GOVERNO DA GUINÉ-BISSAU

MINISTÉRIO DO AMBIENTE E BIODIVERSIDADE

unicef

A CLIMATE LANDSCAPE ANALYSIS FOR CHILDREN IN GUINEA-BISSAU

November 2024

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

Etona Ekole, Representative
Luula Mariano, Deputy Representative
Jacques Mabea, Deputy Representative Operations
Wesley Galt, Chief of Education
Sonia Polonio, Child Protection Manager
Aminta Medina, WASH Specialist
Bessa Vitor Da Silva, PM&E Specialist
Renato Pinto, Chief Health and Nutrition
Wilson Miguel Da Gama, Communication Officer
Delfim Mendes, Communication Officer
Fadel Gomes Da Silva, Communication Associate
Deborah Herbert, Social and Behaviour Change Specialist
Dr. Umaro Ba, Health Specialist
Iama Sanha, Nutrition Officer
Mamadu Balde, Social Policy Specialist
Iracema Miguel, Administrative Associate, Operations Section

UNICEF West and Central Africa Regional Office
David Knaute, Climate Specialist

Government
Mauricio Correia de Matos, General Director of Water and Sanitation, Ministry of Natural Resources
Eng. João Lona Tchedna, General Director of Environment, Ministry of Environment
Malan Djaura, President of Civil Protection

Youth Climate Advocates
Anissa J da S. L. Correia, RCJJ, Bissau
Jose Jorge Curaro, CNJ, Bissau
Adriano Lopes, CNJ, Bissau
Saraia Rosangela Molé, RENAJELF, Bissau
Umero Petna, NSRT, Bissau
Florenca Na Nalche, NSRT, Bissau
Lucumane Bacon Sonco, NSRT, Bissau

Children
Nado, Bijagos Islands
Maisa, Bissorã, Oio
Mariama, Aissatu, Ducher, Mariama and Emerson, Biombo
Isaque, Debora, Adamaua, Alai Balde and Etiandro, Bissau

Community members
Bico Sedja Muscate, Bubaque
Luis Henrique, Bubaque
Adelino J Nunes, Bubaque
Eduardo Muscate, Bubaque
Ivone Oliveira Sanca, Bubaque Women's Association
Maria Ramos Gomes, Bubaque Women's Association
Jorge Pedro Mouro, Bruce
António Júnior, Bruce

Other partners
Edinilson Augusto Da Silva, Programme Manager Officer, UNHABITAT
Raquel Guidolin, communication Officer, UNHABITAT
Ana Paula Debastiani, Sustainable Urban Development Analyst, UNHABITAT
Geniveva Edneusa Mendes Correia Tavares, Designer and Construction Manager, UNHABITAT
Nelvina Barreto, Head of Sustainable Development Cluster, UNDP
Dr Aissa Said Morais Regalla de Barros, Institute of Biodiversity and Protected Areas (IBAP)
Alexandre Cabral, environmental impact assessment Consultant, WFP
Mário Reis, Assistant representative programme, FAO Guinea Bissau
Nicolau Mendes, Executive Director, Palmeirinha
Lamine Soncó, Executive Director, ASIC
Mussa Sanhá, President, ASPAAB (Bafata & Gabu)
Gentil da Silva, Executive Secretary, ORDEMAR-Biombo
Sidi Mohamed Jaquite, President, NADEL, Quinara and Tombali
Adriano Jose Nunes, President,Konhneguena
Daniel Vieira, Executive Secretary, Red Cross GB (CVGB)

KEY DEFINITIONS

Adaptation	The process of adjusting infrastructure, systems, services and behaviours to become more resilient to climate hazards and seasonal variabilities.
Air pollution	The contamination of air due to the presence of substances in the atmosphere that are harmful to the health of humans and other living. Includes greenhouse gases and particulate matter.
Child vulnerability	Childrens' vulnerability to climate change and other environmental degradation as a result of poverty indicators, including a lack of access to safe housing, WASH, healthcare, adequate nutrition and education.
Climate change	Climate change refers to long-term, average shifts in temperatures and weather patterns. These shifts may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (such as coal, oil, and natural gas).
Climate hazard	A climate-related event or trend that may cause loss of life, injury, or other health impacts, including drought, flooding, cyclones, thunderstorms and temperature extremes.
Climate resilience	This refers to infrastructure, systems, services and behaviours that can survive, adapt, and function in the face of climate-related hazards and seasonal variabilities.
Desertification	Land degradation is the process of turning fertile land into less or non-productive land, which is often driven by unsustainable human activities, in combination with land and climatic constraints.
Drought	A drought is broadly defined as drier than normal conditions; that is, moisture deficit relative to the average water availability at a given location and season.
Ecosystem	A functional unit consisting of living organisms, their nonliving environment and the interactions within and between them.
Microplastics	Fragments of any type of plastic less than 5 mm in length.
Mitigation	Efforts to reduce or prevent the emission of greenhouse gases, for example by incorporating renewable technologies into infrastructure, systems and services.
National Adaptation Plan (NAP)	This plan helps identify country-specific climate adaptation needs and develops and implements strategies to address them, to protect the most vulnerable communities from the impact of climate change.
Nationally Determined Contributions (NDCs)	This is a country-specific climate action plan to cut greenhouse gases emissions and adapt to climatic impacts. Each party to the Paris Agreement is required to establish an NDC and update it every five years.
Particulate matter	Solid particles or liquid droplets found in the air. They are often hazardous to human health.
Renewable energy	Any form of energy from solar, geophysical, or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use (e.g. solar and wind energy).
Water scarcity	Water scarcity is the lack of fresh water resources to meet the standard water demand. There are two types of water scarcity: physical water scarcity and economic water scarcity.

ACRONYMS

AIMS	Atlantic, Indian Ocean, Mediterranean and South China Sea (one of the three SIDS regions)
ARIs	Acute Respiratory Infections
CLAC	Climate Landscape Analysis for Children
CCRI	Children's Climate Risk Index
CO_2	Carbon dioxide
FAO	Food and Agricultural Organisation
GCF	Green Climate Fund
GHG	Greenhouse Gas
IBAP	Instituto da Biodiversidade e das Áreas Protegidas
NAP	National Adaptation Plan
NDCs	Nationally Determined Contributions
PM2.5	Particulate Matter 2.5 micrometres
SIDS	Small Island Developing State
SYAH	SIDS Youth AIMS Hub
UNICEF	United Nations Children's Fund
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organisation

Fig.1 A summary of the climate and environment-related impacts facing Guinea-Bissau's children.

Table.1 Summary of observed and projected changes in climate in Guinea-Bissau, including their impact on children

Climate impacts	Current situation	Projected changes	Most affected regions	Potential impacts for children	The most affected children
1. Extreme heat 	Temperatures today are around 1.5°C higher than they were in the 1950s. 540,000 children in Guinea-Bissau (54% of the under-18 population) currently experience sustained exposure to extreme high temperatures.	By 2080, average annual temperatures are expected to increase by an additional 2.0°C to 3.8°C, compared to the 1950s.	All regions will be affected, but especially Gabu and Bafata, and Oio.	• Heatstroke and dehydration • Increased incidence of pre-eclampsia in pregnant women • Increased risk of low birth weights in infants • Increased risk of chronic and acute malnutrition in under-5 children • Increased risk of food and water-borne diseases. • Increased risk of vector-borne disease, including Malaria and Dengue Fever. • Reduced concentration and learning at school. • Increased risk of violence and abuse • Anxiety and other mental health disorders.	• Children living in extreme poverty, including those without access to water and electricity • Children under-5, particularly infants • Children with disabilities and other medical conditions • Orphans and other vulnerable children (including migrant children, street children and those engaged in child labour).
2.Drought and water scarcity 	Over the past century, dry spell length and precipitation intensity have both increased, with the climate becoming slightly dryer overall. Guinea-Bissau has experienced a series of recurring droughts since the 1970s, including in 2002, 2006 and 2012. Water scarcity is an ongoing challenge in	Rainfall patterns will become more extreme and unpredictable - and the country will become hotter and dryer overall.	All regions will be affected, but especially Gabu and Bafata. Oio and Tombali are also highly vulnerable due to extremely poor WASH access and poor water quality The Bijagos islands and coastal regions are also vulnerable due to the salinisation of water sources.	• Increased risk of malnutrition due to food insecurity and loss of livelihoods. • Increased risk of vector-borne disease, including Malaria, Dengue Fever and Leishmaniases. • Increased concentration of toxins, bacteria and other contaminants in water, increasing risk of water-borne disease • Increased risk of dehydration • Increased risk of displacement, urban migration and exploitation. • Women and children are required to walk further to collect water, putting them at risk of violence and abuse, and taking time away from school and other activities.	• Children living in extreme poverty, including from families without access to water • Children from remote rural communities that rely on rain-fed agriculture • Children under-5, particularly infants • Children with disabilities and other medical conditions • Orphans and other vulnerable children (including migrant children, street children and those engaged in child labour).

	many regions, due to the lack of safe water access.				
3. Flooding, storms and sea-level rise 	The intensity and frequency of heavy rainfall and storms have increased significantly, leading to increased flooding in coastal, delta and riverine areas. Sea levels have risen at a rate of 8.79 mm/year over the last 15 years, exceeding the global rate of 3.1mm/year. Two-thirds of the country's land area, and approximately half of the child population (470,000 children) live in areas with coastal flood risk.	Flooding and storms will likely become more intense and frequent. Sea levels are predicted to rise even more rapidly in the coming years, rising by a further 250-375 mm by 2050, and by 600-700mm by 2100.	• Coastal regions (Cacheu, Biombo, Oio, Quinara and Tombali) • The Bijagos Islands • The Cacheu, Geba and Corubal river basins (particularly Gabu, Bafata, Oio and Cacheu regions). • Urban areas, including Bissau, particularly informal settlements.	• Injury and death. • Salinisation of water sources, leading to, safe water shortages for consumption and agriculture, displacement and health issues such as high blood pressure • Destruction of homes, infrastructure and essential services for children. • Displacement and urban migration. • Financial hardship and stress for families. • Increased exposure to chemicals, pathogens and other toxins, which contaminate soil and water sources. • Increased risk of water and vector-borne disease.	• Children living in extreme poverty, including those without access to safe housing • Children living close to rivers and the ocean • Children under-5, particularly infants • Children with disabilities and other medical conditions • Orphans and other vulnerable children (including migrant children, street children and those engaged in child labour).

FOREWORD

The climate crisis is a child rights crisis. Guinea Bissau is experiencing extreme temperatures, rising sea levels, more flooding, and the gradual disappearance of our coastal lands. At the same time pollution and deforestation are increasing, placing children and young people at great risk. It is impacting our health, education, and access to vital resources. It is also undermining our cultural heritage and identity, which is inextricably linked to our environment.

Despite our rich biodiversity, natural resources, and vibrant culture, Guinea-Bissau remains one of the world's least developed countries, ranking at the bottom of the 2024 Human Development Index. The majority of Guinea-Bissau's children live in poverty, a hardship exacerbated by climate change and environmental degradation. It is the children of today and the generations to come who will bear the brunt of this escalating crisis.

The Climate Landscape Analysis for Children (CLAC) sheds light on the direct impacts of climate change on our communities, with invaluable insights from youth across Guinea-Bissau. Young people are profoundly concerned about the future but cannot solve this problem on their own. We need strong collaboration and support from the government and international organisations such as UNICEF.

We, the young people of Guinea-Bissau, are calling on our government, civil society, the private sector and international organisations to listen to our voices and the evidence provided in this report.

More specifically, we are calling on the Government and partners to:

1. Ensure access to safe drinking Water, Sanitation and Hygiene (WASH) facilities across the country, prioritising those with the worst WASH access. Improving the resilience of these facilities is critical in protecting children's health and well-being in the face of climate change.

2. Establish and strengthen waste management and recycling systems for all households, institutions and businesses across the country. All communities must have access to appropriate waste collection bins, including separation, treatment and waste recycling. Once collected, they must be treated appropriately respecting waste management standards, so as not to pollute the environment, which could affect children's lives.

3. Increase green skills training and employment opportunities for young people. Primary, secondary, technical schools and universities must provide adequate training in green skills for children and young people. At the same time, the Government, UNICEF and partners must work on advocacy to mobilise the necessary financing, in collaboration with the private sector, to finance youth initiatives that aim to reduce the impacts of climate change in the lives of young people and create employment opportunities.

4. Implement environmental education in the school curriculum at national level. Environmental education must be included in the school curriculum, making it more fun and practical, to ensure that children and young people have a stronger emotional connection to the environment and understand what needs to be done to tackle climate change. This additionally means supporting the activities of formal and informal environmental education with youth organisations working in the field of environment.

5. Enforce a plastic bag ban and limit other forms of packaging. This includes the application of fees and fines for violations, including illegal littering and dumping, to control and conserve Guinea Bissau's environment.

6. Ensure that young people are included in all national climate negotiations and decisions, regional and international. The Government must establish a core group of young climate ambassadors to support national and international advocacy efforts. These young people must support internal environmental advocacy efforts, including policy and strategy development, negotiations with the Ministry of Environment, Biodiversity and Climate Action, partners and international bodies.

We hope you will listen to our voices and the evidence presented at CLAC and that together, you can act swiftly and decisively to address the climate crisis, protect our environment, and secure a brighter future for every child in Guinea-Bissau.

Yours sincerely

Anissa J da S. L. Correia, RCJJ, Bissau
Jose Jorge Curaro, CNJ, Bissau
Adriano Lopes, CNJ, Bissau
Saraia Rosangela Molé, RENAJELF, Bissau
Umaro Petna, NSRT, Bissau
Florenca Na Nalche, NSRT, Bissau
Lucumane Bacon Sonco, NSRT, Bissau

1. EXECUTIVE SUMMARY

Climate change is impacting the children of Guinea-Bissau's right to a clean, healthy and sustainable environment. Each year, the growing number of extreme weather events puts more children's lives at risk. When floods rage, schools, homes and hospitals are destroyed. When droughts hit, families lose their livelihoods and child poverty increases. Additionally, other forms of environmental degradation, including air and water pollution, forest loss and desertification also threaten the country's children. It is Guinea-Bissau's poorest, most vulnerable children that will be the most affected by these impacts.

Unless urgent and decisive action is taken, the impacts of climate change will continue to intensify. Current projections point to a hotter climate across all of Guinea-Bissau, particularly across the country's northern and eastern regions of Oio, Bafata and Gabu. At the same time, the country is expected to experience an increased intensity of rainfall events and coastal storms, placing those children living in coastal, island and riverine communities at high risk.

Climate change is an imminent threat to children in Guinea-Bissau, not only because of the projected frequency of extreme weather events but also because of the country's low human development index and fragility. According to UNICEF 2021 Children's Climate Risk Index (CCRI), which analyses countries' exposure to climate and environmental hazards, shocks and stresses; and child vulnerability, Guinea-Bissau holds a score of 8.4, ranking 4th out of the 163 countries covered in the Index. Children in Guinea-Bissau are considered at "extremely high" risk to the impacts of climate change, given their physical and psychosocial vulnerability, and disruption to services essential for their development.

The Climate Landscape Analysis for Children (CLAC) compiles all the available data and research on the impacts of climate change and environmental degradation on children in Guinea-Bissau. It provides a snapshot of who the country's most vulnerable children are - and where they live, and outlines specific measures to protect them.

The report has been developed in consultation and collaboration with the Government and other partners. Most importantly, the CLAC has been developed in collaboration with children and young people, including their experiences and recommendations for future action. It is hoped that the CLAC will provide the evidence required to help UNICEF and their partners create a safer, healthier environment for Guinea-Bissau's children.

1.1 Key findings

- **Climate change and other environmental hazards are among the greatest threats facing Guinea-Bissau's children, both now and in the future.** Water scarcity, drought, flooding and sea-level rise are all becoming more common as a result of climate change. Additionally, air pollution, water pollution, deforestation and a lack of sustainable solid waste management, all threaten Guinea-Bissau's children's right to a safe and healthy environment. **Unless tackled, they are set to undermine all aspects of children's rights.**

- **It is the poorest children living in the most hazard-prone regions who are most vulnerable to climate change and other environmental impacts.** All of Guinea-Bissau's regions face multiple overlapping climate hazards, in addition to having extremely high levels of child vulnerability. **This means the country's children face an extremely high overall risk.**

- **Around 540,000 children in Guinea-Bissau (or 55% of the under-18 population) are currently exposed to extreme high temperatures (exceeding 35°C).** These rising temperatures are expected to lead to the tripling of heat-related mortality by 2080 - with many of the victims likely to be children.

- **Flooding currently threatens almost half of Guinea-Bissau's children; 47 percent, or 470,000 children live in areas with high coastal flood risk.** In addition, around 70,000 children in Guinea-Bissau are at high risk of riverine flooding.

- **Guinea-Bissau's primary food sources, rice and fish, in addition to cash crops, such as cashew nuts, are highly vulnerable to the impact of climate change.** This has major implications for food security, poverty and child nutrition. There are additionally emerging concerns around the loss of livelihoods, poverty and child protection issues such as early marriage, violence and child labour.

- **In Guinea-Bissau, seasonal variations exist in rates of food insecurity and under-5 malnutrition - both of which peak during the dry season (August to October).** Malnutrition rates are the highest in the hotter, dryer northern and eastern regions of Gabu, Oio and Bafata. As water scarcity increases and seasons continue to change, both food insecurity and malnutrition are set to increase.

- **Guinea-Bissau's heavy rainfall and flooding are important risk factors for post-neonatal infant and child mortality in Guinea-Bissau - the majority of which is caused by vector-borne disease.** Post-neonatal infant and child mortality during the rainy season was found to be the most pronounced in children aged 1-4, particularly among girls.

- **Climate change is set to alter the country's epidemiological landscape, favouring the proliferation of certain pathogens in warmer climates (e.g E.coli, malaria etc) while hindering others (e.g. rotavirus).** Understanding this dynamic relationship, and its differential impact on different groups of children, is crucial for anticipating and mitigating the evolving risks posed by infectious diseases in a rapidly warming world.

- **The country's northern and eastern regions, which are the most affected by drought and extreme heat, face some of the greatest livelihood risks. They also have the worst child protection indicators (including child labour, early marriage and extreme violence towards children).** Emerging evidence from other countries has established a strong link between child protection issues and climate change - particularly drought and extreme heat.

- **Guinea-Bissau's hottest and most drought-prone regions (Gabu and Bafata) also have the worst access to WASH in schools.** This is leading to the spread of infectious disease and undermining school attendance of both teachers and students.

- **According to the most recent satellite data, children across Guinea-Bissau are exposed to unsafe levels of air pollution from multiple sources.** Many of these air pollutants exceed the levels that are considered safe for children's health and wellbeing.

- **Air pollution (mostly in the form of PM2.5), is estimated to be responsible for more than 12% of deaths in the country - among the highest in Africa.** It is linked to

a higher incidence of cancers, asthma, neurological disorders and lower respiratory infections in children. PM2.5 is particularly high in Guinea-Bissau's northern regions due to the sandy soils and proximity to the Sahel.

- **More than 26% of the country's territory is protected by eight coastal, marine, and terrestrial parks.**[1] Despite this, the country continues to experience the loss of biodiversity at an alarming rate. The root cause of this biodiversity loss is poverty and the ensuing lack of economic alternatives for the poorest households.[2]

- **A lack of solid waste management is posing an additional threat to children, with pollutants, including microplastics and heavy metals, leaching into soil and water.**

    - **Microplastics are also an emerging concern for children, particularly in urban and coastal areas.** They have been linked to numerous neurological and behavioural issues, in addition to childhood cancer.

    - **Research from the Bijagós islands has found cockles and oysters contain unsafe levels of heavy metals, including cadmium, and more than half of the country's children and youth are exposed to lead pollution.** These heavy metals have been linked to multiple mental, physical and neurological disorders, including childhood cancers, low birth weights and reduced cognitive function.

- **Guinea-Bissau's young people care deeply about the state of the environment and want their Government to do more to protect it**. Their voices and needs are however, still not included across the policy, strategy and programmes that affect their futures. Additionally, Guinea Bissau has not yet received any significant child-responsive climate funding from the major climate donors.

