitive public policies.

Within the realm of public policy, there is an urgent need to promote measures that address the specific needs of early childhood in the context of the climate crisis. Progress in the field of children's health and well-being must be aligned with the principles of ecological sustainability and equity, ensuring the protection of all babies and young children, with particular emphasis on those living in the most vulnerable conditions.[16]

Integrated public policies are essential to protect children and strengthen resilience in the face of climate change.

The *'Estratégia Saúde da Família'* ('Family Health Strategy' – ESF)—a primary health care model based on the work of multi-professional teams within defined territories—can incorporate protocols aimed at climate-related risks, such as guidelines for managing extreme heat, preventing dehydration, controlling waterborne diseases, monitoring respiratory symptoms, providing mental health support after extreme events, and conducting home visits to strengthen community resilience.

The development of integrated public policies that encompass areas such as health, education, infrastructure, and social assistance is crucial to ensuring a safe and resilient environment for children. These policies must respect regional and cultural specificities, ensuring equitable care for the most vulnerable populations. Essential services, including universal health care, food security, decent housing, and access to clean energy, are vital to safeguarding children's well-being.

Coordination among governments, civil society, and policymakers can reinforce joint efforts aimed not only at mitigating the impacts of the climate crisis but also at fostering more inclusive, healthy, and resilient societies.

CLIMATE ADAPTATION: INTERNATIONAL EXAMPLES[42-45]

INITIATIVE/ LOCATION	ACTIONS TAKEN	RESULTS
 **Plan against extreme heat** India and South Asia	Cool roofs with reflective paint were installed, green areas and health services were expanded, early warning systems were implemented, drinking water was distributed, and educational campaigns were conducted.	Extreme heat adaptation has led to a **reduction of more than 1,190 deaths per year.**
 **Reduced vulnerability to disasters** Dominica	Hydro-meteorological and seismic networks, water tanks, forest nurseries, green infrastructure, and road improvements were developed, along with technical training in climate risk.	Climate risk measures **directly benefited 11,000 people**, storing over 1 million liters of water and enhancing resilience to extreme events.
 **Lingang Sponge City** China	Green infrastructure, including tree-lined sidewalks, wetlands, green roofs, permeable pavements, artificial ponds, and rain gardens, was designed to retain and reuse water.	Green infrastructure initiatives have reduced urban flooding and **increased drainage capacity** in densely populated areas.
 **Nutrition and community resilience programs** Niger (Maradi, Zinder, Tillaberi, Tahoua)	Efforts focused on food security and preventing maternal and child malnutrition, with targeted support for pregnant women, breastfeeding mothers, and children under age 2.	Nutrition-focused programs have **improved maternal and child health and food security**, while also reducing mortality in vulnerable regions.

07

ENVIRONMENTAL DISASTERS AND EARLY CHILDHOOD: THE CASE OF RIO GRANDE DO SUL

MORE THAN 470 CITIES WERE AFFECTED BY THE FLOODS THAT OCCURRED IN THE STATE IN 2024, WITH DIRECT CONSEQUENCES FOR THOUSANDS OF CHILDREN. REVISITING THIS EXPERIENCE CAN INFORM THE **DEVELOPMENT OF EMERGENCY ACTION PLANS** THAT ENSURE CONTINUOUS CARE FROM THE EARLIEST YEARS OF LIFE.

BETWEEN APRIL AND MAY 2024, THE STATE OF RIO GRANDE DO SUL FACED ONE OF THE MOST SEVERE CLIMATE-RELATED DISASTERS IN ITS HISTORY. Intense and prolonged rainfall triggered flooding in more than 470 cities, heavily impacting metropolitan areas such as Porto Alegre, as well as cities in the Taquari Valley, Serra Gaúcha, the central region, and the northern coast.

Overflowing rivers, sustained floodwaters, and landslides rendered thousands of people homeless or in severe need, prompting extensive emergency response efforts. As a result, more than 3,930 children aged 0 to 5 were placed in public shelters across the state between May and June.[36]

The emergency response posed numerous challenges to child protection. Guardianship councils reported cases of children being separated from their caregivers during rescues, complicating both identification and family reunification. In many instances, children were received at different locations from their guardians and were unable to identify themselves accurately.