©UNICEF/GuineaBissau/Knaute/2024

[1] Guinea-Bissau Nation (2024) Biodiversity in Guinea Bissau https://www.bioguinea.org/Guinea-Bissauin-guinea-bissau/

[2] IFRC (2023) Guinea Bissau 2023 IFRC network country plan https://reliefweb.int/report/guinea-bissau/guinea-bissau-2023-ifrc-network-country-plan-maagw002

2. INTRODUCTION

Located on the far west coast of Africa, Guinea-Bissau is home to around 2.1 million people, with around 42% being under the age of 15.[3] The country is home to a large variety of ethnic groups, languages, and religions. It is also considered to be one of the poorest countries in the world, ranking 179th on the 2024 Human Development Index.[4] The country borders Senegal to the north and Guinea to the south and comprises 8 regions (Fig.1).

Fig.1 Regional map of Guinea-Bissau

The majority of the country is located in the tropical savanna climatic zone. As such, the climate of Guinea-Bissau is hot and humid on the coastal central and southern territory and drier in the rest of the territory. In addition, Guinea-Bissau's Bijagós archipelago, on the Atlantic Ocean coast, is composed of 88 islands, leading to its classification as a Small Island and Developing State (SIDS), part of Atlantic, Indian Ocean, Mediterranean and South China Sea (AIMS) SIDS region.[5]

Women and child sit on their boat in the Djobel islands
©UNICEF/GuineaBissau/Mendes/2024

Globally, SIDS suffer higher levels of loss and damage than non-SIDS across all income groups. They experience five times more climate change-attributable deaths due to extreme weather, and on average 0.8% of SIDS' collective gross domestic product is lost every year due to climate disasters.

According to UNICEF's Children's Climate Risk Index, the children of Guinea-Bissau are simultaneously "at high risk of both climate and environmental-related shocks" whilst also having an "extremely high vulnerability" to these hazards."[6] Many children in Guinea-Bissau live in regions that experience multiple, overlapping climate and environmental hazards, which include flooding, sea-level rise, air and water pollution.

In addition, around 65% of Guinea-Bissau's population live below the international poverty line.[7] Children from these families experience overlapping deprivations, including a lack of access to healthcare, education, nutritious food and Water, Sanitation and Hygiene (WASH) services. As such, Guinea-

[3] World Bank (2022) Population ages 0-14 (% of total population) - Guinea-Bissau https://data.worldbank.org/indicator/SP.POPGuinea-Bissauocations=GW

[4] UNDP (2024) Human Development Report 2023-2024 https://hdr.undp.org/system/files/documents/global-report-dGuinea-Bissau23-24reporten.pdf

[5] World Bank (2024) Guinea Bissau Overview https://www.worldbank.org/en/country/guineabissau/overview

[6] Guinea-BissauChildren's Climate Risk Index: Guinea Bissau https://experience.arcgis.com/experience/0d9d2209bf104584a65e012b03b6d3f8/#data_s=id%3AdataSource_2-17b3a7be4c5-layer-1_427%3A152

[7] UNDP (2021) Guinea Bissau Country Profile https://hdr.undp.org/sites/default/files/Country-Profiles/MPI/GNB.pdf

Bissau has a CCRI score of 8.4, ranking 4th in the world - and placing the country's children at extremely high risk from the impacts of climate change.[8]

The Climate Landscape Analysis for Children (CLAC) aims to compile all the available evidence on the climate-related shocks and stresses affecting Guinea-Bissau's children, and outline priority measures to protect them, as the country's climate continues to change. This analysis has been developed in collaboration with government partners, UN agencies and civil society organisations from across the country. Most importantly, it incorporates the voices and perspectives of Guinea-Bissau's children and youth, including a clear Call to Action (see *Foreword*). This asks the Government and development partners to do more to protect Guinea-Bissau's children from the impacts of climate change.

"Mangroves, plants and seafood are a critical part of our Guinea Bissau's cultural heritage. A loss of these natural resources represent a loss of culture for our coastal and island communities."

AISSA SAID MORAIS REGALLA DE BARROS,
MINISTRY OF ENVIRONMENT AND BIODIVERSITY

Moving forward, it is hoped that the CLAC and its Call to Action, will serve as a catalyst for urgent and decisive action by the government and other stakeholders to reduce greenhouse gas emissions and better protect the country from the impacts of climate change and environmental degradation, for the sake of its children.

Children from School For Blind Children in Bissau and School for the Deaf in Biombo, discuss their greatest concerns for the environment ©UNICEF/Guinea-Bissau/2024/Gama

[8] UNICEF (2023) Analysis of the CCRI for Least Developed Countries https://www.unicef.org/media/135686/file/Analysis%20of%20the%20CCRI%20for%20Least%20Developed%20%20Countries.pdf

3. CLIMATE AND ENVIRONMENT HAZARDS IN GUINEA-BISSAU AND THEIR IMPACT ON CHILDREN

3.1 An overview

Guinea-Bissau's climate is hot and tropical, year-round, with a dry season from November to May, and a rainy season from June to October. Average annual temperatures currently stand around 30°C.[9] However, during the dry season, temperatures can often exceed 40°C, particularly in the far eastern regions of Gabú and Bafatá, exposing children to the impacts of extreme heat.

Precipitation varies between Guinea-Bissau's coastal and inland areas. The country's coast and islands have more of a tropical maritime climate, receiving some 60 to 120 inches (1,500 to 3,000 mm / year) of precipitation, compared to the interior, which tends to be both hotter and dryer.[10] **These variations are becoming more unpredictable and extreme as a result of climate change, exposing greater numbers of children to the impacts of coastal flooding, river flooding and water scarcity.**

A summary of these observed and projected changes can be found in Table.1. Map.1 highlights the most important climate-related hazards facing the country's children by region.

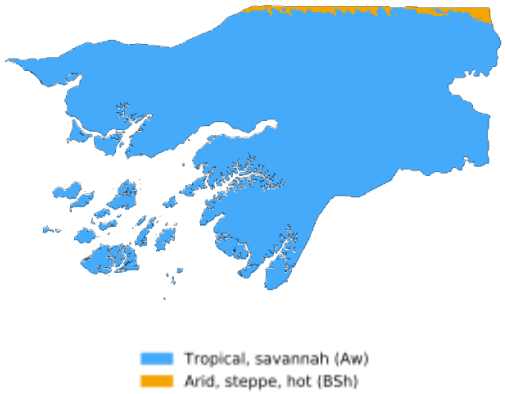


Fig.2 Koppen Geiger climate zones in Guinea-Bissau[11]

This includes extreme heat, water scarcity and drought, flooding and sea-level rise.

In Guinea-Bissau under-5 mortality rates (74.3 per 1,000 live births) remains high. **Many of the leading causes of child mortality, including malaria, diarrhoea, premature birth and Acute Respiratory Infections (ARIs) are all closely related to climate and the environment.**

Climate change and environmental degradation impact all aspects of children's health and wellbeing through multiple pathways, all of which exacerbate child poverty. At the same time, child poverty also makes children more vulnerable to climate change and environmental degradation.

"Climate change has a disproportionate impact on women and girls as we spend more time outside in the environment, collecting water and firewood, and we're often more exposed to waste and pollution. "

SARAIA ROSANGELA MOLLÉ, YOUTH CLIMATE ADVOCATE

[9] World Bank (2024) Guinea Bissau Climatology https://climateknowledgeportal.worldbank.org/country/guinea-bissau/climate-data-historGuinGuinGuinGuinea-Bissau

10

[11] Beck et al (2018) Present and future Köppen-Geiger climate classification maps at 1-km resolution". Nature Scientific Data. https://doi.org/10.1038/sdata.2018.214

Around 65% of Guinea-Bissau's population currently live below the international poverty line.[12] Children living in these families are among the country's most vulnerable. Poverty means that these children have the worst access to water, sanitation, healthcare, nutritious foods and education, and live in the poorest housing. This makes them even more exposed to environmental extremes - and less able to protect themselves from their impacts (Box 1 and Table.1). **Children, particularly those living in poverty and those without parental support, are highly vulnerable to the trauma and mental health disorders caused by environmental shocks and stresses** *(Box.1)*.[13]

marriage. All of these indicators increase children's vulnerability to the impacts of climate change and environmental degradation vulnerability faced by children living in each region of the country.

The sections below provide a more detailed analysis of each of these key climate and environment-related hazards - and the impacts they have, and will continue to have, on the country's children. Evidence from Guinea-Bissau has been referenced, wherever available. Where it is not yet available, regional and global studies have been used as evidence.

Box.1 Which children are the most vulnerable to climate change in Guinea Bissau

Across Guinea Bissau, children are vulnerable to the impacts of climate change and environmental degradation. However, it is the following groups of children that face the highest levels of vulnerability:

Children from the poorest families, facing multiple deprivations (including lack of access to WASH, education, healthcare, basic nutrition, safe housing and electricity).

Children under-5, particularly infants

Children with pre-existing medical conditions (including HIV/AIDs)

Orphans and other children not in the care of their biological parents

Ostracised "Irá"(Iran) children, including twins, children with mental and physical disabilities and children who are born albino.

Children living in remote rural communities, dependent on rain-fed agriculture.

Map.1 and 2 have then been combined to create an Overall Children's Climate Risk Map for Guinea-Bissau (*Map.3*). This map shows the combined climate exposure risk and The analysis also includes key child protection vulnerabilities, such as child labour and child

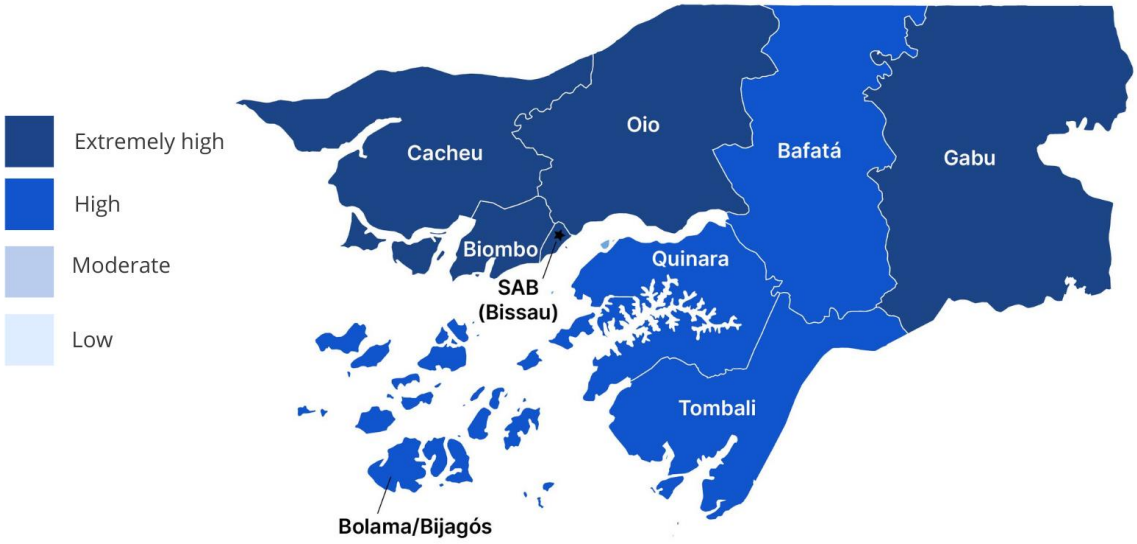
Map.2 provides a snapshot of the key vulnerabilities children face, by region, including a lack of access to water and sanitation, nutritious food, healthcare, education, social protection and safe housing

[12] UNDP (2021) Guinea Bissau Country Profile https://hdr.undp.org/sites/default/files/Country-Profiles/MPI/GNB.pdf

[13] Hodgkinson et al (2017) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5192088/

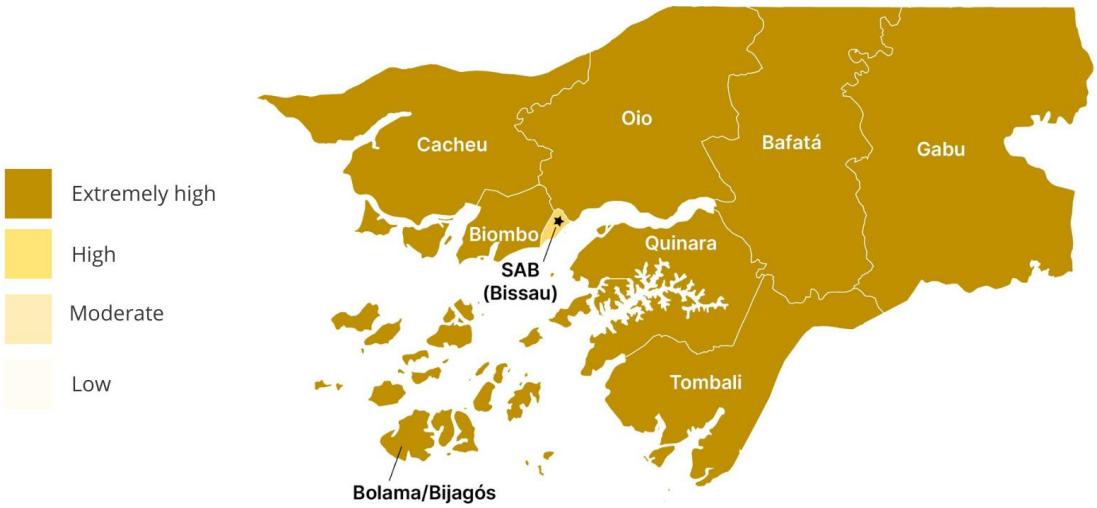
Map.1 Children's exposure to climate hazards

The map below provides a snapshot of the most important climate-related hazards facing Guinea-Bissau's children; **flooding, extreme heat and water scarcity.** These hazards have then been combined to create the total hazard exposure score for each region. The regions with the highest score have the greatest exposure to overlapping climate hazards.



Map.2 Children's vulnerability to climate hazards

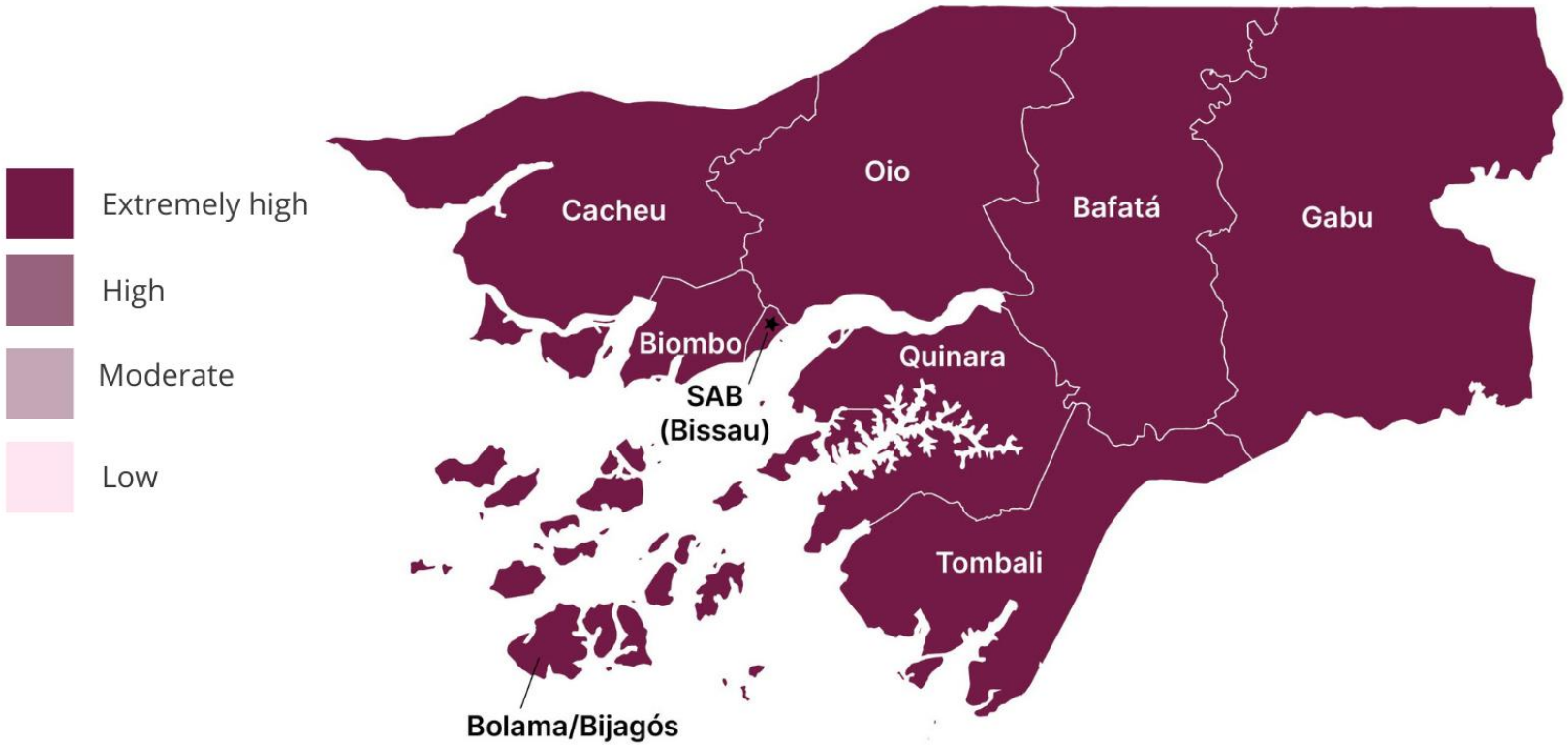
The map below provides a snapshot of the most important climate-related vulnerabilities for children in Guinea-Bissau. These include **key multidimensional child poverty indicators; including lack of access to Water, Sanitation and Hygiene (WASH), Health, Food Security and Nutrition Education and Child Protection services**. **They also include access to safe housing, population density and other factors which increase children's vulnerability.** All these vulnerabilities have then been combined to create the total vulnerability score for each region



Map.3 Overall Child Climate Risk

In Guinea-Bissau, the children facing the greatest climate change risks are the ones who are most exposed to climate hazards (Map.1) and are highly vulnerable due to multidimensional child poverty (Map.2). **An overall Children's Climate Risk Score has been developed by combining the Climate Hazard (Map.1) and Child Vulnerability scores (Map.2) for each region.**

The result is that all regions of Guinea-Bissau face an extremely high level of climate risk for children.



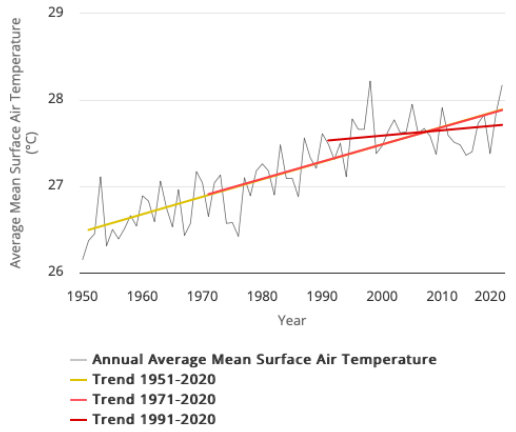
3.2 Climate-related hazards

3.2.1 Extreme heat

a. Observed trends and future projections

Temperatures in Guinea-Bissau have been steadily rising over the past 75 years. Average temperatures are around 1.5°C higher than they were in the 1950s *(Fig.3)*.[14] As such, many regions, particularly in the north and east, now experience temperatures exceeding 35°C - temperatures which are life threatening, particularly for infants.[15] The high humidity in coastal and island communities also exacerbate these temperature extremes.

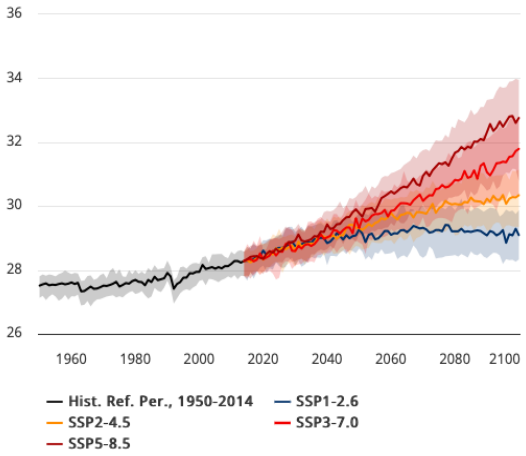
Fig.3 Observed average annual air temperatures in Guinea-Bissau (1951-2020)[16]



By 2080, average annual temperatures in Guinea-Bissau are expected to increase by an additional 2.0°C to 3.8°C, compared to the 1950s *(Fig.4)*.[17] The extent to which this temperature increases will be based on efforts to mitigate greenhouse gas emissions in the coming years.

These temperature extremes will be felt the most in the country's interior and far northern and eastern regions.[18]

Fig.4 Projected average mean temperature increases for Guinea-Bissau (2020-2100)[19]



b. The impacts of extreme heat on children

Around 540,000 children in Guinea-Bissau (55% of the under-18 population) are currently exposed to extreme high temperatures (exceeding 35°C), where, on average, 83.54 or more days a year exceed 35°.[20] These rising temperatures are expected to lead to the tripling of heat-related mortality by 2080 - with many of the victims likely to be children.[21] Children are particularly susceptible to extreme heat for multiple reasons.

[14] World Bank (2024) Climatology: Guinea Bissau https://climateknowledgeportal.worldbank.org/country/guinea-bissau/trends-variability-historGuinGuinGuinGuinea-Bissau

[15]

[16] World Bank (2024) Climatology: Guinea Bissau https://climateknowledgeportal.worldbank.org/country/guinea-bissau/trends-variability-histoGuGuGuGuinea-Bissau

[17] World Bank (2024) Mean Projections,: Guinea Bissau https://climateknowledgeportal.worldbank.org/country/guinea-bissau/climate-data-projections

[18] Ibid.

[19] Ibid.

[20] UNICEF (2022) The coldest year of the rest of their lives https://www.unicef.org/media/129506/file/UNICEF-coldest-year-heatwaves-and-children-EN.pdf

[21] UNICEF (2022) The coldest year of the rest of their lives https://www.unicef.org/media/129506/file/UNICEF-coldest-year-heatwaves-and-children-EN.pdf

Firstly, children are less able to regulate body temperature than adults - and are more prone to heat stroke and dehydration.[22] Heatstroke is considered to be the most severe form of heat-related illness for children, particularly infants. Heat stroke can lead to multi-organ failure, including the central nervous system, kidneys and liver. It is currently unknown how children suffer from heatstroke in Guinea-Bissau each year, due to the lack of data.

Research has also shown that the risk of stillbirth is also much higher among mothers who experience extreme high temperatures during the week before giving birth.[23] In Guinea-Bissau, stillbirths account for 7 out of every 1,000 births.[24]

The risk of premature birth has been found to be 15% higher for mothers who experienced extreme heat.[25] Premature birth is a leading cause of neonatal mortality in Guinea-Bissau, accounting for 38% of neonatal deaths.

©UNICEF/GuineaBissau

Data from 19 African countries, including neighbouring Guinea and Senegal, shows the risk of both pre-eclampsia in pregnant women and low birth weights in infants is also linked with extreme heat, likely resulting from the mothers' heat stress during the prenatal period.[2627] Around 21% of children born in Guinea-Bissau are currently born with a low birth weight - an extremely high number.[28] More research is needed to investigate the link between extreme heat and neonatal mortality in Guinea-Bissau.

Additionally, extreme heat has a significant impact on both the quality and quantity of food available to children in Guinea-Bissau, thereby affecting their nutritional status. Around 28% of children are considered to be stunted (short for their age) and just 8% are considered to have a sufficiently diverse and nutritious diet.[29] A study of more than 32,000 children ages 3-36 months across West Africa found that extreme heat exposure (over 35°C) increased the prevalence of stunted growth from chronic malnutrition by 12%, and acute

22

23 Cushing L, Morello-Frosch R, Hubbard A. Extreme heat and its association with social disparities in the risk of spontaneous preterm birth. Paediatr Perinat Epidemiol. 2022 Jan;36(1):13-22. doi: 10.1111/ppe.12834. PMID:GuGuGuGuinea-Bissau

24 ICEF (2023) Countdown to 2030: Guinea Bissau Country Profile https://data.unicef.org/countdown-2030/country/Guinea-Bissau/1/

25 McElroy S, Ilango S, Dimitrova A, Gershunov A, Benmarhnia T. Extreme heat, preterm birth, and stillbirth: A global analysis across 14 lower-middle income countries. Environ Int. 2022 Jan;158:106902. doi: 10.1016/j.envint.2021.106902. Epub 2021 Oct 6. PMID: 34627013

26 Grace K, Davenport F, Hanson H, Funk C, Shukla S. (2015). Linking climate change and health outcomes: examining the relationship between temperature, precipitation and birth weight in Africa. Global Environ Change 35:125–137 https://epc2014.eaps.nl/papers/141109

27 Shashar et al (2020) Temperature and preeclampsia: Epidemiological evidence that perturbation in maternal heat homeostasis affects pregnancy outcome https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0232877

28 UNICEGuinea-Bissautdown to 2030 Country Profile: Guinea Bissau https://data.unicef.org/countdown-2030/Guinea-Bissaua-Bissau/2/

29 UNICEGuinea-Bissautdown to 2030 Country Profile: Guinea Bissau https://data.unicef.org/countdown-2030/country/Guinea-Bissau/2/

malnutrition by 29%.[30] Additionally, the researchers estimate that if the average global temperature rises 2°C, which scientists warn is likely without significant reductions in carbon emissions, the average effect of heat exposure on stunting would nearly double.

As temperatures continue to rise across Guinea-Bissau, so too will children's exposure to food-borne disease. Food spoils more rapidly in warmer temperatures and bacteria such as E.coli, campylobacter and salmonella flourish under these conditions.[31] The 65% of households living without electricity access in Guinea-Bissau are particularly vulnerable to these food-borne diseases, due to the lack of refrigeration facilities (*3.3.3 A lack of energy access*).[32]

Additionally, cattle and other livestock become stressed at higher temperatures, shedding larger amounts of enteric pathogens (e.g. Salmonella and E.coli). This has been found to affect the pathogen prevalence among crops, water and produce, increasing rates of disease and mortality amongst children.[33] This, in addition to the death of livestock, due to water scarcity and climate-related disease, also increases children's risk of malnutrition.[34]

Rising temperatures can also cause water-borne pathogens to bloom, including E.coli and giardiasis.[35][36][37] The exposure to this risk will be greatest for the 34% of households in Guinea-Bissau that rely on unimproved WASH facilities.[38] Similarly, warmer temperatures have been found to increase the transmission of soil-transmitted helminths (e.g. hookworm and ancylostomiasis) in Africa.[39] All of these parasites are a direct threat to children's health and nutrition.

Fall Armyworm and other pests are increasing in Guinea-Bissau as a result of climate change ©FAO 2024

Increasing temperatures have also been linked to an increased absorption of heavy metals by crops and livestock, making them less safe for human consumption.[40][41] Increased climate-stress may also lead to additional fertiliser and pesticide use to maintain yields. Children's small bodies leave

[30] Sylvia Blom, Ariel Ortiz-Bobea, John Hoddinott, Heat exposure and child nutrition: Evidence from West Africa, Journal of Environmental Economics and Management, Volume 115, 2022, 102698, ISSN 0095-0696, https://doi.org/10.1016/j.jeem.2022.102698

[31] Van Elsas et al (2011) Survival of E.Coli in the environment https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3105702/

[32] World Bank (2021) Access to electricity (% of population) - World, Guinea-Bissauhttps://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=1W-GW

[33] Kempf F, La Ragione R, Chirullo B, Schouler C, Velge P. Super Shedding in Enteric Pathogens: A Review. Microorganisms. 2022 Oct 22;10(11):2101. doi: 10.3390/microorganisms10112101. PMID: 36363692; PMCID: PMC9692634

[34]) Effects of climate change in Guinea Bissau https://rflgd.org/2024/01/28/effects-of-climate-change-in-guinea-bissau/#:~:text=Droughts%20are%20one%20of%20the,inGuinea-Bissau1983%20and%202012.

[35] Philipsborn R, Ahmed SM, Brosi BJ, Levy K. Climatic Drivers of Diarrheagenic Escherichia coli Incidence: A Systematic Review and Meta-analysis. J Infect Dis. 2016 Jul 1;214(1):6-15. doi: 10.1093/infdis/jiw081. Epub 2016 Feb 29. PMID: 26931446; PMCID: PMC4907410

[36] Britton E, Hales S, Venugopal K, Baker MG. The impact of climate variability and change on cryptosporidiosis and giardiasis rates in New Zealand. J Water Health. 2010 Sep;8(3):561-71. doi: 10.2166/wh.2010.049. Epub 2010 Mar 9. PMID: 20375485

[37] Azage M, Kumie A, Worku A, C Bagtzoglou A, Anagnostou E. Effect of climatic variability on childhood diarrhoea and its high risk periods in northwestern parts of Ethiopia. PLoS One. 2017 Oct 26;12(10):e0186933. doi: 10.1371/journal.pone.0186933. PMID: 29073259; PMCID: PMC5658103

[38] UNICEGuinea-Bissautdown to 2030 Country Profile: Guinea Bissau https://data.unicef.org/countdown-2030/country/Guinea-Bissau/2/

[39] Blum AJ, Hotez PJ. Global "worming": Climate change and its projected general impact on human helminth infections. PLoS Negl Trop Dis. 2018 Jul 19;12(7):e0006370. doi: 10.1371/journal.pntd.0006370. PMID: 30024871; PMCID: PMC6053132

[40] Alam, Md. (2020). Impacts of heavy metal feed contaminants in cattle farming https://www.researchgate.net/publication/341787485_Impacts_of_heavy_metal_feed_contaminants_in_cattle_farming

[41] Yasmine A. Farhat, Soo-Hyung Kim, Angelia L. Seyfferth, Long Zhang, Rebecca B. Neumann, Altered arsenic availability, uptake, and allocation in rice under elevated temperature, Science of The Total Environment, 10.1016/j.scitotenv.2020.143049, 763, (143049), (2021)

them particularly vulnerable to these toxins, with major health repercussions.[42][43]

Each year, pests in Guinea-Bissau cause millions of dollars of damage, destroying crops and livelihoods.[44][45] Studies have linked these pest infestations to rising temperatures. For example, Fall Armyworm, a pest that destroys crops such as rice and maize in Guinea-Bissau, reproduces much more quickly, as temperatures warm.[46]

In Bafata, a mother instals a mosquito net over her bed ©UNDP Guinea-Bissau 2019

Fruit flies and locusts increase in prevalence as temperatures rise, all of which are important food and income crops in Guinea-Bissau.[47] The incidence of pó-fidalgo, a parasitic plant, is also a growing concern across the islands, Quinara, Tombali and Cacheu.[48] All of this has major implications for rural livelihoods, food security and child nutrition.[49]

Across West Africa, warmer temperatures, resulting from climate change, have been linked to an increased risk of vector-borne disease including malaria and dengue fever.[50]

"Increasing temperatures are discouraging children from attending school and leaves them unable to concentrate in class."

UMARO PETNA,
YOUTH CLIMATE ADVOCATE

In Guinea-Bissau, mosquitos are responsible for transmitting malaria, dengue fever, Rift Valley Fever and the West Nile Virus. Infection rates increase significantly as warmer temperatures increase bite rates and increase transmission rates.[51][52] Malaria already accounts for more than 10% of deaths among children between the ages of 1-14 in Guinea-Bissau (*Annex 6.1 Neonatal, Child and*

[42] Sanobar Iqbal, Mujahid Farid, Muhammad Zubair, Zaki Ul Zaman Asam, Shafaqat Ali, Muhammad Abubakar, Sheharyaar Farid, Muhammad Rizwan, Efficacy of Various Amendments for the Phytomanagement of Heavy Metal Contaminated Sites and Sustainable Agriculture. A Review, Managing Plant Production Under Changing Environment, 10.1007/978-981-16-5059-8, (239-272), (2022).

[43] Duchenne-Moutien RA, Neetoo H. Climate Change and Emerging Food Safety Issues: A Review. J Food Prot. 2021 Nov 1;84(11):1884-1897. doi: 10.4315/JFP-21-14Guinea-Bissau5849

[44] IPPC (2024) Saving Guinea-Bissau's crops and trade from pests: Plant health technicians trained in the use of modern pest prevention tools https://www.ippc.int/es/news/saving-guinea-bissaus-crops-and-trade-from-pests-plant-health-technicians-trained-in-the-use-of-modern-pest-prevention-tools/#:~:text=Fall%20Armyworm%20affects%20crops%20such,income%20crops%20in%20Guinea%2DBissau.

[45] Relief Web (2005) Guinea-Bissau: Locust invasion causes panic in the capital https://reliefweb.int/report/guinea-bissau/guinea-bissau-locust-invasion-causes-panic-capital#:~:text=Locusts%20first%20appeared%20in%20eastern,trees%20may%20suffer%20heavy%20damage.

[46] Paudel Timilsena, B., Niassy, S., Kimathi, E. et al. Potential distribution of fall armyworm in Africa and beyond, considering climate change and irrigation patterns. Sci Rep 12, 539 (2022). https://doi.org/10.1038/s41598-021-04369-3

[47] IPPC (2024) Saving Guinea-Bissau's crops and trade from pests: Plant health technicians trained in the use of modern pest prevention tools https://www.ippc.int/es/news/saving-guinea-bissaus-crops-and-trade-from-pests-plant-health-technicians-trained-in-the-use-of-modern-pest-prevention-tools/#:~:text=Fall%20Armyworm%20affects%20crops%20such,income%20crops%20in%20Guinea%2DBissau.

[48] FAO (2022) Improving cashew cultivation: FAO supports research activities in Guinea-Bissau https://www.fao.org/africa/news/detail-news/en/c/1513835/#:~:text=The%20p%C3%B3%2Dfidalgo%20(a%20semi,%2C%20Quinara%2C%20Tombali%20and%20Cacheu

[49] AFDB (2017) Fall Armyworm: Impacts and Implications for Africa https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Fall_Armyworm-final.pdf

[50] Justin Stoler, Rawan al Dashti, Francis Anto, Julius N. Fobil, Gordon A. Awandare, Deconstructing "malaria": West Africa as the next front for dengue fever surveillance and control, Acta Tropica, Volume 134, 2014, Pages 58-65, ISSN 0001-706X, https://doi.org/10.1016/j.actatropica.2014.02.017

[51] Ibid.

[52] World Bank (2024) Guinea Bissau, Historical Hazards https://climateknowledgeportal.worldbank.org/country/guinea-bissau/vulnerability

Adolescent Causes of Death in Guinea-Bissau 2019).[53] Overall malaria deaths have been increasing in the country since 2015.[54] These numbers are likely to increase in the coming years, as higher temperatures lead to faster growth and reproduction of mosquitoes, and increased bite rates.[55]

Extreme heat also negatively impacts children's ability to attend school - and concentrate in class.[56] In Guinea-Bissau, children may miss school when temperatures exceed 35°C, particularly when there is a lack of access to safe water. Most schools, particularly in rural communities, also lack access to electricity and fans for cooling, making classroom temperatures unbearable for both children and teachers. Hotter temperatures have been found to reduce cerebral blood flow and increase heat-related fatigue, limiting children's ability to concentrate in class.[57]

In Guinea-Bissau, illness has been listed as a key reason for both student and teacher absenteeism.[58] Diarrhoea and other infectious diseases are among the key causes of this absenteeism, particularly in schools without access to basic WASH facilities for students and staff.

Extreme heat has been found to put women and children at a greater risk of violence and abuse in the home.[59] Whilst limited research on this exists in Guinea-Bissau, research from other countries suggests that climate change and other forms of environmental degradation increase children's risk of violence at home. This is due to increased economic stress on parents, increased time spent indoors and other psychological impacts caused by extreme heat.[6061]

Other research has also shown that extreme heat and rising temperatures increase stress and anxiety amongst children also, triggering various mood and behavioural disorders, in both children and adults.[626364] These risks, likely to increase with further warming, are thought to be triggered by thermoregulation stress and a subsequent negative neurological response to heat.[65]

---

[53] UNICEFGuinea-Bissautdown to 2030 Country Profile: Guinea Bissau https://data.unicef.org/countdown-2030/Guinea-Bissaua-Bissau/4/

[54] WHO (2023) Guinea Bissau Country Disease Outlook https://www.afro.who.int/sites/default/files/2023-08/Guinea%20Bissau.pdf

[55] AP News (2023) As temperatures rise, mosquitoes are also on the move. Scientists worry that could mean more malaria https://apnews.com/article/malariaclimate-changemosquitos-48166329d2eeb9037b49b381a1bbe598

[56] Hyunkuk Cho, The effects of summer heat on academic achievement: A cohort analysis, Journal of Environmental Economics and Management, Volume 83, 2017, Pages 185-196, ISSN 0095-0696, https://doi.org/10.1016/j.jeem.2017.03.005.

[57] Wayne C. Drevets & Marcus E. Raichle (1998) Suppression of Regional Cerebral Blood during Emotional versus Higher Cognitive Implications for Interactions between Emotion and Cognition, Cognition and Emotion, 12:3, 353-385, DOI: 10.1080/026999398379646

[58] UNICEF Innocenti (2021) Time to Teach: Teacher attendance and time on task in primary schools in Guinea-Bissau https://www.unicef-irc.org/publications/1237-time-to-teach-teacher-attendance-and-time-on-task-in-primary-schools-in-guinea-bissau.html

[59] Sanz-Barbero B, Linares C, Vives-Cases C, González JL, López-Ossorio JJ, Díaz J. Heat wave and the risk of intimate partner violence. Sci Total Environ. 2018 Dec 10;644:413-419. doi: 10.1016/j.scitotenv.2018.06.368. Epub 2018 Jul 6. PMID: 29981991

[60] End Violence (2022) How the climate crisis is driving violence against children and what w can do about it https://www.end-violence.org/articles/how-climate-crisis-driving-violence-against-children-and-what-we-can-do-about-it

[61] Mahendran R, Xu R, Li S, Guo Y. Interpersonal violence associated with hot weather. Lancet Planet Health. 2021 Sep;5(9):e571-e572. doi: 10.1016/S2542-5196(21)00210-2. PMID: 34508676

[62] Chan EYY, Lam HCY, So SHW, Goggins WB III, Ho JY, et al. 2018. Association between ambient temperatures and mental disorder hospitalizations in a subtropical city: a time-series study of Hong Kong Special Administrative Region. Int. J. Environ. Res. Public Health 15(4):754

[63] Wang X, Lavigne E, Ouellette-Kuntz H, Chen BE. 2014. Acute impacts of extreme temperature exposure on emergency room admissions related to mental and behaviour disorders in Toronto, Canada. J. Affect. Disord 155(1):154–61

[64] Kim Y, Kim H, Gasparrini A, Armstrong B, Honda Y, et al. 2019. Suicide and ambient temperature: a multi-country multi-city study. Environ. Health Perspect 127(11):117007

[65] Burke M, González F, Baylis P, Heft-Neal S, Baysan C, et al. 2018. Higher temperatures increase suicide rates in the United States and Mexico. Nat. Clim. Change 8(8):723–29

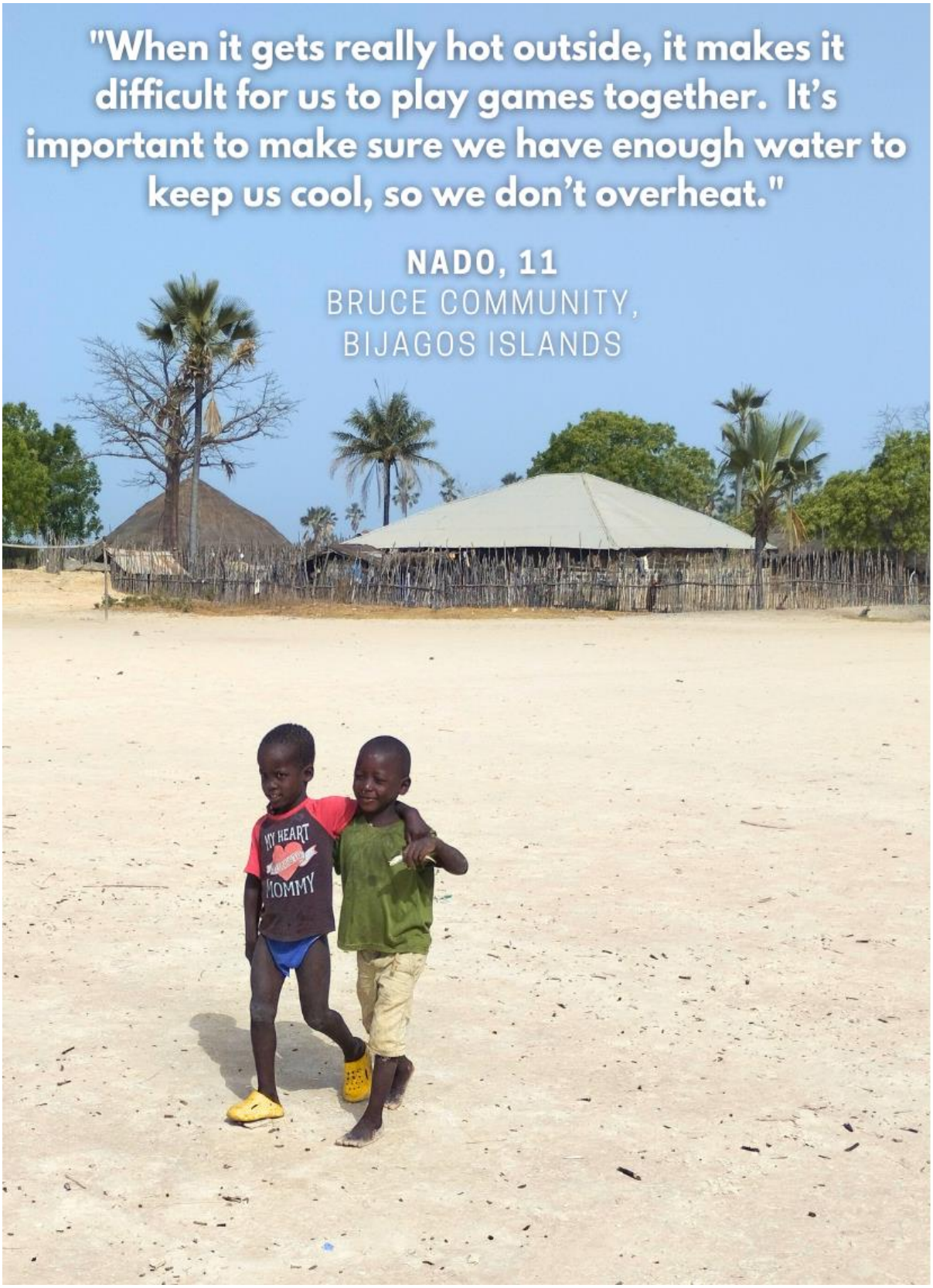
"The temperature is getting hotter - and cutting down the trees is only making it worse for us."