Cities such as Canoas and Porto Alegre implemented specific procedures for referring unaccompanied children to institutional care. To date, no official data has been released on the number of children who were orphaned, a factor with potentially long-term developmental consequences.[36]

In response to the crisis, various technical materials were developed and disseminated to support early childhood care in emergency contexts. Notable examples include the booklet '*Promoção do desenvolvimento integral na primeira infância – Organização de espaços seguros no contexto de desastres*

climáticos' ("Promoting Integral Development in Early Childhood – Organizing safe spaces in the context of climate disasters")[46] and informational bulletins for the *'Primeira Infância Melhor'* ('Better Early Childhood' – PIM) and *'Criança Feliz'* (Happy Childhood) programs, coordinated by the *'Sistema Único de Assistência Social'* ('Brazilian Social Assistance System' – SUAS). Concise and accessible guides also addressed topics such as emotional health, infant nutrition, vaccination, accident prevention, post-flood illnesses, water and food safety, and the protection of children's images.

The 2024 floods in Rio Grande do Sul disrupted more than 55,000 class hours in basic education, demonstrating how extreme weather events undermine the right to education and exacerbate childhood inequalities.

Despite the gravity of the situation, official records of violence against children aged 0 to 5 between May and July 2024 showed a decrease compared to previous years. According to the *'Sistema de Informação de Agravos de Notificação'* ('Notifiable Diseases Information System' – Sinan), 468 cases were recorded in 2024, compared to 544 in 2023 and 554 in 2022. However, this decline likely does not indicate a real reduction in incidents, but rather reflects probable underreporting due to the reduced capacity of local surveillance and child protection networks during the disaster.

The floods also had a profound impact on education. It is estimated that 55,749 class hours were lost in basic education across the state. Material damage was extensive. According to the Federal Government, losses in basic education are estimated at approximately R$2.36 billion, including R$2.1 billion in damage to public and private school infrastructure, and R$263 million related to the loss of furniture, equipment, and teaching materials.

The situation in Rio Grande do Sul highlights the urgent need for intersectoral emergency planning that engages governments, international organizations, and local communities in implementing short, medium, and long-term actions.

This includes both the capacity to respond promptly to extreme events—ensuring comprehensive protection for children—and the reinforcement of preventive and resilient public policies aimed at promoting child well-being in crisis contexts.

08

DEVELOPING CHILD-CENTERED CLIMATE POLICIES

PROTECTING EARLY CHILDHOOD IN THE FACE OF THE CLIMATE CRISIS REQUIRES INTEGRATED PUBLIC POLICIES THAT ARE RESPONSIVE TO THE NEEDS OF CHILDREN AND THEIR FAMILIES. WITHOUT COORDINATED ACTION, BRAZILIAN BOYS AND GIRLS WILL CONTINUE TO FACE RISKS THAT COMPROMISE THEIR DEVELOPMENT.

ENSURING A HEALTHY, SAFE, AND EQUITABLE START IN LIFE IS NOT ONLY AN ETHICAL IMPERATIVE, BUT ALSO A FUNDAMENTAL CONDITION FOR BUILDING MORE RESILIENT AND SUSTAINABLE SOCIETIES. In light of the escalating crises driven by the climate emergency, public policies must adopt a tailored approach to the specificities of early childhood. Coordinated action among governments, civil society, and international organizations is essential to secure a safe and healthy environment for all children and their families.[47]

Although Brazil has made significant strides in developing environmental and social protection policies, the effectiveness of these initiatives remains hindered by territorial disparities, limited resources, and a lack of cross-sectoral integration. Instruments such as the *'Política Nacional sobre Mudança do Clima'* ('National Policy on Climate Change' – Law 12187/2009)[48], the 'Plano Nacional de Adaptação' ('National Adaptation Plan' – PNA, 2016)[49] and, more recently, Law 14904/2024[50], which outlines guidelines for sub-national adaptation plans, represent significant milestones. However, their full implementation requires robust intergovernmental coordination, sustained funding, and meaningful social participation.

Incorporating the climate agenda into policies for children requires targeted actions to ensure the continuity of essential services, even in emergencies. These include:

- Expanding primary health care coverage, with emphasis on prevention, nutrition, and immunization
- Ensuring safe educational infrastructure adapted to extreme weather events

- Increasing access to decent housing and basic sanitation
- Promoting local food security strategies in vulnerable communities

Such measures must be coordinated through an intersectoral lens, overcoming fragmentation among government bodies. To effectively address children's needs, these actions should be guided by the Nurturing Care Framework developed by the World Health Organization, the World Bank, and the United Nations Children's Fund (UNICEF).[51] This framework focuses on five domains: good health, adequate nutrition, safety and security, early learning, and responsive caregiving.