ETIANDRO DOS SANTOS, 11
SCHOOL FOR THE BLIND,
BISSAU

Finally, according to the children and young people interviewed, extreme heat can also prevent them from socialising and playing outdoors. This limits their ability to exercise, socialise, and connect with nature and their cultural heritage. Studies from other countries have shown that this can increase the risk of social isolation, anxiety and depression.[66] It can also increase the risk of childhood obesity, which currently affects around 3% of children in the country.[67]

[66] Vergunst F, Berry HL. Climate Change and Children's Mental Health: A Developmental Perspective. Clin Psychol Sci. 2022 Jul;10(4):767-785. doi: 10.1177/21677026211040787. Epub 2021 Sep 14. PMID: 35846172; PMCID: PMC9280699.

[67] UNICEF (2024) % of children under-5 who are moderately overweight https://data.unicef.org/countdown-2030/country/Guinea-Bissau/2/


"When it gets really hot outside, it makes it difficult for us to play games together. It's important to make sure we have enough water to keep us cool, so we don't overheat."
NADO, 11
BRUCE COMMUNITY,
BIJAGOS ISLANDS
MY HEART
MOMMY

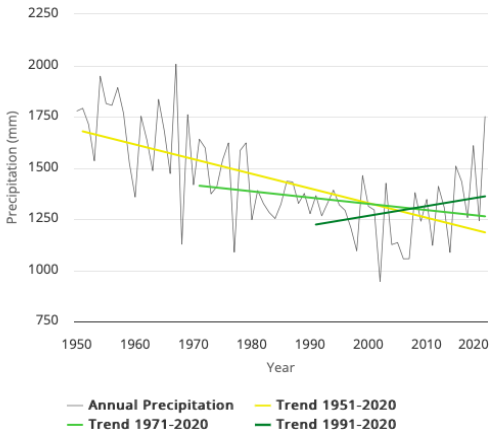
3.2.2 Drought and water scarcity

a. Observed trends and future projections

Guinea-Bissau's water resources are relatively abundant, consisting of surface waters of the Geba-Kayenga River and the Koliba Corubal and its tributaries, as well as multiple aquifers located at different depths throughout the country.[68] **Guinea-Bissau's water resources are, however, poorly distributed over both space and in time: 90% of flow occurs in just 6 months of the year, during the rainy season which runs between May and November.** The wettest months are usually July, August, and September, however, these seasonal patterns are becoming less predictable as a result of climate change, with major implications for water supply and food security.[69]

Over the past century, dry spell length and precipitation intensity have both increased, with the climate becoming slightly dryer overall (*Fig.4*).[7071] In addition, changes in the rainy season have had major impacts on the rural population, who rely predominantly on rain-fed agriculture for their survival.[72] The rainy season now starts later, in June, and rains have become much heavier, falling within a shorter space of time, washing away newly planted crops. For the rest of the year, many regions experience relative water scarcity.

Fig.4 Annual average precipitation trends (1951-2020)[73]



Drought is most commonly experienced between December to April, with the country's most intense and prolonged periods of drought occurring in 2002, 2006 and 2012, impacting more than 130,000 people.[74] **It is the country's eastern and northern regions which are the worst affected by drought (Fig.6).**

Saltwater intrusion is also a major driver of water scarcity in Guinea-Bissau's coastal and island communities, including the islands such as Jobel, which lie predominantly below sea level.[7576]

These trends are set to continue, with rainfall patterns being more extreme and unpredictable - and the country becoming hotter and dryer overall (Fig.5).

[68] UNECE (2021) Guinea-Bissau's accession to the United Nations Water Convention further strengthens cross-border cooperation on shared waters https://unece.org/media/press/357654

[69] Sylla, Mouhamadou & Nikiema, Michel & Gibba, Peter & Kebe, Ibourahima & Klutse, Nana Ama Browne. (2016). Climate Change over West Africa: Recent Trends and Future Projections. 10.1007/978-3-319-31499-0_3

[70] Sylla, Mouhamadou & Nikiema, Michel & Gibba, Peter & Kebe, Ibourahima & Klutse, Nana Ama Browne. (2016). Climate Change over West Africa: Recent Trends and Future Projections. 10.1007/978-3-319-31499-0_3

[71] Government of Guinea Bissau (2021) Updated NDC https://unfccc.int/sites/default/files/NDC/2022-06/NDC-Guinea%20Bissau-12102021.Final.pdf

[72] Mendes, O.; Fragoso, M. Assessment of the Record-Breaking 2020 Rainfall in Guinea-Bissau and Impacts of Associated Floods. *Geosciences* **2023**, *13*, 25. https:// doi.org/10.3390/geosciences13020025

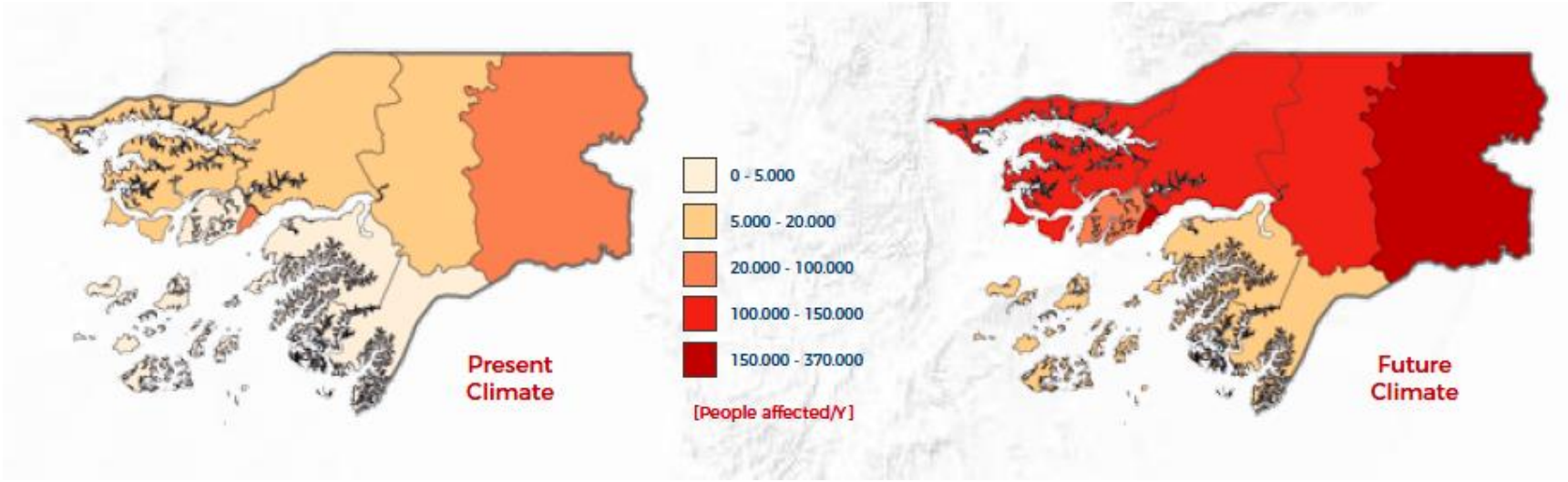
[73] Ibid.

[74] World Bank (2024) Guinea Bissau Historical Hazards https://climateknowledgeportal.worldbank.org/country/guinea-bissau/vulnerability

[75] ICRC (2009) Guinea-Bissau: struggling to survive on Jobel island https://www.icrc.org/en/doc/resources/documents/feature/2009/guinea-bissGuinea-Bissau0409.htm

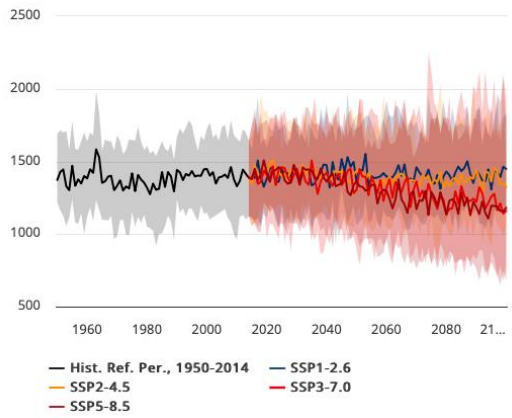
[76] 2) The Restoration Initiative: Guinea Bissau Story https://www.iucn.org/story/202212/restoration-initiative-guinea-bissau-story

Fig.6 Annual average of population affected by at least three months of drought conditions[77]



[77] UNDRR (2018) Guinea Bissau Disaster Risk Profile https://www.undrr.org/publication/disaster-risk-profile-guinea-bissau#:~:text=This%20country%20risk%20profile%20for,their%20likelihood%2C%20and%20associated%20impacts

Fig.5 Annual average precipitation trends (2020-2080)[78]



b. The impacts of drought and water scarcity on children

In Guinea-Bissau, the impacts of climate change are felt, first and foremost, through their impacts on water and food security. Around 38% of the population still lack access to safe water at home, and around 77% of the population face moderate to severe food insecurity, exacerbated by irregular rainfall patterns and fluctuating food prices.[79][80][81][82]

In Guinea-Bissau, drought and water scarcity have been found to increase malnutrition through two main channels: insufficient food intake, due to reductions in food production and availability, and diseases which are exacerbated due to a lack of food and access to safe water.

The country relies heavily on food imports to feed its population, with many families reliant on cash crops, particularly cashew nuts, to generate their basic income. **Research has shown that cashew nut production is highly vulnerable to drought, sea-level rise and increasing temperatures, placing many families' livelihoods at risk, as the climate continues to change.[83]**

Gabu is one of the hottest, most water-scarce regions of Guinea-Bissau ©UNICEF/GuineaBissau/Mendes/2024

When crops fail, food production falls and household poverty increases, reducing both the quality and quantity of food available for children. **Data from other countries in West Africa have shown that children born in a drought year are 72 percent more likely to be stunted than those born in a non-drought year.[84]** In Guinea-Bissau, around 28 percent of children under 5 are stunted (have low height-for-age) and 5 percent are acutely malnourished or wasted (have low weight-for-

[78] Ibid.

[79] Ibid.

[80] Food insecurity decreases in Guinea Bissau https://centrodeexcelencia.org.br/en/food-insecurity-decreases-guinea-bissau/

[81] UNICEF-WHO (2022) Progress on household drinking water, sanitation and hygiene 2000-2022: special focus on genderhttps://washdata.org/reports/jmp-2023-wash-households

[82] World Bank (2021) Prevalence of moderate or severe food insecurity in the population (%) - Guinea-Bissau https://data.worldbank.org/indicator/SN.ITK.MSFI.ZS?locations=GW

[83] Rupa, T. R. & Rejani, R. & Bhat, Moodakare. (2013). Impact of Climate Change on Cashew and Adaptation Strategies. Climate-Resilient Horticulture: Adaptation and Mitigation Strategies. 189-198. 10.1007/978-81-322-0974-4_17

[84] UN Economic Commission for Africa, Climate Change Through the Lens of Vulnerability and Human Rights, presented at the Seventh African Development Forum (ADF VII) Pre-Event, Addis Ababa, EthiopGuinea-Bissau2, 2010.

height ratio).[85] While the capital city of Bissau has the lowest stunting prevalence (12%), the north-central region of Oio, which is highly dependent on rain-fed agriculture, has the highest (41%).[86] Additionally, around 21 percent of babies are born with a low birth weight[87] This phenomena has been linked to both extreme heat (see *3.2.1 Extreme Heat*) and mothers' experience of drought during the prenatal period. The impacts of this have then been found to persist into adulthood, in the form of stunting, impaired cognitive development and lower earnings.[88]

In Guinea-Bissau, cashew nuts are a critical source of income for rural communities. They are highly vulnerable to extreme temperatures, drought and sea-level rise. ©UNICEF/Guinea

Seasonal variations also exist in rates of malnutrition and food insecurity - both of which peak during the dry season (August to October), particularly in the northern and eastern regions of Gabu, Oio and Bafata. Research from the Gambia found that birth weight followed seasonal variations, as shown by the highest incidence of small-for-gestational age births occurring at the end of the dry season, and the lowest incidence occurring through the harvest season.[89]

[85] Ibid.

[86] UNICEF Guinea Bissau (2020) Integrating safe water, sanitation and hygiene with nutrition to prevent stunting https://www.unicef.org/guineabissau/media/2821/file/Integrating%20safe%20water,%20sanitation%20and%20hygiene%20with%20nutrition%20to%20prevent%20stunting.pdf

[87] Ibid.

[88] Puentes, Esteban & Wang, Fan & Behrman, Jere & Cunha, Flavio & Hoddinott, John & Maluccio, John & Adair, Linda & Borja, Judith & Martorell, Reynaldo & Stein, Aryeh. (2016). Early Life Height and Weight Production Functions with Endogenous Energy and Protein Inputs. Economics & Human Biology. 22Guinea-Bissauhb.2016.03.002.

[89] Rayco-Solon P, Fulford AJ, Prentice AM. Differential effects of seasonality on preterm birth and intrauterine growth restriction in rural Africans. Am J Clin Nutr. 2005 Jan;81(1):134-9. doi: 10.1093/ajcn/81.1.134. PMID: 15640472.

Malaria has also been found to increase the risk of low birth weight, especially in the case of first births in malaria-endemic areas.[90]

The loss of rural livelihoods in Guinea-Bissau is also fueling rural-urban migration. Rural families may also send their children to live in urban areas, with extended family members or acquaintances, as a coping strategy, leaving children more vulnerable to abuse and exploitation.

"Many families are losing their livilihoods as a result of drought and climate change. When families don't have money, children don't go to school - and are more likely to be exposed to early marriage and crime."

JOSE JORGE CURARO, YOUTH CLIMATE ADVOCATE

The country's northern and eastern regions, which face the highest levels of drought and extreme heat, also experience the highest levels of child labour, child marriage and extreme violence towards children.[91] In other countries, these phenomena have been closely linked to climate change and the loss of livelihoods.[92][93][94][95] In Gabu and Tombali, the regions most affected by drought and extreme heat, 25% and 33% of children ages 1-14 experience extreme violence (compared to the national average of 21%).[96] In Gabu and Tombali, 12% and 19% of girls are married before the age of 15 (compared to a national average of 8%), and 42% and 29%, respectively, are involved in child labour (compared to a national average of 23%).[97]

©UNDRR/Guinea-Bissau/2024

Increasing temperatures lead to a lack of water availability for children, both at home and at school. Severe dehydration can lead to multi-system failure and death, particularly among younger children.[98] It also leads to lethargy, limiting children's ability to concentrate at school. This is particularly the case for children living in Guinea-Bissau's remote rural areas, who often have to travel long-distances at school and then must sit in hot classrooms for long periods of time.

At the same time, Guinea-Bissau's most drought-prone regions also have the worst access to WASH in schools (Figs 7 and 8). This is leading to the spread of infectious disease and undermining school attendance of both teachers and students.[99]

[90] Kudamatsu, Masayuki & Persson, Torsten & Strömberg, David. (2012). Weather and Infant Mortality in Africa

[91] Government of Guinea Bissau (2019) MICS 6 2018-2019

[92] UN (2022) The climate crisis and violence against children https://violenceagainstchildren.un.org/sites/violenceagainstchildren.un.org/files/the-climate-crisis-and-violence-against-children.pdf

[93] UNFPA (2021) Child Marriage and Environmental Crises: An Evidence Brief https://esaro.unfpa.org/sites/default/files/pub-pdf/child_marriage_and_environmental_crises_an_evidence_brief_final.pdf

[94] Sanz-Barbero B, Linares C, Vives-Cases C, González JL, López-Ossorio JJ, Díaz J. Heat wave and the risk of intimate partner violence. Sci Total Environ. 2018 Dec 10;644:413-419. doi: 10.1016/j.scitotenv.2018.06.368. Epub 2018 Jul 6. PMID: 29981991

[95] ILO (2023) Climate change profoundly affects child labour, ILO research findshttps://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_905673/lang--en/index.htm#:~:text=The%20damage%20caused%20by%20climate,child%20labour%2C%20the%20paper%20says.

[96] Ibid.

[97] Ibid.

[98] Stanberry LR, Thomson MC, James W. Prioritising the needs of children in a changing climate. PLoS Med. 2018 Jul 31;15(7):e1002627. doi: 10.1371/journal.pmed.1002627. PMID: 30063709; PMCID: PMC6067701

[99] UNICEF Innocenti (2021) Time to Teach: Teacher attendance and time on task in primary schools in Guinea-Bissau

Fig.7 Access to basic water supply at school[100]

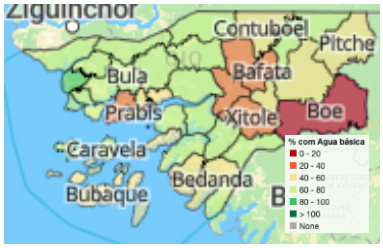
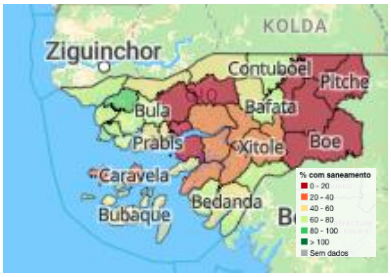


Fig.8 Access to basic sanitation at school



I**n Guinea-Bissau, women and children are primarily responsible for collecting water, fruit and other forest products, such as firewood.** Many report having to walk long distances to collect these resources, particularly during periods of water scarcity, taking time away from school and other activities. These long journeys may also leave women and children vulnerable to harassment and assault. There have also been recent reports of chimpanzee attacks in Eastern Guinea-Bissau, during the dry season, when children enter the forests to collect fruit, due to competition over scarce resources.[101]

"There is less rain now, compared to when I was younger. I sees many animals dying and people are also getting sick more often now."

MAISA LANQUI, 14
ESCOLA BÁSICA N'PANQUENHAM, OIO

Climate change is set to alter Guinea-Bissau's epidemiological landscape, favouring the proliferation of certain pathogens in warmer climates (e.g E.coli, malaria etc) while hindering others (e.g. rotavirus). A decrease in water volume, combined with an increase in temperatures can also lead to a relative increase in the concentration of biological and chemical contaminants found in the water that children consume.[102] These rising temperatures cause water-borne pathogens to bloom, including e.coli and giardiasis, increasing disease and mortality rates amongst children.[103][104][105] **Hotter, more intense dry seasons have also been linked to increased pneumonia and COVID-19 risks, including through a reduction of key hygiene practices such as handwashing.[106][107]**

However, research from Guinea-Bissau has also shown that some pathogens, including rotavirus (responsible for the majority of

https://www.unicef-irc.org/publications/1237-time-to-teach-teacher-attendance-and-time-on-task-in-primary-schools-in-guinea-bissau.html

[100] mWater (2024) Nível de Serviço JMPhttps://portal.mwater.co/#/consoles/aade2b2d20364c6a862348ef7dc08f2f?share=71913dd228b54ef59233b84995176b41&tab=c8761ffd-8da5-4bb7-a4ac-20aeae626a11

[101] Cassanova and Costa (2024) The interface between humans and other primates: The case of the Republic of Guinea-Bissau https://ojs.uv.es/index.php/Metode/article/view/25532

[102] Ibid.

[103] Philipsborn R, Ahmed SM, Brosi BJ, Levy K. Climatic Drivers of Diarrheagenic Escherichia coli Incidence: A Systematic Review and Meta-analysis. J Infect Dis. 2016 Jul 1;214(1):6-15. doi: 10.1093/infdis/jiw081. Epub 2016 Feb 29. PMID: 26931446; PMCID: PMC4907410

[104] Britton E, Hales S, Venugopal K, Baker MG. The impact of climate variability and change on cryptosporidiosis and giardiasis rates in New Zealand. J Water Health. 2010 Sep;8(3):561-71. doi: 10.2166/wh.2010.049. Epub 2010 Mar 9. PMID: 20375485

[105] Azage M, Kumie A, Worku A, C Bagtzoglou A, Anagnostou E. Effect of climatic variability on childhood diarrhoea and its high risk periods in northwestern parts of Ethiopia. PLoS One. 2017 Oct 26;12(10):e0186933. doi: 10.1371/journal.pone.0186933. PMID: 29073259; PMCID: PMC5658103

[106] Global Handwashing Partnership (2022) https://globalhandwashing.org/about-handwashing/why-handwashing/health/

[107] Ford et al (2022) Interactions between climate and COVID-19 , The Lancet, Planetary Health, VOLUME 6, ISSUE 10, E825-E833, OCTOBER 2022 https://doi.org/10.1016/S2542-5196(22)00174Guinea-Bissau

diarrhoea cases in children), are more prevalent during the cooler, dryer seasons in Guinea-Bissau and may decrease as the climate becomes hotter and more humid.[108] As such, understanding this dynamic relationship between climate and pathogen composition will be crucial in anticipating and mitigating the evolving risks posed by infectious diseases, as the country continues to warm.

In Guinea-Bissau, 38% of households still don't have access to safe water, making them more vulnerable to the impacts of climate change
©UNICEF/GuineaBissau/Knaute/2024

[108] Thea Kolsen Fischer, Peter Aaby, Kåre Molbak, Amabélia Rodrigues, Rotavirus Disease in Guinea-Bissau, West Africa: A Review of Longitudinal Community and Hospital Studies, The Journal of Infectious Diseases, Volume 202, Issue Supplement_1, September 2010, Pages S239–S242, https://doi.org/10.1086/653568

3.2.3 Storms, Flooding and Sea-level rise

a. Observed trends and future projections

Guinea-Bissau has a high ratio of shoreline to land area and remains among the African countries most vulnerable to storms, flooding, sea-level rise, marine storm surges and extreme waves.[109] The intensity and frequency of heavy rainfall and storms have increased significantly in recent years, leading to increased flooding in coastal, delta and riverine areas.

Flooding in Cuntum Madina, Bissau 2020 ©Medium

Urban areas, including the capital, Bissau, have experienced major flooding in recent years. In 2020, Bissau experienced record-breaking rainfall. This heavy rain accompanied by strong winds caused major flooding, leading to the destruction of roads, houses, and infrastructure.[110] It also led to multiple deaths and the displacement of 4617 people, many of them children, from their homes.[111]

The Cacheu, Geba and Corubal river basins are highly prone to flooding, in addition to the country's coastal and island regions, where 70% of the population lives.[112] The country's flat topography makes these populations even more vulnerable. In coastal areas, low elevations, the complexity of shoreline inlets, and the absence of rocky shores also increase vulnerability.

In Guinea-Bissau, sea levels have risen at a rate of 8.79 mm/year over the last 15 years, exceeding the global rate of 3.1mm/year.[113][114] **This has led to high levels of coastal erosion (with an average land loss of 19.1 m/year), some of the highest in West Africa.**[115][116] Additionally, saline intrusion into groundwater sources remains an ongoing challenge, particularly during the dry season, making water unsafe to drink in many coastal regions.[117]

Sea levels are predicted to rise even more rapidly in the coming years, rising by a further 250-375 mm by 2050, and by 600-700mm by 2100 (*Fig.7*).

[109] Temudo, M.P., Cabral, A.I.R. & Reis, P. The Sea Swallowed our Houses and Rice Fields: The Vulnerability to Climate Change of Coastal People in Guinea-Bissau, West Africa. *Hum Ecol* **50**, 835–850 (2022). https://doi.orGuinea-Bissau745-022-00352-2

[110] Mendes, Orlando, and Marcelo Fragoso. 2023. "Assessment of the Record-Breaking 2020 Rainfall in Guinea-Bissau and Impacts of Associated Floods" Geosciences 13, no. 2: 25. https://doi.org/10.3390/geosciences13020025

[111] Mendes, Orlando, and Marcelo Fragoso. 2023. "Assessment of the Record-Breaking 2020 Rainfall in Guinea-Bissau and Impacts of Associated Floods" Geosciences 13, no. 2: 25. https://doi.org/10.Guinea-Bissauces13020025

[112] World Bank (2024) Guinea Bissau Historical Hazards https://climateknowledgeportal.worldbank.org/country/guinea-bissau/vulnerability

[113] Lopes, Namir & Li, Tianxin & Matomela, Nametso & Sá, Rui. (2022). Coastal vulnerability assessment based on multi-hazards and bio-geophysical parameters. case study - northwestern coastline of Guinea-Bissau. Natural Hazards. 114. 10.1007/s11069-022-05420-w.

[114] Namir Domingos Raimundo Lopes, Tianxin Li, Peng Zhang, Nametso Matomela, Harrison Odion Ikhumhen, Rui M. Sá,
Predicting future coastal land use/cover change and associated sea-level impact on habitat quality in the Northwestern Coastline of Guinea-Bissau, Journal of Environmental Management, Volume 327, 2023, 116804, ISSN 0301-4797

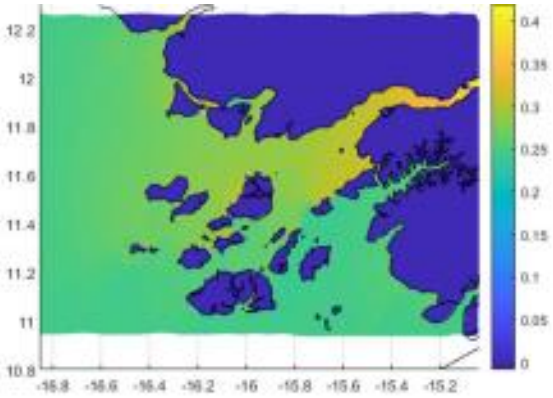
[115] Tine et al (2023) Coastline Dynamics And Its Impacts In The Northern Part Of The Southern Guinea-Bissau Of The Northern Coastline OfGuinea Bissau https://ijpsat.org/index.php/ijpsat/article/download/4462/2744

[116] Dada OA, Almar R, Morand P. Coastal vulnerability assessment of the West African coast to flooding and erosion. Sci Rep. 2024 Jan 9;14(1):890. doi: 10.1038/s41598-023-48612-5. PMID: 38195778; PMCID: PMC10776606

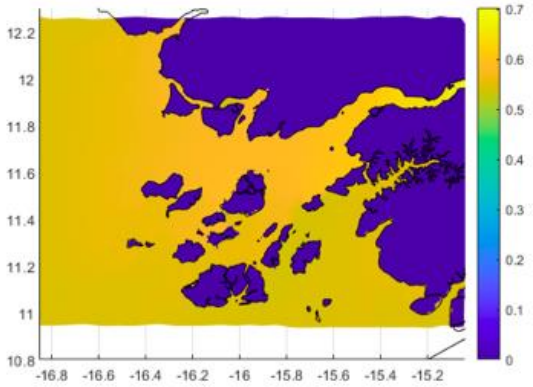
[117] FAO (2024) The West Coast, excluding the Gambia River and Volta basins https://www.fao.org/3/W4347E/w4347e0v.htm

Fig.7 Sea-level rise predictions[118]

a. By 2050



b. By 2100



b. The impacts of flooding, storms and sea-level rise on children

In Guinea-Bissau, two-thirds of the country's land area, and approximately half of the child population (47 percent, or 470,000 children) live in areas with coastal flood risk.[119] Additionally, around 70,000 children in Guinea-Bissau are at high risk of riverine flooding.[120]

In Bubaque, Bijagos Islands, sea-level rise and coastal erosion are leading to the loss of land, around 19.1 m/year per year ©UNICEF Guinea-Bissau

In the past 3 years alone, more than 3200 children have lost their homes due to severe wind or flood damage in the country, the majority of which occurs during the rainy season.[121] Homes made with traditional materials are more prone to collapse during floods and storms. Additionally, there have been reports of zinc roofs, which easily become dislodged during a storm, injuring both children and adults.

[118] UNDP (2023) Final Project Report: Vulnerability of Guinea-Bissau's Coastal Zone to the Effects of the Climate Change

[119] UNICEF (2023) Analysis of the CCRI for Least Developed Countries https://www.unicef.org/media/135686/file/Analysis%20of%20the%20CCRI%20for%20Least%20Developed%20%20Countries.pdf

[120] UNICEF (2023) Analysis of the CCRI for Least Developed Countries https://www.unicef.org/media/135686/file/Analysis%20of%20the%20CCRI%20for%20Least%20DeveGuinea-Bissauuntries.pdf

[121] National Service of Civil Protection (2024) Affected population data

In Guinea-Bissau, traditional homes provide natural cooling due to their design, but are prone to damage and collapse during heavy rainfall and flooding
©UNICEF/GuineaBissau/Mendes/2024

In a flood or storm, children are less able to physically protect themselves from immediate danger, leading to a greater risk of drowning and injury.[122] **Drowning and injuries are two of the leading causes of death of children between the ages of 5 and 19 in Guinea-Bissau.[123]** However, the total number of child deaths and injuries due to storms and flooding in Guinea-Bissau remains unknown.

Floods and storms also destroy or disrupt the water and sanitation services that children rely on for their survival and wellbeing. This includes damaging and destroying latrines and wastewater systems; which then contaminates water supplies and the environment. In Guinea-Bissau, around 62% of the population have access to basic water supply at home, and just 28% have access to basic sanitation.

The majority of these basic systems are not considered to be resilient to storms and flooding, with many collapsing or becoming flooded. This is evidenced by the fact that up to 80% of households are drinking water contaminated with e.coli, resulting from faecal contamination.[124]

Children cross a bridge during heavy rainfall in Guinea-Bissau
©UNICEF/Guinea-Bissau

Children living in informal urban settlements, including Antula, Bandim and Quelele in Bissau are among the most vulnerable to these flood risks.

Guinea-Bissau's heavy rainfall and flooding are important risk factors for post-neonatal infant and child mortality - the majority of which is caused by vector-borne disease.[125] Malaria deaths alone currently account for more than 50% of all under-5 mortality during the rainy season. This is because, during periods of heavy rainfall and flooding, stagnant flood water creates favourable mosquito breeding grounds, increasing transmission rates.

Access to mosquito nets helps to reduce children's vulnerability to vector-borne diseases, such as Malaria, as Guinea-Bissau's climate continues to change ©UNICEF/Guinea Bissau/2024

[122] IbidGuGuGuGuinea-Bissau

[123] 24) Countdown to 2030 Profile: Guinea Bissau, Neonatal, Child and Adolescent Causes of Death https://data.unicef.org/countdown-2030/country/Guinea-Bissau/4/

[124] MICS 6 (2019) Guinea Bissau

[125] Nielsen BU, Byberg S, Aaby P, Rodrigues A, Benn CS, Fisker AB. Seasonal variation in child mortality in rural Guinea-Bissau. Trop Med Int Health. 2017 Jul;22(7):846-856. doi: 10.1111/tmi.12889. Epub 2017 Jun 6. PMID: 28464403; PMCID: PMC5811910.

Around 990,000 children are estimated to live in areas exposed to one or more disease vectors in Guinea-Bissau.[126] Ninety-nine percent of children are at risk of Plasmodium falciparum Malaria (the deadliest form of Malaria), 94 percent of children are exposed to dengue and 75 percent are exposed to zika.[127] However, in urban Guinea-Bissau, the situation is more complex. Research has shown that Malaria transmission changed around 2011 from an endemic (year-round) pattern to an epidemic (large, but contained increase) pattern with peaks in October-November and with almost no cases during the rest of the year for children below 15 years.[128]

Whilst risks of exposure remain high across the country, the widespread use of ITNs by 97 percent of households has helped reduce infection rates.[129]

Post-neonatal infant and child mortality during the rainy season was found to be the most pronounced in children aged 1-4, particularly among girls.[130] More research is required to understand why girls in particular face a higher mortality risk. In contrast, the proportions of deaths due to diarrhoea, respiratory infections and the proportion of the indeterminate causes of death were higher during the dry season for both sexes.[131]

Sea-level rise also poses a direct threat to children's lives, as rising waters undermine homes and infrastructure and displace families. This can lead to injury and death - in addition to financial hardship and psychosocial stress, particularly for the indigenous communities, including the Bijagó people, whose culture is intrinsically linked to their islands. Migration and displacement can also leave children more vulnerable to risk of exposure to violence, exploitation, abuse and trafficking.[132] Over the past decades, many young people in Guinea-Bissau have moved to urban areas, further reducing the available workforce in rural areas and further reducing food production.[133]

Sea-levels have risen significantly along Guinea-Bissau's coastline, including the island of Djobel, where houses and agricultural land are now being lost to the ocean. ©UNICEF/Guinea-Bissau/2024/Mendes

Rising sea-levels and storm surges are causing the salinisation of water sources in Guinea-Bissau's coastal and island communities. Consuming water, with high levels of salinity, has major health implications, causing hypertension and reduced cognitive development in children.[134] Brackish (slightly saline) water, combined with warmer

[126] UNICEF (2023) Analysis of the CCRI for Least Developed Countries https://www.unicef.org/media/135686/file/Analysis%20of%20the%20CCRI%20for%20Least%20Developed%20%20Countries.pdf

[127] UNICEF (2023) Analysis of the CCRI for Least Developed Countries https://www.unicef.org/media/135686/file/Analysis%20of%20the%20CCRI%20for%20Least%20Developed%20%20Countries.pdf

[128] Ursing J, Rombo L, Rodrigues A, Aaby P, Kofoed PE. Malaria transmission in Bissau, Guinea-Bissau between 1995 and 2012: malaria resurgence did not negatively affect mortality. PLoS One 2014: 9: e101167

[129] UNICEF, Guinea-Bissau Indicator: Percentage of households with at least one insecticide-treated mosquito net (ITN), 2019. https://data.unicef.org/resources/data_explorer/unicef_f/?ag=UNICEF&df=GLOBAL_DATAFLOW&ver=1.0&dq=GNB.MNCH_ITNOWN.&startPeriod=1970&endPeriod=2023

[130] Ibid.

[131] Ibid.

[132] UNICEF (2023) Number of displaced children reaches new high of 43.3 million https://www.unicef.org/press-releases/number-displaced-childreGuinea-Bissau-high-433-million

[133] IFRC (2023) Guinea Bissau 2023 IFRC network country plan https://reliefweb.int/report/guinea-bissau/guinea-bissau-2023-ifrc-Guinea-Bissaury-plan-maagw002

[134] Sonia Akter, Impact of drinking water salinity on children's education: Empirical evidence from coastal Bangladesh, Science of The Total Environment, Volume 690, 2019, Pages 1331-1341, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2019.06.458

temperatures, also provides a perfect breeding ground for cholera bacteria.[135]

The timing of the seasonal cycle in particular determines the length of the growing season and agricultural yields.[136] **The slower onset of the rainy season combined with heavier, intense rains, is destroying crops and reducing yields. This includes the destruction of rice paddies in coastal regions and salinisation of land intended for cashew nut production.** Together, these account for more than 50% of GDP and 85% of employment in the country in Guinea-Bissau, leaving the country even more economically vulnerable to these impacts.[137]

Heavy rains and flooding make students' and teachers' travel to school highly challenging, with many, instead, choosing to stay home.[138][139]Slower-onset hazards such as waterlogging and salinity intrusion in coastal and island regions, also gradually contaminate school water supplies, where they exist, and cause buildings to deteriorate, making them more susceptible to collapse. This poses a direct danger to children's safety and overall health.[140]

Children look on as their mother prepares cashew fruit juice ©UNICEF/Guinea-Bissau/Knaute/2024

3.3 Other environmental issues

3.3.1 Air pollution

a. Observed trends

According to the most recent satellite data, children across Guinea-Bissau are exposed to unsafe levels of air pollution from multiple sources (Table.2)**.** Many of these air pollutants exceed the levels that are considered safe for children's health and wellbeing.

The majority of pollutants in Guinea-Bissau are human-made, and are mostly caused by fossil fuel combustion, industrial manufacturing, waste-burning, dust from traffic, smoke, and exhaust from cars, ships, and aeroplanes. Fires and brush clearing are also a major source of pollution in the form of smoke and black carbon. The burning of solid fuels for household cooking is also a cause of air pollution in Guinea-Bissau *(3.3.3 A lack of energy access)*.

In Guinea-Bissau, air pollution also includes major greenhouse gases, including Carbon Dioxide (CO_2), Carbon Monoxide (CO), Nitrogen Oxides (NOx), Sulphur Oxides (SOx) and Methane (CH_4) (Table.2). The majority of these gases are emitted from Guinea-Bissau's urban areas, including port towns along the coast. These gases trap the sun's heat, exacerbating extreme temperatures, particularly in urban areas, where trees, which

[135] Borroto (1998) https://www.jstor.org/stable/41147826

[136] Vizy et al (2018) Later Wet Seasons with More Intense Rainfall over Africa under Future Climate Change https://journals.ametsoc.org/view/journals/clim/31/23/jcli-d-18-0102.1.xml#bib86

[137] AFDB (2021) Guinea Bissau: Country Diagnostic Note https://www.afdb.org/sites/default/files/documents/projects-and-operations/cdn_guineabissau_revised_fGuGuGuGuinea-Bissau

[138] UNICEF (2022) Focus group discussions held in Western Area, February 2022 - see Appendix.4.

[139] PNAS (2019) https://www.pnas.org/doi/10.1073/pnas.1817480116

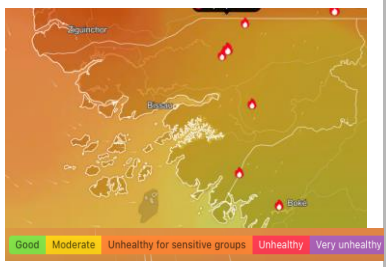
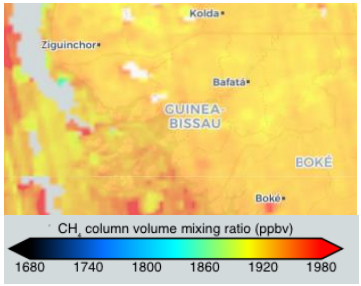
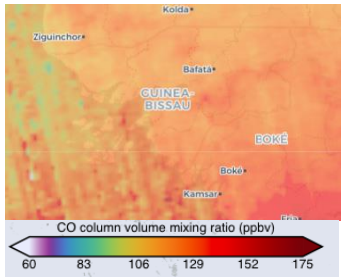
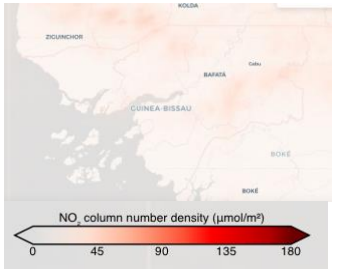
[140] UNICEF (2017) https://www.unicef.org/reports/thirsting-future

provide natural shade and cooling, have also been cut down.