RECOMMENDATIONS ALIGNED WITH THE NURTURING CARE MODEL

GOOD HEALTH

- Strengthen primary care with an emphasis on surveillance and rapid response to heat waves and floods, aiming to prevent outbreaks of vector-borne diseases such as dengue, Zika, malaria, and diarrhea.
- Expand and modernize drainage and sanitation infrastructure by adapting sewage and stormwater systems to withstand heavy rainfall and reduce the risks of flooding and contamination.
- Install community rainwater harvesting—such as cisterns—and purification systemsin areas facing water scarcity, and ensure access to potable water in the event of supply disruptions caused by disasters.

ADEQUATE NUTRITION

- Promote public policies grounded in agroecology and smallholder farming, integrating these with income transfer programs such as *Bolsa Família*—a social welfare program of the Government of Brazil.
- Encourage the development of urban, community, and school gardens supported by low-cost, sustainable irrigation systems.
- Encouraging food and nutrition security through initiatives to promote access to healthy meals, such as the *'Programa Nacional de Alimentação Escolar'* ('National School Meals Program' – PNAE).

SECURITY AND SAFETY

- Establish safe, clean, and structured childcare spaces in displacement contexts, ensuring privacy, ventilation, hygiene, and age-appropriate environments.
- Expand child mental health service coverage, providing appropriate psychosocial support for children and their families, particularly in areas prone to climate-related disasters.
- Prioritize the dignified resettlement of families with young children living in high-risk areas, including those vulnerable to landslides, floods, or extreme heat.

RECOMMENDATIONS ALIGNED WITH THE COMPREHENSIVE CARE MODEL *(CONTINUATION)*

EARLY LEARNING

- Implement cooling zones in preschools and kindergartens, equipped with proper ventilation, shaded areas, and greenery, to provide protection during heat waves and reduce ambient temperatures.
- Train teachers and caregivers to serve as facilitators of sustainable practices within the school environment.
- Develop protocols to ensure the continuity of services in nurseries and preschools following climate-related disasters.

RESPONSIVE CAREGIVING

- Train community health workers to advise families on caregiving practices during extreme heat, air pollution, and water scarcity.
- Promote qualified listening and encourage child participation in disaster preparedness and prevention initiatives in ways that are respectful and developmentally appropriate.
- Provide welcoming spaces that support the emotional well-being of mothers, fathers, and caregivers, with a focus on preserving family bonds during periods of displacement.

At the same time, it is essential to recognize the transformative potential of environmental education from the first few years of life. Incorporating themes related to sustainability and climate risk awareness into early childhood education curricula can foster environmental consciousness from an early age. Schools and community centers must be recognized as strategic spaces for promoting adaptation and resilience practices, engaging families and caregivers in the co-creation of local solutions. Active school outreach and dropout prevention efforts should likewise be considered critical strategies for mitigating inequalities in contexts of environmental crisis.

Schools and community centers are key spaces for promoting adaptation and resilience with the participation of families.

Another crucial aspect is the proper allocation of resources. A World Health Organization commission, in collaboration with UNICEF and *The Lancet*, estimates that an investment of US$195 per capita would be sufficient to close the gaps in early childhood services.[16] Protective measures that ensure food security, safe housing, access to drinking water, and basic sanitation are also fundamental to addressing the impacts of climate change.[2] Rectifying these disparities demands evidence-based policy decisions aligned with international commitments to climate justice and intergenerational equity.

A World Health Organization commission with UNICEF and The Lancet estimates that an investment of US$195 per capita would be enough to fill the gaps in early childhood services.

Public administrators must prioritize investments in social policies that ensure integrated and continuous access to health, education, nutrition, and social protection services for children in vulnerable circumstances. It is equally urgent to strengthen the *'Sistema de Garantia de Direitos da Criança e do Adolescente'* ('Child and Adolescent Rights Guarantee System' – SGDCA) with a climate-responsive lens, advancing food security, comprehensive development, and social inclusion.

Public administrators must prioritize investments in social policies that ensure that vulnerable children have access to health, education, nutrition, and social protection in an integrated and continuous manner.

Ultimately, it is crucial to establish robust systems for the continuous monitoring and evaluation of public policies, allowing for real-time adjustments and promoting transparency in public administration. These strategies must be flexible, evidence-based, and responsive to the dynamic nature of the climate crisis. Only through such commitment will it be possible to ensure that no child is left behind in the face of the climate emergency—and that the future is built with justice, equity, and sustainability from the earliest years of life.

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