Coastal wind patterns often disperse this pollution away from urban centres and towards the country's interior regions (*Table.2*). Particulate matter is particularly high in Guinea-Bissau's northern regions due to the sandy soils and proximity to the Sahel.

A mother uses her outdoor cookstove in Bruce community, Bijagos Islands ©UNICEF/GuineaBissau/Mendes/2024

Table.2 Examples of air pollutants (including greenhouse gases) and their sources in Guinea-Bissau

Air pollutant	Particulate Matter (PM2.5)[141]	Total Methane (CH4)[142]	Total Carbon Monoxide (CO)[143]	Total Nitrogen Oxide (NO)[144]
Current volume of emissions (1-29 Feb 2024)	 **Moderate-High**	 **Moderate-High**	 **Moderate-High**	 **Low-Moderate**
Key sources	Sand and dust, exacerbated by deforestation and desertification Construction sites, unpaved roads, smokestacks or fires Also formed as a result of complex reactions of chemicals such as sulphur dioxide and nitrogen oxides in the atmosphere	Livestock (particularly cattle), sanitation, human/animal waste and natural gas.	Vehicle emissions, leaking chimneys and furnaces and gas stoves.[145]	Vehicle emissions, energy production, agriculture, industrial processes and human waste.[146]

[141] IQ Air (2024) Guinea Bissau, accessed 18 March 2024, https://www.iqair.com/air-quality-map

[142] European Space Agency (2024) Sentinel-5P Total Column CH4 https://maps.s5p-pal.com/ch4/month/

[143] European Space Agency (2024) Sentinel-5P Total Column CO https://maps.s5p-pal.com/co/

[144] European Space Agency (2024) Sentinel-5P Total Column NO2 https://maps.s5p-pal.com/no2-tropospheric/month/

[145] EPA (2022) Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxGuinea-Bissaur-air-pollution

[146] S.C. Gad (2014) Encyclopedia of Toxicology https://www.sciencedirect.com/referencework/9780123864550/encyclopedia-of-toxicology

b. The impacts on children

Children in Guinea-Bissau are disproportionately affected by the impacts of air pollution. Firstly, children breathe twice as fast as adults, taking in more air per unit of body weight. In addition, children's bodies are still growing and developing and their detoxification mechanisms are not fully

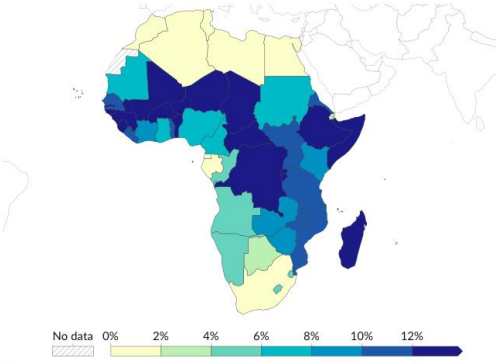
developed. Harm to their organs in this delicate and critical stage can have lifelong implications.[147] For example, lung damage in early childhood due to air pollution can be irreparable and affect lung capacity throughout adulthood.

Of all the pollutants, it is fine particulate matter (PM2.5) which is considered the most harmful to the country's children. In Guinea-Bissau, children on average are exposed to 54 µg/m³ of fine particle outdoor air pollution each year — almost 11 times what is considered safe by the World Health Organisation (WHO).[148] Around 19 deaths per 100,000 people, were attributable to fine particle pollution in 2019 (355 in total in the country).[149]

In Guinea-Bissau, indoor air pollution (mostly in the form of PM2.5), is estimated to be responsible for more than 12% of deaths - among the highest in Africa (Fig.9).[150][151] Air pollution has been found to lead to an increased incidence of cancers, asthma, neurological disorders and lower respiratory infections in children.[152][153] High levels of fine particles also contribute to other illnesses, like diabetes, can hinder cognitive development in children and also cause mental health issues.

Similarly, Sulphur dioxide has been linked to respiratory diseases such as Bronchitis and Asthma.[154][155]

Fig.9 Share of total deaths (adults and children) attributed to indoor air pollution in Africa[156]



Increased levels of Carbon Dioxide in the atmosphere, due to human activity, have also been linked to reduced protein, iron and other micronutrient content of crops - leading to increased rates of nutrient deficiency in children, particularly those living in Sub-

147 Ibid.

148 UNEP (2023) Pollution Action Guinea-Bissau you need to know, by country, Guinea Bissau https://www.unep.org/interactive/air-pollution-note/?gclid=Cj0KCQjwuNemBhCBARIsADp74QRs2OTRA0PDDKh5813DCvjBWYYfjFdIB7mv_3sI03G-xaPiDt0Okz8aAjS-EALw_wcB

149 Ibid.

150 Pengfei Li, Jingyi Wu, Ruohan Wang, Hengyi Liu, Tong Zhu, Tao Xue (2023) Source sectors underlying PM2.5-related deaths among children under 5 years of age in 17 low- and middle-income countries, Environment International, Volume 172, 2023, 107756, ISSN 0160-4120, https://doi.org/10.1016/j.envint.2023.107756

151 Owili PO, Lien WH, Muga MA, Lin TH. The Associations between Types of Ambient PM2.5 and Under-Five and Maternal Mortality in Africa. Int J Environ Res Public Health. 2017 Mar 30;14(4):359. doi: 10.3390/ijerph14040359. PMID: 28358348; PMCID: PMC5409560

152 EEA (2021) Health impacts of air pollution https://www.eea.europa.eu/themes/air/health-impacts-of-air-pollution

153 UNICEF (2017) Danger in the Air https://www.unicef.org/sites/default/files/press-releases/glo-media-Danger_in_the_Air.pdf

154 Herbarth O, Fritz G, Krumbiegel P, Diez U, Franck U, Richter M. Effect of sulfur dioxide and particulate pollutants on bronchitis in children--a risk analysis. Environ Toxicol. 2001 Jun;16(3):269-76. doi: 10.1002/tox.1033. PMID: 11409199

155 Smargiassi A, Kosatsky T, Hicks J, Plante C, Armstrong B, Villeneuve PJ, Goudreau S. Risk of asthmatic episodes in children exposed to sulphur dioxide stack emissions from a refinery point source in Montreal, Canada. Environ Health Perspect. 2009 Apr;117(4):653-9. doi: 10.1289/ehp.0800010. Epub 2008 Oct 21. PMID: 19440507

156 Our World in Data (2019) Indoor Air Pollution https://ourworldindata.org/indoor-air-pollution

Saharan Africa.[157158159] These deficiencies have been linked to increased maternal and child mortality rates and impaired cognitive development in children.[160]

Finally, pregnant women are more likely to give birth prematurely and their babies are also prone to be underweight.[161] Around 21% of children born in Guinea-Bissau are currently born with a low birth weight - an extremely high number.[162] Low birth rates have also been linked to extreme temperatures, further compounding the impacts of air pollution on children.[163]

"When people in my community burn their plastic rubbish, it smells so bad and makes us sick. Because I'm deaf, I feel like my voice is not being heard."

AISSATU TURÉ, 13
ASSOCIATION OF THE DEAF, BIOMBO

This is because air pollution traps heat, making temperatures more extreme and dangerous for children *(3.2.1 Extreme heat)*. Research has found that death tolls are three times higher on hot days that also have high levels of fine particulate air pollution (PM2.5).

Children pull faces for the camera in the Bijagos Islands ©UNICEF/Guinea-Bissau/Knaute/2024

157 Myers SS, Wessells KR, Kloog I, Zanobetti A, Schwartz J. Effect of increased concentrations of atmospheric carbon dioxide on the global threat of zinc deficiency: a modelling study. Lancet Glob Health. 2015 Oct;3(10):e639-45. doi: 10.1016/S2214-109X(15)00093-5. Epub 2015 Jul 15. PMID: 26189102; PMCID: PMC4784541

158 Medek DE, Schwartz J, Myers SS. Estimated Effects of Future Atmospheric CO2 Concentrations on Protein Intake and the Risk of Protein Deficiency by Country and Region. Environ Health Perspect. 2017 Aug 2;125(8):087002. doi: 10.1289/EHP41. PMID: 28885977; PMCID: PMC5783645

159 Yixiang Zhu, Cheng He, Antonio Gasparrini et al. Global warming may significantly increase anaemia burden among children under five years in sub-Saharan Africa, 01 June 2022, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-1647761/v1]

160 Smith MR, Golden CD, Myers SS. Potential rise in iron deficiency due to future anthropogenic carbon dioxide emissions. Geohealth. 2017 Aug 2;1(6):248-257. doi: 10.1002/2016GH000018. PMID: 32158990; PMCID: PMC7007116

161 UNICEF (2019) Clean the air for children https://www.unicef.org/sites/default/files/2019-02/Clear_the_Air_for_Children_Executive_summary_ENG.pdGuGuGuGuinea-Bissau

162 24) Countdown to 2030 Profile: Guinea Bissau, Neonatal, Child and Adolescent Causes of Death https://data.unicef.org/countdown-2030/country/Guinea-Bissau/4/

163 Chersich MF, Pham MD, Areal A, Haghighi MM, Manyuchi A, Swift CP, Wernecke B, Robinson M, Hetem R, Boeckmann M, Hajat S; Climate Change and Heat-Health Study Group. Associations between high temperatures in pregnancy and risk of preterm birth, low birth weight, and stillbirths: systematic review and meta-analysis. BMJ. 2020 Nov 4;371:m3811. doi: 10.1136/bmj.m3811. PMIDGuinea-BissauMCID: PMC7610201.

3.3.2 Ecosystem loss and degradation

a. Observed trends

Guinea-Bissau's current and future economy is highly dependent on its natural resources. The sale of cashew nuts and fisheries licences are currently the country's two best income earners (representing approximately 87% of the country's export earnings). Both of these industries are highly vulnerable to the impacts of climate change.

Sea turtles are among Guinea-Bissau's rare and threatened

i. Coastal and marine ecosystems

More than 26% of the country's territory is protected by eight coastal, marine, and terrestrial parks.[164] Despite this, the country continues to experience the loss of biodiversity at an alarming rate. The root cause of this biodiversity loss is poverty and the ensuing lack of economic alternatives for the poorest households.[165] Changes in climate, including increasing temperature, changes in rainfall patterns and sea-level rise are also contributing to biodiversity losses.

Around 70% of the population lives in the country's coastal and island regions, placing a significant pressure on the environment.[166] A large proportion of this population rely heavily on agriculture and fishing as their main source of income, using techniques that have led to deforestation, overfishing, groundwater and soil pollution, rising water levels and soil erosion.

Mangrove forests presently cover some 326,000 hectares – 9% of Guinea-Bissau, the highest proportion in the world. These coastal trees provide critical protection against coastal erosion and flooding. **While still substantial in size, the total area of mangrove forests in Guinea-Bissau has declined by 32% over the past 80 years, as a result of agricultural expansion, particularly rice cultivation, and the harvesting of biomass for fuel and fertiliser.**[167] Around sixty per cent of the rice produced in Guinea-Bissau is currently cultivated in mangrove ecosystems.[168] In recent years, there is also evidence of mangroves being replanted by communities, including youth groups, to help mitigate the impact of strong tides and marine storm events.[169]

[164] Guinea-Bissau Nation (2024) Biodiversity in Guinea Bissau https://www.bioguinea.org/Guinea-Bissauin-guinea-bissau/

[165] IFRC (2023) Guinea Bissau 2023 IFRC network country plan https://reliefweb.int/report/guinea-bissau/guinea-bissau-2023-ifrc-network-country-plan-maagw002

[166] World Bank (2024) Guinea Bissau Historical Hazards https://climateknowledgeportal.worldbank.org/country/guinea-bissau/vulnerability

[167] IUCN (2020) Where rice, mangroves and dikes connect in Guinea-Bissau https://www.iucn.org/news/forests/202002/where-rice-mangroves-and-dikes-connect-guinea-bissau

[168] vention on Biodiversity (2024) Guinea Bissau Country Profile https://www.cbd.int/countries/profile?country=gw

[169] Temudo, M.P., Cabral, A.I.R. & Reis, P. The Sea Swallowed our Houses and Rice Fields: The Vulnerability to Climate Change of Coastal People in Guinea-Bissau, West Africa. Hum Ecol50, 835–850 (2022). https://doi.Guinea-Bissau10745-022-00352-2

Guinea-Bissau's coastal regions are home to some of the region's most beautiful and important habitats ©UNICEF Guinea Bissau/2024/Knaute

Mangrove forests help protect coastal areas from storms and flooding ©UNICEF/Guinea-Bissau/2024/Knaute

Other significant threats to the coastal and marine biodiversity of Guinea-Bissau is illegal, unreported and unregulated fishing by industrial fishing vessels, particularly in areas or zones reserved for artisanal fishing or in marine protected areas. Foreign vessels routinely encroach upon the country's marine protected areas and the artisanal fishing zone, creating conflicts with artisanal fishers and damaging fragile ecosystems.

Increasing ocean temperatures, and ocean acidification, caused by increased carbon dioxide levels in the atmosphere, are also reducing marine productivity and traditional fish supplies in Guinea-Bissau. **By 2050, it is expected that fisheries catches in West Africa will decrease by at least 26%, threatening the region's food security and exacerbating child malnutrition, unless urgent action is taken.**[170]

"The replanting of trees and mangroves is critical in protecting Guinea Bissau from floods, soil erosion, reducing emissions and cooling our urban areas."

UMARO PETNA, YOUTH CLIMATE ADVOCATE

ii. Terrestrial ecosystems

In Guinea-Bissau, between 30,000 and 60,000 hectares of tropical forest disappear each year.[171] From 2000 to 2020, the country experienced a net change of -180 kilo hectares (-7.6 percent) in tree cover. In 2021, it lost 13.7kha of tree cover, equivalent to 6.36Mt of CO_2 emissions.[172] Much of this deforestation has been to make way for cashew trees - the main source of income for rural communities. Climate change and poverty also force households to engage in a variety of negative coping strategies, such as accelerated destruction of trees for fuel, that perpetuate and deepen the cycle of poverty, fragility, and vulnerability.

Desertification, the process of fertile land becoming desert, is also a growing problem for the country's northern regions of Gabu

[170] CFFA (2021) Living on the frontline: climate change will first impact African coastal fishing communitieshttps://www.cffacape.org/publications-blog/climate-change-also-impacts-small-scale-fisheries-in-africa#:~:text=According%20to%20a%20high%20CO2,Ivoire%20and%20Guinea-BissauGhana

[171] IFRC (2023) Guinea Bissau 2023 IFRC network country plan https://reliefweb.int/report/guinea-bissau/guinea-bissau-2023-ifrc-network-country-plan-maagw002

[172] IFRC (2023) Guinea Bissau 2023 IFRC network country plan https://reliefweb.int/report/guinea-bissau/guinea-bissau-2023-ifrcGuinea-Bissautry-plan-maagw002

and Bafata, particularly in communities close to the Guinea-Bissau - Senegal border.

A poilao tree in Guinea-Bissau ©UNICEF Guinea-Bissau/Mendes

It is leading to a reduction in the amount of arable land, grazing land, forests and water resources.

Slash-and-burn agriculture, charcoal production, fires, fuelwood cutting and logging for timber are also leading to soil degradation and erosion in the country.[173] Additionally, in coastal regions, the practice of letting the brackish water enter the rice fields is no longer used due to the frequent delayed onset, recurrent dry spells, and shorter duration of the rainy season. This has resulted in reduced fertility and increasing toxicity of the acid-sulphate soils developed under aerobic soil conditions.[174]

All these forms of environmental degradation are placing additional pressures on the ecosystem services, including water, food and clean air, that Guinea-Bissau's children rely upon for their survival.

iii. Pollution

The leading drivers of soil and water pollution in Guinea-Bissau, include the use of chemical fertilisers, pesticides in agriculture, as well as the release of hazardous industrial waste into the environment.[175] In Guinea-Bissau, all sources of water, including surface, ground and ocean water, face a heightened risk of pollution, as a result of human activity. For example, open defecation and the lack of climate-resilient sanitation increases the risk of faecal contamination during periods of heavy rainfall and flooding. For example, around 80% of households in Tombali, Bolama and Bijagós currently consume water that is contaminated with e.coli, as a result of the poor WASH situation in these regions.

Rubbish on Orango island ©UNICEF/Guinea-Bissau/2024/Knaute

Traditionally, the use of pesticides and fertilisers in Guinea-Bissau has remained limited, with the majority of agricultural production being classed as organic. However, climate change, in addition to food security

[173] World Rainforests(2024) Guinea Bissau https://worldrainforests.com/20guinea-bissau.htm#

[174] Temudo, M.P., Cabral, A.I.R. & Reis, P. The Sea Swallowed our Houses and Rice Fields: The Vulnerability to Climate Change of Coastal People in Guinea-Bissau, West Africa. *Hum Ecol* **50**, 835–850 (2022). https://doi.org/10.1007/s10745-022-00352-2

[175] Namir, D.R.L., Cheng, Y., & Shi, W.L, Management of Soil Contaminants in Guinea - Bissau, International Journal of Environmental Monitoring Guinea-Bissau 6:1, 2018, 26-39

pressures, is pushing communities to explore the use of fertilisers and pesticides. A recent increase in pest attacks is now reportedly fueling the use of non-specific pesticides, which can leach into soils and water.[176]

A lack of solid waste management is additionally a major threat to both aquatic and terrestrial ecosystems in Guinea-Bissau, and also children's health. In the capital Bissau alone, more than 200 tonnes of solid waste is produced every day and only 50 percent is collected and disposed of.[177] The capital, like the rest of the country, lacks access to recycling facilities. As a result, most households resort to burning their waste, contributing to the country's growing levels of air, water and soil pollution. Coastal areas additionally struggle with plastic pollution, which peaks at the end of the rainy season (September-October), as a result of heavy rains and converging ocean currents. **The cost of the damage caused by marine plastic pollution in West Africa is estimated at around $10,000 to $ 33,000 per ton of plastic waste.[178]**

©UNICEF/Guinea-Bissau/2024/Knaute

"Plastic waste is a huge problem in our country. We are not recycling or disposing of it safely - so it ends up in the soil and ocean."

FLORENCA NA NALCHE, YOUTH CLIMATE ADVOCATE

A key source of plastic in Guinea-Bissau is plastic bags, including from water packets. Guinea-Bissau banned plastic bags in 2016, but the legislation has been poorly enforced, making it one of the last countries in West Africa to implement the ban.[179] As a result, plastic pollution remains one of the most visible signs of pollution in the country.

When plastic breaks down over time, it creates microplastics, tiny fragments of plastic less than 5 mm in length. Microplastics can enter the water, soil and air through plastic litter, cosmetics, clothing, and industrial processes. These plastics then accumulate in both plants and animals, making their way into children's bodies, where proportionally, they accumulate at a greater rate than in adults.[180]

Additionally, heavy metals and other contaminants from solid waste and other industrial contaminants put children's health at risk. **Research from the Bijagós islands has**

[176] Temudo, M.P., Cabral, A.I.R. & Reis, P. The Sea Swallowed our Houses and Rice Fields: The Vulnerability to Climate Change of Coastal People in Guinea-Bissau, West Africa. *Hum Ecol* **50**, 835–850 (2022). https://doi.org/10.1007/s10745-022-00352-2

[177] Macau Business (2021) Guinea-Bissau: Bissau produces 200 t solid waste daily; only 50pct collected – NGO https://www.macaubusiness.com/guinea-bissau-bissau-produces-200-t-solid-waste-daily-only-50pct-collected-ngoGuGuGuGuinea-Bissau

[178] World Bank (2023) "We are losing our treasure": the West African coastal areas tackle plastic waste https://www.worldbank.org/en/news/feature/2023/07/12/we-are-losing-our-treasure-the-west-african-coastal-areas-tackle-plastic-waste

[179] Statista (2022) The Countries Banning Plastic Bags https://www.statista.com/chart/14120/the-countries-banning-plastic-bags/i

[180] Amran NH, Zaid SSM, Mokhtar MH, Manaf LA, Othman S. Exposure to Microplastics during Early Developmental Stage: Review of Current

found cockles and oysters contain unsafe levels of heavy metals, including cadmium.[181]

Additionally, more than half of the country's children and youth are exposed to lead pollution (54 percent). These heavy metals have been linked to multiple mental, physical and neurological disorders, including childhood cancers, low birth weights and reduced cognitive function.[182]

Organic pollution caused by fishing camps has contributed to modifying the physico-chemical parameters of the mangroves. Additionally, sea-level rise is contributing to the salinisation of soils and water sources (*3.2.3 Storms, Flooding and Sea-level rise*).

b. The impacts of ecosystem loss and degradation on children

Desertification is leading to a loss of livelihoods, reducing community resilience and increasing child poverty in the country's northern and eastern districts, particularly Gabu and Bafata. It is also leading to increased food insecurity due to crop failure or reduced yields. This places a greater burden on families, fueling rural-urban migration and increasing the risk of child labour and early marriage. Desertification has also been linked to higher risks of mortality due to malnutrition.[183] Desert sand and dust increases the risk of respiratory illnesses and eye infections among children (*3.3.1 Air pollution*).

Open rubbish dump in Bissau ©UNICEF Guinea-Bissau

The microplastics, lead and other toxins that are present in Guinea-Bissau's environment, can also have a significant impact on children's health (Fig.10).[184] They have the greatest impact on children, especially infants, where they accumulate in greater concentrations.[185] Children's immature defence systems, and developing organ systems leave them particularly vulnerable. They can also cause developmental delays and impact brain and behaviour development.[186]

Evidence. Toxics. 2022 Oct 10;10(10):597. doi: 10.3390/toxics10100597. PMID: 36287877; PMCID: PMC9611505.

[181] Teresa Catry, Carlos Vale, Patrícia Pedro, Eduarda Pereira, Mário Mil-Homens, Joana Raimundo, Daniela Tavares, José P. Granadeiro, Elemental composition of whole body soft tissues in bivalves from the Bijagós Archipelago, Guinea-Bissau, Environmental Pollution, Volume 288, 2021, 117705, ISSN 0269-7491, https://doi.org/10.1016/j.envpol.2021.117705

[182] Chandravanshi L, Shiv K, Kumar S. Developmental toxicity of cadmium in infants and children: a review. Environ Anal Health Toxicol. 2021 Mar;36(1):e2021003-0. doi: 10.5620/eaht.2021003. Epub 2021 Feb 4. PMID: 33730790; PMCID: PMC8207007

[183] Jaramillo-Mejía MC, Chernichovsky D. Impact of desertification and land degradation on Colombian children. Int J Public Health. 2019 Jan;64(1):67-73. doi: 10.1007/s00038-018-1144-0. Guinea-Bissau. PMID: 30019136

[184] UNEP (2021) From Pollution to Solution https://www.unep.org/resources/pollution-solution-global-assessment-marine-litter-and-plastic-pollution

[185] Ibid.

[186] Ibid.

Children in the Bijagos Islands play with an empty plastic container ©UNICEF/Guinea-Bissau/2024/Knaute

Guinea-Bissau's coastal communities are especially exposed to marine and air microplastic pollution. Additionally, women and girls are more affected by plastics than males, as a result of their greater exposure through cleaning, cosmetics and hygiene products. Families, including children and adolescents, who collect, process, shred, and burn plastic waste, or who live near dump sites, also face higher risks related to microplastics on top of other hazards. **As such, there is an urgent need for the country to tackle its solid waste crisis, including addressing plastic pollution and improving waste collection and recycling.**

Ocean acidification and a rise in sea-level surface temperatures are also having a negative impact on fish survival and reproduction.[187] As such, the IPCC has predicted a **50% decline in seafood catch and employment by 2050.**[188] This combined with the intense levels of coastal degradation, overfishing and water pollution will impact the livelihoods of families living in coastal communities, increasing poverty. It will also likely cause a rise in fish prices across the country, reducing children's main source of protein intake.

Environmental degradation, fueled by climate change, is also leading to a loss of cultural heritage for Guinea-Bissau's children and young people. For example, coastal populations rely on the collection of mussels and oysters for their diets, traditional dress and cultural (Fanadu) ceremonies.

For children living in these regions, the mangroves and ocean remain a critical part of their culture, spirituality and happiness. The natural environment has been found to help instil a sense of belonging and pride amongst young people. The transfer of indigenous environmental knowledge, including how to survive in an ever-changing coastal environment, is also transferred between generations during these ceremonies. Changes in climate have the potential to impact these cultural practices, through changes in biodiversity, including mangrove and shellfish availability.

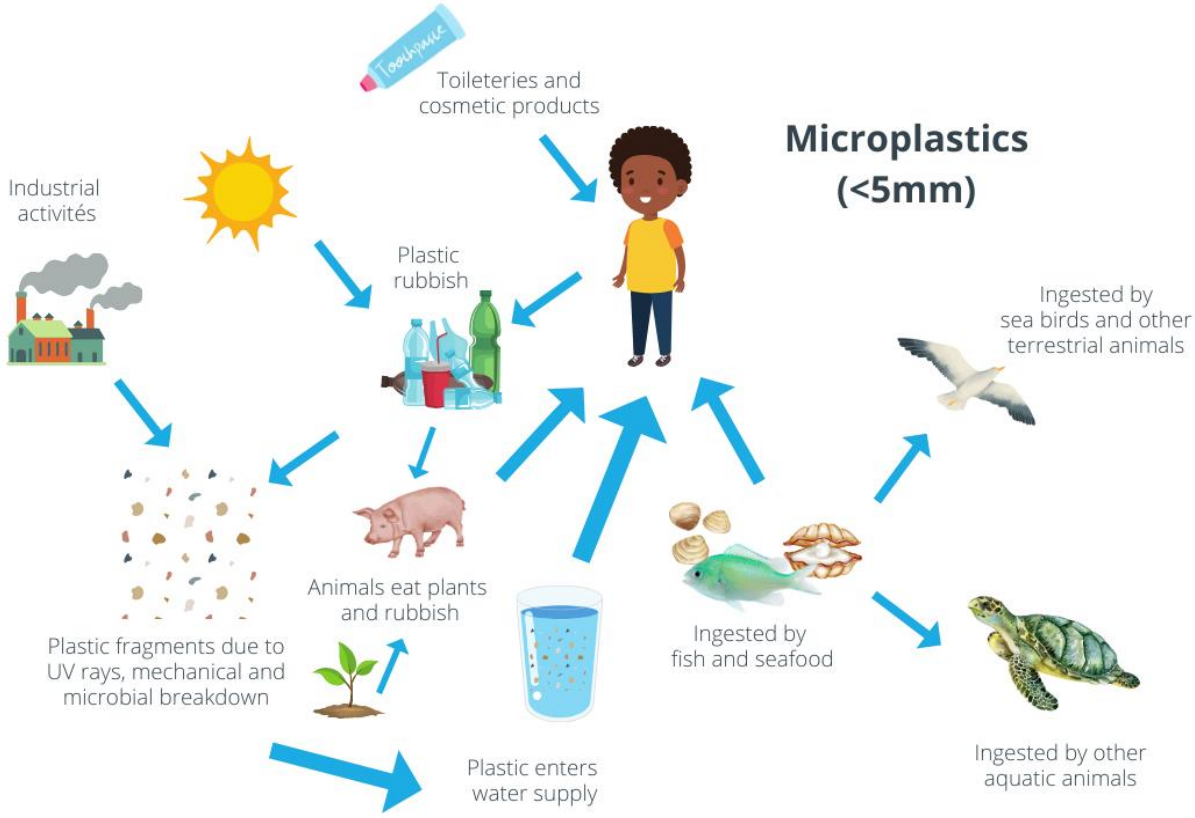
Finally, unless urgent action is taken, water pollution, including microplastic pollution, will continue to impact aquatic ecosystems and the safety of food consumed by Guinea-Bissau's children.

A mother dries the seafood she's collected in the sun ©UNICEF Guinea-Bissau/2024/Mendes

[187] Pankhurst et al (2011) https://www.publish.csiro.au/mf/pdf/MF10269

[188] IPCC (2014) http://ipcc-wg2.gov/AR5/

Fig.10 How microplastics enter a child's body in Guinea-Bissau



Guinea-Bissau relies heavily on fossil fuels for electricity generation, with clean, low-carbon energy sources making up only a tiny fraction of the total consumption

3.3.3 A lack of energy access

a. Observed trends

In Guinea-Bissau, like in all other countries, access to energy, particularly electricity, is vital in order for children to live a safe, happy life. From having light to study at night; to staying cool during extreme temperatures, a lack of energy has the potential to impact all aspects of children's lives, including access to safe water, nutrition, education and security.

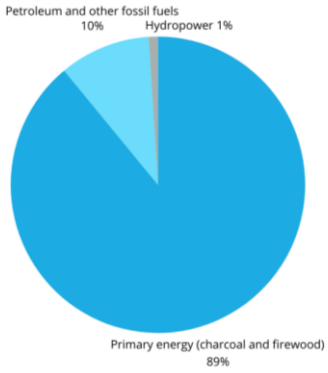
(Fig.10). Petroleum products are also used for transport and other forms of energy generation.[189]

Renewable energy sources include biomass (wood and charcoal products, mostly used for

[189] Irena (2021) Guinea Bissau Energy Profile https://www.irena.org/-/media/Files/IRENA/Agency/Statistics/Statistical_Profiles/Africa/Guinea-Bissau_Africa_RE_SP.pdf

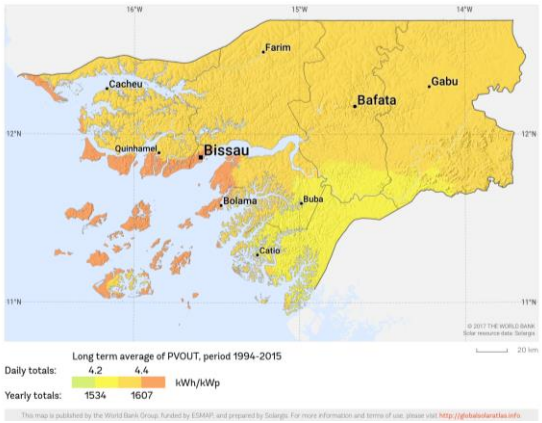
cooking), also make up the majority of domestic energy use and are a major cause of deforestation *(3.3.2 Ecosystem loss and degradation)*.[190]

Fig.10 Energy consumption in Guinea-Bissau (2020)[191]



Renewable energy projects are currently being implemented on an ad hoc basis, despite the country's major potential, particularly for solar power (Fig.11).[192]

Fig.11 Guinea-Bissau's potential for solar power[193]



However, the Government's Nationally Determined Contributions (NDCs), commit to increase renewable energies in the country's electricity mix from 5% to 58% by 2030, 40% of which would come from hydroelectricity and the rest from solar PV and wind power.[194] This conditional contribution would be based on sufficient support being provided by the international community, allowing for an additional reduction in emissions of 20%.[195]

Access to electricity has increased significantly in recent years, from 6% in 2010 to 13% in 2020.[196]The situation remains particularly critical in rural areas, including in the Bilagos islands and Quinara where around 90% of the population still do not have access.[197] This lack of access is largely as a result of low total grid capacity (just 15 MW), and an electricity tariff which is among the most expensive in Africa.[198][199]Consequently, wealthier households rely on gasoline or diesel generators or other independent sources of electricity, though these may cost up to four times the national tariff. For the poorest families, most still rely on kerosene lamps.

Table.4 Key energy indicators for Guinea-Bissau[200]

Indicator	Details
% of population with electricity access	13%

[190] Ibid.

[191] Tito Francisco Ianda, Antonio Domingos Padula, Exploring the Brazilian experience to design and simulate the impacts of a biodiesel program for sub-Saharan countries: The case of Guinea-Bissau, Energy Strategy Reviews, Volume 32, 2020, 100547, ISSN 2211-467X, https://doi.orgGuinea-Bissaur.2020.100547

[192] World Bank (2022) G5 Sahel Group: Country Climate and Development Report https://openknowledge.worldbank.org/server/api/core/bitstreams/197f07e0-d3ec-48bc-9d52-38d551d5d312/content

[193] SolarGis (2024) Guinea Bissau Photovoltaic Power Potential https://solargis.com/maps-Guinea-Bissaudownload/guinea

[194] Government of Guinea Bissau (2021) Updated Nationally Determined Contribution https://unfccc.int/sites/default/files/NDC/2022-06/NDC-Guinea%20BisGuinea-BissauFinal.pdf

[195] Ibid.

[196] World Bank (2019) Access to electricity (% of population) https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=MR

[197] MICS 6 (2019)

[198] AEP (2024) Profile: Guinea Bissau https://africa-energy-portal.org/aep/country/guinea-bissau

[199] Ascent (2024) Better NRG services https://africasustainability.org/what-we-do/climate-finance/promoting-better-access-to-modern-enGuinea-Bissau-guinea-bissau/

[200] World Bank (2019)

CO2 emissions (metric tonnes per capita)	0.2
Main sources of energy	Heavy oil and biomass
% renewable energy production for electricity	1%
% of population without clean fuels and technology for cooking	99%

b. The impacts of poor energy access on children

In Guinea-Bissau, around 99% of the population are still living without access to clean fuels and technology for cooking - among the worst proportions in the world.[201] The country's unsustainable reliance on wood and charcoal for cooking, combined with inefficient cooking methods, including traditional stoves, are accelerating forest degradation and deforestation.[202] This, in turn, is undermining agricultural productivity, food security and water security and leaving the country's children more vulnerable to climate shocks.[203]

©UNICEF/Guinea-Bissau/2024/Knaute

Guinea-Bissau's unsustainable reliance on biomass for cooking contributes to indoor air pollution and burn risks for children. The introduction of fuel-saving technologies, including more efficient cook stoves, has been challenging however, as new cleaner technologies still remain unaffordable for many households and electricity access remains lacking.

The absence of electricity access results in numerous challenges for the children of Guinea-Bissau. **Firstly, as Guinea-Bissau's temperatures continue to increase, a lack of electricity access limits the cooling of homes, schools and healthcare centres.** This includes the use of fans and air conditioning which help protect children from heat-related illnesses such as heat stroke. A lack of electricity for refrigeration, particularly for meats and dairy, is also increasing the risk of food-borne disease. It also limits the storage and subsequent trade of food produced locally, impacting livelihoods. A lack of access to electricity in hospitals, including during power cuts can undermine life-saving care and vaccine refrigeration. Children with specific health needs may also struggle to keep their medication at the proper temperature.

In Guinea-Bissau, diesel generators, for both electricity and water supply, remain unobtainable for many families and an unnecessary financial burden to others. Diesel generators also create localised air and noise pollution, impacting children's health and overall wellbeing.

A lack of lighting at home limits children's ability to study at home. Dark streets and homes pose a security risk, particularly for girls. Additionally, children with autism and

[201] World Bank (2020) Access to clean fuels and technologies for cooking (% of population) - Guinea-Bissau https://data.worldbank.org/indicator/EG.CFT.ACCS.ZS?locations=GW

[202] World Bank (2022) G5 Sahel Group: Country Climate and Development Report https://openknowledge.worldbank.org/server/api/core/bitstreams/197f07e0-d3ec-48bc-9d52-38d551d5d312/content

[203] Ibid.

other special needs often experience trouble adapting to a lack of light.

©UNICEF/

4. CLIMATE, ENERGY AND ENVIRONMENT POLICIES

Over the past decade, Guinea-Bissau has embarked on a series of initiatives to address climate change and mitigate environmental degradation, with a focus on transitioning towards cleaner, sustainable energy sources. This commitment is evident in the country's endorsement of the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 and its subsequent ratification of the Paris Climate Agreement in 2018, highlighting its dedication to limiting greenhouse gas emissions and implementing adaptive strategies to safeguard its population.

Aligned with these global accords, the government of Guinea-Bissau has introduced various policies and strategic plans aimed at translating these commitments into actionable steps. Notably, the formulation of the country's Nationally Determined Contributions (NDCs), updated in 2021, which serves as a roadmap for integrating climate policies with its broader development agenda.[204] This agenda incorporates objectives from the UN's 2030 Agenda and the African Union's Agenda 2063. **In the updated NDCs, Guinea-Bissau defined its first quantified target for reducing greenhouse gas emissions, committing to a reduction of 30% by 2030 with support and an unconditional target of reducing emissions by 10%.[205]**

Despite significant strides in policy development, there still remains a significant gap in efforts to adequately address the impacts of climate change and environmental degradation on children and youth. Few policies have been crafted with the consultation of young people, and fewer still incorporate specific measures to shield them from these environmental challenges. This gap extends to sectoral policies, which generally lack provisions for addressing the unique vulnerabilities of children and youth.

A growing number of stakeholders in Guinea-Bissau, including a growing number of young climate advocates, are launching environmental programs and initiatives, several of which include children and young people (*Annex II*) . These efforts, albeit small-scale, reflect a growing acknowledgment of the importance of engaging children and youth in climate action and ensuring their participation in policy processes.

The upcoming National Climate Dialogue, led by the Ministry of the Environment, in May 2024 provides an important opportunity to reflect on the current and future impacts of climate change on children in Guinea Bissau. Similarly, the upcoming development of a new National Development Plan, the National Adaptation Plan (NAP), updated Nationally Determined Contribution (NDC) and the 4th National Communication to the UNFCCC, to integrate specific activities to protect children and youth from the impacts of climate change into national policy and planning. In the coming years, there will also be opportunities to revise sectoral policies, including the upcoming revision of the Education Sector Plan, to similarly make them more inclusive of children, youth and the environment.

Table.5 provides a summary of existing climate policies and their consideration of children and youth.

[204] Government of Guinea Bissau (2021) Updated NDC https://unfccc.int/sites/default/files/NDC/2022-06/NDC-Guinea%20Bissau-12102021.Final.pdf

[205] Ibid.

Table.5 A snapshot of key national documents and their inclusion of children and youth, in relation to climate and the environment

National document	Date	Ministry	Purpose	Specific actions to protect children from climate and environment hazards?	Observations
Climate and environment policies					
Nationally Determined Contribution)	2021	Ministry of Environment and Biodiversity	Outlines Guinea-Bissau's commitment to reducing greenhouse gas emissions and adapting to climate change impacts, to achieve the goals outlined in the Paris Agreement.	**No**	Briefly mentions children in terms of their specific vulnerabilities, including nutrition, but does not discuss their specific needs or measures to protect them from the impacts of climate change.
Third National Communication	2018	Ministry of Environment and Biodiversity	Outlines efforts, actions, and achievements related to climate change mitigation and adaptation, as well as greenhouse gas emissions inventories, and future plans to address climate change.	**No**	Mentions children in relation to their specific health and nutrition vulnerabilities, but does not include specific mentions of actions to protect them.
National Programme of Action for Adaptation to Climate Change	2006	Ministry of Environment and Biodiversity	Identifies urgent and immediate adaptation needs and prioritises projects and programs to address them.	**No**	Small mention of children in relation to their specific health and nutrition vulnerabilities. Does not include specific measures to protect them from the impacts of climate change. No mention of youth.

National Strategy for Disaster Risk Management	2013	Republic of Guinea Bissau	Aims to establish a national framework for disaster risk management and promote security and resilience to disasters.	**No**	Small mention of children, but only as a vulnerable group - and not in relation to specific measures required to protect them from disasters
Other related policies					
National Development Plan of Guinea Bissau (2020-2023)	2020	Ministry of Economy, Planning and Regional Integration	Outlines a plan for national development, including the preservation of biodiversity, combating climate change and improving access to clean energy.	**No**	Mentions children and youth, but not specifically in relation to climate change and the environment.
National Agricultural Investment Plan	2017	Ministry of Agriculture and Rural Development	Outlines strategic priorities and the allocation of resources to promote sustainable agricultural development, increase food security, and enhance rural livelihoods.	**Partially**	Outlines specific measures to ensure agricultural productivity and resilience in the face of climate change. Also mentions the importance of preventing malnutrition, particularly among under-5 children. However, it does not outline specific measures to tackle the climate crisis' or environmental pollutants impact on children.
Public Hygiene Code	2000	Ministry of Public Health	Set of professional standards and expectations intended to guide the delivery of public health services in the country.	**No**	No significant mention of children or climate change.
Child Protection Policy	2022	Ministry of Women, Family and Social Solidarity	An important milestone in the child protection agenda of the country, enabling the authorities, especially those	**No**	No mention of measures to protect children from the climate and environment-related shocks and stresses.

			charged with enforcing the Code, to make a decisive contribution to improving child protection.		
Updated Water and Sanitation Master Plan (2011-2020)	2010	Minister of Energy, Industry and Natural Resources	To provide a comprehensive framework for effectively managing water resources and improving sanitation infrastructure nationwide.	**No**	Some mentions of climate change, but none in relation to the specific WASH needs of children - or how they can be protected.
National Water Policy (Water Code)	1992	Minister of Energy, Industry and Natural Resources	Aims to ensure the sustainable management, equitable access, and efficient use of water resources.	**Partially**	Outlines the impacts of climate change and pollution on water. Mentions that children require additional support, in terms of water supply, to ensure their health and development. Also highlights environmental education as being critical.
National Basic Sanitation and Hygiene Policy	2015	Ministry of Public Health	Aims to improve public health outcomes by ensuring access to safe sanitation facilities and promoting hygienic practices across the country	**Partially**	Children are explicitly mentioned throughout. Mentions the importance of WASH in schools for creating a safe, healthy learning environment for children and safe disposal of child faeces. Also includes the importance of protecting children from other waste, including eliminating child labour in waste management activities. Strategy lacks specific measures to protect children from climate-related hazards however.

Education Sector Plan (2017-2025)	2017	Ministry of Education	Aims to improvise access to and the quality of education at both the primary and secondary levels.	**Partially**	Limited mention of climate change, but does mention the need for climate-resilient construction standards for schools, to ensure they are safe for children.
National Health Policy, PNDS III (2023-2028)	2023	Ministry of Public Health	Aims to improve the health of populations by keeping people healthy, improving their health and by preventing disease.	**No**	Brief mention of the impact of climate change on health, but not specifically in relation to children.
National Nutrition Policy	2014	Ministry of Public Health	Aims to improve the nutritional status of Guinea Bissau's population, including specific measures to tackle child malnutrition.	**No**	Does not explicitly mention climate change in relation to children. However, it does include multiple mentions of the impact of poor WASH access and the specific vulnerabilities of children.

5.CONCLUSION AND RECOMMENDATIONS

The Climate Landscape Analysis for Children in Guinea-Bissau has found that extreme heat, water scarcity, water pollution, air pollution and other forms of environmental degradation, are among the greatest threats facing Guinea-Bissau's children - both now and in the future. These climate-related hazards, unless addressed, will further exacerbate inequalities and undermine the country's social and economic development.

All of the country's regions scored "Extremely Highly" in terms of overall Children's Climate Risk. This means that children across the country are simultaneously exposed to climate-related hazards, whilst being simultaneously vulnerable to their impacts, as a result of multidimensional poverty. Those children living in the regions with the greatest number of overlapping climate hazards (e.g. flooding, drought, extreme heat and sea-level rise) face the greatest risks.

It is the poorest of the poor, within these regions, including children with disabilities, girls, ostracised "Irá" (Iran) children, orphans and other vulnerable children that face some of the worst deprivations. These children often have the least secure homes, least access to continuous safe water, sanitation and energy supply, and the worst health and nutrition indicators - all of which are critical in ensuring they are protected from climate-related hazards.

The crisis however does not have to be inevitable. With the right political will and investment, the impacts of climate hazards - and much of Guinea-Bissau's environmental degradation can be reversed - to help promote equity and prosperity across the country. Young people are an important part of the solution. It is imperative that their voices are included across all the policies, strategies and programmes that affect them - and all partners rally together, to protect their future.

5.1 Overall Recommendations

1. Ensure that all national policies and strategies in Guinea-Bissau incorporate considerations of climate change and environmental degradation, with specific measures to protect children and youth. To include and prioritise specific opportunities include updating the National Development Plan (2025-2034), the upcoming National Adaptation Plan and 4th National Communication to the UNFCCC, in addition to sector-specific policies and plans. The May 2024 National Climate Dialogue also provides an important opportunity to reflect on the current and future impacts of climate change on children in Guinea Bissau.

2. Enhance the collection of climate and environment-focused research, data, and evidence pertaining to children in Guinea-Bissau. Community-level data should also be collected, where available, to provide a more complete picture of local hazards and vulnerabilities. This involves strengthening academic research and integrating climate-related indicators for children into existing monitoring and data collection systems (e.g., MICS, DHS and EMIS), disaggregated by gender, socioeconomic status, and ethnicity.

3. Identify and support the specific technical expertise required by partner organisations and government agencies in Guinea-Bissau to build capacity around climate mitigation and adaptation actions to protect children. Training and support should concentrate on child-focused policy development, project design, implementation, and monitoring to

better address the needs of children and young people.

4. Prioritise climate-resilient interventions for children in the most hazard prone regions, tackling all aspects of child vulnerability and deprivation. Partners must work together to ensure holistic interventions that increase the resilience of communities and children.

5. In collaboration with the Government and development partners, establish Early Warning Systems to facilitate the early identification, monitoring, preparedness, communication and response to climate-induced threats to children. This will help establish more resilient systems capable of safeguarding children from climate-related risks before they materialise.

6. Mobilise additional financial resources to shield Guinea-Bissau's children from the long-term impacts of climate change. An estimated $688.8 million in climate finance is needed to address both climate mitigation and adaptation in Guinea Bissau, yet the country is still failing to fully access and benefit from the large amount of climate financing available globally. It remains one of the most underfunded LDCs and SIDS in the world. UNICEF and the Government must therefore cultivate new partnerships with donors, to apply for large scale climate funding. This includes exploring opportunities with private sector entities and the Green Climate Fund (GCF) and Global Environment Facility (GEF) in collaboration with the Ministry of the Environment, Biodiversity and Climate Action, and accredited partners. The 2025 UN Climate Change Conference (UNFCCC COP 30) in Brazil also provides a critical opportunity for the country to prevent evidence of the impact of climate change on its children - and lobby for additional financial support.

5.2 Sector-specific recommendations

i. WASH

1. Strengthen the capacity of the WASH sector to adapt to climate change. This includes:

- Ensuring that all sectoral policy and strategy includes specific measures to tackle the impacts of future water scarcity, flooding and sea-level rise on water and sanitation systems.
- Reorganising the WASH sector to ensure that all ministries (including the Ministry of Health, Ministry of Natural Resources) and implementing partners have a clear understanding of their roles and responsibilities in relation to the National Water and Sanitation Master Plan and Water Code.
- Establishing a National WASH Taskforce, to enhance sectoral governance and coordination for climate-resilient WASH services in the most vulnerable regions.
- Rolling out training and other initiatives to strengthen sector partners' knowledge of climate-resilient WASH options at all levels.
- Establish and enforce Minimum Standards for WASH infrastructure development and construction, which includes climate resilience and guidance for construction of WASH facilities in sandy soils.

2. Increase access to climate-resilient WASH services for children residing in the most hazard-prone areas of Guinea-Bissau. This includes prioritising WASH access for the poorest, the most hazard-prone communities, including schools and healthcare centres - prioritising the ones that have yet to gain access. It also means ensuring new and existing services remain safe and functional as

the climate continues to change. More specifically, this includes:

- Exploring opportunities for Managed Aquifer Recharge in coastal and island communities that are experiencing the salinization of their water sources.
- Scaling-up Community-led Total Sanitation and other behaviour change campaigns across the country, including the use of targeted subsidies and voucher schemes for the most at-risk households, to support them in constructing more climate-resilient sanitation facilities. The use of revolving sanitation funds should also be explored to help households move up the sanitation ladder and protect their sanitation systems from heavy rain and flooding.
- Integrating Water Safety Planning (WSP) into CLTS activities, wherever possible, to ensure communities can also assess risk and protect their water points in the face of climate change.
- Supporting efforts to better capture and store rainwater, particularly in drought-prone and saline intrusion-affected areas.
- Scaling-up the use of solar-powered water systems to ensure sufficient safe water supply and storage in drought-prone areas.
- Advocating for improved solid waste management in communities, healthcare centres and schools, to ensure improved recycling and safe disposal of waste.

ii. Health and nutrition

1. Strengthen national health and nutrition policy, coordination efforts and risk informed planning, to ensure climate-resilient health and nutrition services for all children. This includes ensuring all health and nutrition policies and strategies, including the upcoming Nutrition Strategy, clearly acknowledge the impacts of climate change on children's education and outline measures to address them, to ensure the continuity of healthcare during periods of drought, flood and other extreme weather events.

2. Ensure healthcare centres across the country are resilient and provide safe and effective services to children in the face of climate-related hazards. This includes:

- Enhancing the siting, design and construction standards of healthcare facilities, incorporating features such as climate-resilient WASH facilities, safe medical waste disposal systems. and solar power.
- Scaling up the implementation of solar power systems, for refrigeration, cooling, lighting and water supply, to allow systems to function "off-grid" and reduce energy costs.

3. Optimise the timing of the delivery of critical health and nutrition interventions for children, in line with the changing seasons. For example, Vitamin-A supplementation and measles vaccines have been found to be more effective when administered during the dry season. More research on seasonal differences in childhood illnesses, effective interventions and sex-differential effects should also be carried out.

4. Work with the Ministry of Agriculture and Rural Development, FAO and other partners to strengthen livelihoods and support better, more affordable access to nutritious, locally produced foods. This includes:

- Diversifying cash crop production beyond cashew nuts, which are highly vulnerable to climate change and other external pressures.
- Promoting sustainable agricultural practices such as drip irrigation systems,

forage/fodder production, crop rotation, and rainwater harvesting.

- Establishing biological control strategies across the country to tackle issues such as Fall ArmyWorm, Pó-fidalgo and other pests.
- Improving access to climate-resilient and higher yielding crop varieties, including more drought and salt-resilient crop varieties (e.g. rice, corn and alfalfa) to strengthen climate-resilient farming practices, particularly in water scarce regions such as Gabu and Bafata.
- Improving local grain storage and processing, in addition to guaranteeing prices for customers, to help minimise increases in food prices during the dry season.
- Promoting land and mangrove rehabilitation and the conservation of soil resources.

4. Work on improving access to safer, energy efficient cookstoves, to reduce indoor air pollution and minimise deforestation. Other adaptations, such as moving these stoves outside (or at least near a window) can also help improve indoor air quality for children.

4. Strengthen climate and health-related surveillance and data collection, including:

- The mapping of the most at-risk healthcare centres and communities
- Establishing climate and pollution monitoring stations in the most hazard prone areas, enhancing ongoing health and nutrition surveillance mechanisms and strengthening Early Warning Systems.

5. Strengthen the capacity of the health and nutrition sectors to adapt to climate change. This includes the provision of training and other guidance to healthcare workers, at all levels, on the diagnosis and treatment of climate and pollution-related illnesses.

iii. Education

1. Ensure schools across the country have an improved resilience to climate-related hazards, providing a safer, more conducive school environment for all students, as outlined in the Comprehensive School Safety Framework 2022-2030 for Child Rights and Resilience in the Education Sector.[206] This includes:

- Ensure Minimum Standards for School Construction are updated to include climate-related considerations (particularly flood risk and sea-level rise rise) during site selection, design and construction. The Standards must also be effectively disseminated and enforced.
- Implementing a risk-informed prioritisation plan and guidance for existing schools, particularly those in high-risk areas, to identify and intervene where refurbishment, rehabilitation, repair, retrofit, reconstruction, replacement, or relocation is needed to maximise investment, upgrade safety and ensure accessibility.
- Defining minimum performance standards, post-construction, within the legislative framework for physical assets. This should address life safety, gender responsive water and sanitation facilities, cooling, and ventilation systems, and providing a healthy learning environment fit for climate impacts.

[206] Global Alliance for DRR and Resilience in the Education Sector (2022) Comprehensive School Safety Framework 2022-2030 for Child Rights and Resilience in the Education Sector https://gadrrres.net/wp-content/uploads/2022/10/CSSF-2022-2030-EN.pdf

- Assessing and using the Education Management Information System (EMIS) for mapping, assessment and monitoring for school facility conditions and safety and for planning and decision-making.
- Engaging school management teams and communities in conducting environmental and social safeguarding assessments, identifying and implementing effective and sustainable measures to improve the safety and quality of learning facilities, safeguard education sector investments and promote a culture of safety and resilience.
- Provide guidance for response preparedness, including contingency plans Standard Operating Procedures (SOPs) for disasters and emergencies in schools, including drills, maintaining response provisions, and early action in response to early warnings.

2. Strengthen the National Curriculum from grades 1-12 to improve green skills and climate change education, making it more fun and practical for students. This includes:

- Further strengthening the integration of climate and environment across Physical and Social Environment and Citizenship classes, for all ages. This includes developing a curriculum that helps nurture connection and love for the natural environment, linking it with children's cultural heritage.
- Providing teachers with lesson plans, materials (including games etc), to make environmental education more practical, fun and relevant to the local context. This includes taking children outside the classroom, wherever possible, to connect with the natural environment
- Establishing a teacher training module on environmental education, to be taught at all teacher training colleges. Training should also be provided to current teaching staff.
- Using non-formal learning pathways such as school assemblies, clubs, youth movements, sports and community programming to engage children, youth and staff in school and community activities, and decision-making for risk identification, reduction and response capacity development, while building civic engagement and leadership.

iv. Child protection

1. Ensure that Child Protection policies and strategies comprehensively address climate and environment-related factors, outlining measures to safeguard children. More, specifically, this includes:

- Ensuring the Child Protection Code and Policy include specific measures to shield children from violence and exploitation, in the face of climate change and environmental degradation.
- Working with other sector partners to tackle food insecurity, livelihood loss and poverty - all of which are key drivers of child protection issues in Guinea-Bissau.

2. Enhance community-level child protection mechanisms to foster a safer environment for children. More specifically, this involves:

- Identifying climate-related threats at the community level and collaborating with communities to mitigate and respond to these risks, particularly safeguarding the most vulnerable children.
- Ensuring continuous access to resilient Child Protection services during climate-related disasters.
- Preventing and addressing violence against children and gender-based

violence, including harmful traditional practices, by reinforcing existing reporting channels and support services.

- Extending birth registration and civil registration initiatives to ensure universal coverage, enabling all children to access essential services such as social protection, healthcare, and education. This reduces their susceptibility to climate and environment-related impacts.

v. Social protection

1. Establish a systematic approach for updating data on vulnerable children and families, including those within the most hazard-prone areas, within the new national Social Registry database. This will help to ensure that all vulnerable children have access to social protection services and can receive support and assistance during climate-related emergencies.

2. Increase domestic and external financing for social protection to ensure access to crucial and lifesaving social services for the most vulnerable children and their families, focusing on enhancing efficiency, sustainability, and equity in financing. Additionally, progressively broaden the fiscal space required for social protection sustainable funding to address gaps in coverage and adequacy.

3. In collaboration with WFP and other partners, expand children's access to school feeding initiatives in the most hazard prone regions. The utilisation of locally sourced, climate-resilient foods should also be prioritised to bolster community livelihoods and ensure long-term sustainability. These measures aim to safeguard child health and nutrition and encourage continuous school attendance even during periods of drought, flooding, and extreme heat.

4. Reinforce the governance and coordination of national social protection mechanisms while advocating for integrated social protection programs. This involves enhancing data collection, harmonising social protection initiatives and programmes, integrated information management system, monitoring, and evaluation processes, as well as establishing effective outreach and grievance redressal systems. These efforts aim to ensure effective beneficiary selection criteria including targeting, identification and registration programme based results, outreach, and provision of lifecycle approach social protection and high-quality services to those in need.

vi. Communication and Advocacy

1. Enhance and broaden existing mechanisms to facilitate formal interactions between young people and environmental leaders, including representatives from the Ministry of Environment and Biodiversity and other ministries. This involves giving young people a voice in environmental policies and programs that directly affect them and strengthening platforms for their engagement with environmental leaders. UNICEF must also work to ensure that youth from the most hazard-prone communities are fully represented in these discussions.

2. Continue to provide comprehensive support to young climate advocates, including logistical assistance and training, ensuring their continuous involvement and meaningful participation in all climate and environmental initiatives. UNICEF and partners must continue to foster genuine inclusion, rather than tokenism, allowing young people to participate with government representatives in climate and environment-related meetings - and ensure young people's voices are heard.

3. In collaboration with the Ministry of Environment and Biodiversity, youth organisations (e.g. Palmeirinha) and government partners (e.g. IBAP), encourage young people's engagement in environmental conservation efforts in their communities. This includes beach cleaning activities, tree and mangrove plantation drives and recycling activities. Visibility materials including T-shirts and other incentives should be provided to help instil a sense of ownership and pride in their efforts.

4. Establish and reinforce national and sub-national youth networks, particularly in the most climate-affected regions. This includes providing capacity-building assistance to young people, empowering them to advocate for climate change issues, conduct vulnerability assessments and lead collective action projects in their communities.

5. Launch a radio and digital media, based on the Call to Action developed by young people in the CLAC. The campaign should focus on the long-term protection of the environment, particularly the country's beaches, mangroves and forests, and reducing plastic pollution. This campaign should also be linked to preserving families' livelihoods, health and cultural heritage and include practical action such as beach cleaning, waste collection and engagement with community leaders, to help foster further, long-term collective action.

6. Work with the Government and UN partners to implement flood warning strategies such as radio broadcasts, signage and color-coded SMS alerts. This will help ensure that all families, regardless of their literacy levels, will receive early warning.

©UNICEF Guinea-Bissau/2024/Knaute

ANNEXES

ANNEX I. LIST OF YOUTH ORGANISATIONS CURRENTLY WORKING ON CLIMATE AND ENVIRONMENT-RELATED ISSUES

Organisation name	Description	Working locations	Action for children and youth
Palmeirinha	Environmental education NGO, strengthening the capacity of youth on climate change.	All regions	Capacity building activities around environmental issues; Allows young people to co-create and implement solutions for climate resilience activities for the most vulnerable.
Rasta Turpesa	Youth association created in 2015, undertaking climate actions in all regions of the country.	All regions	Youth-led advocacy campaigns at national and community levels on climate actions;; Youth-led initiatives to reduce the impact of climate change in their communities (e.g. tree planting, mangrove restoration, waste management etc.)
Journalist network	Network of children and youth producing and airing media programmes on child rights, including climate, sponsored by UNICEF	All regions	Awareness raising activities through media programmes on the impact of climate change on children and actions to be taken by; Youth-led advocacy campaigns at national and community levels on climate actions
Rede nô rapara ambiente na Guiné-Bissau	Youth association undertaking climate actions in the country.	SAB	Youth-led advocacy campaigns at national and community levels on climate actions; Youth-led initiatives to reduce the impact of climate change in their communities (e.g. tree planting, mangrove restoration, waste management etc.)
Associação de Jovens para	Youth association undertaking climate actions in the country.	SAB	Youth-led advocacy campaigns at national and community levels on climate actions;

Proteção do meio Ambiente			Youth-led initiatives to reduce the impact of climate change in their communities (e.g. tree planting, mangrove restoration, waste management etc.)
Clube Agenda XXI	Youth association undertaking climate actions in the country.	SAB	Youth-led advocacy campaigns at national and community levels on climate actions; Youth-led initiatives to reduce the impact of climate change in their communities (e.g. tree planting, mangrove restoration, waste management etc.)
ONG- Amigos do Ambiente	Youth association undertaking climate actions in the country.	SAB	Youth-led advocacy campaigns at national and community levels on climate actions; Youth-led initiatives to reduce the impact of climate change in their communities (e.g. tree planting, mangrove restoration, waste management etc.)
Organização para Desenvolvimento Sustentável da Região de Gabú	Youth association undertaking climate actions in the country.	Gabu	Youth-led advocacy campaigns at national and community levels on climate actions; Youth-led initiatives to reduce the impact of climate change in their communities (e.g. tree planting, mangrove restoration, waste management etc.)
ONG-NINDJON	Youth association undertaking climate actions in the country.	Bubaque	Youth-led advocacy campaigns at national and community levels on climate actions: Youth-led initiatives to reduce the impact of climate change in their communities (e.g. tree planting, mangrove restoration, waste management etc.)
Homem Novo Bubaque	Youth association undertaking climate actions in the country.	Bubaque	Youth-led advocacy campaigns at national and community levels on climate actions; Youth-led initiatives to reduce the impact of climate change in their

			communities (e.g. tree planting, mangrove restoration, waste management etc.)
Associação de Guias e Monitores Ambientais	Youth association undertaking climate actions in the country.	Varela	Youth-led advocacy campaigns at national and community levels on climate actions; Youth-led initiatives to reduce the impact of climate change in their communities (e.g. tree planting, mangrove restoration, waste management etc.)

Published by United Nations Children's Fund Guinea-Bissau

United Nations Building

P.O.BOX 46

Bissau 1034

www.unicef.org/guineabissau/pt

www.facebook.com/unicefbissau/

www.twitter.com/unicef_bissau

www.instagram.com/unicef_bissau/

www.youtube.com/@unicefguinea-bissau3572