

The Ripple Effect:

Climate change and children's access to water and sanitation



Water, sanitation and hygiene are foundations of child survival and development

But the world is facing a water crisis, and climate change is making this crisis worse. Climate change is affecting our ability to reach children with water and sanitation.

The lives of millions of children are at risk.

To help protect children now and in the future, we must address climate change, and water and sanitation as a whole.

We need to work with communities to build climate resilient water and sanitation infrastructure and behaviors.

We need innovative solutions to keep water flowing.

And we need to put the most vulnerable children first.

Only then can we create a brighter future for every child.



The Ripple Effect: Climate change impacts our ability to provide children with the water and sanitation they need to survive and grow



Without safe water, sanitation and good hygiene, the lives of millions of children are at risk

Climate change threatens our ability to reach children with the water, sanitation and hygiene they need to survive and grow

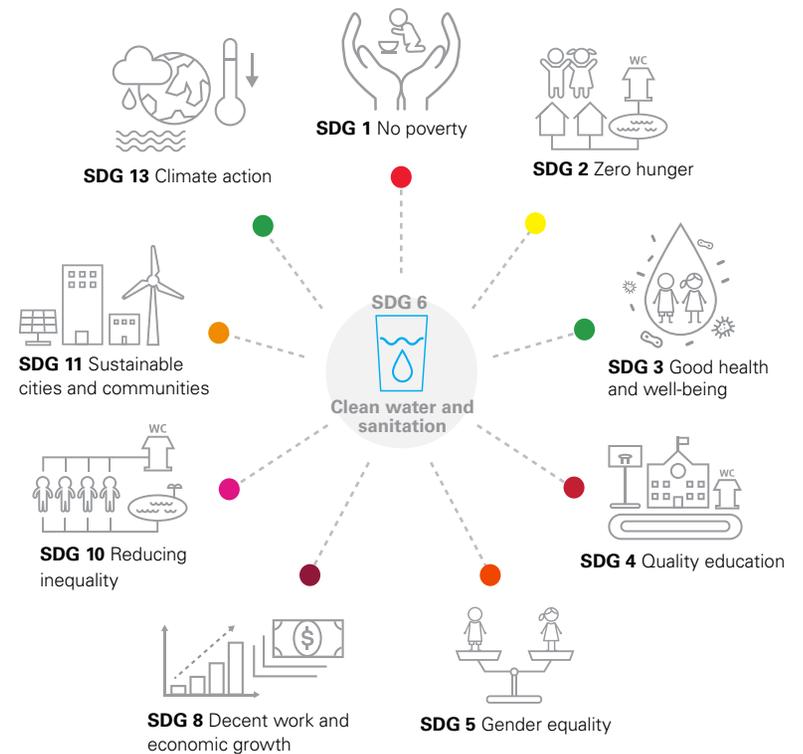
Water, sanitation and hygiene are foundations of child survival and development. When children have access to safe water and sanitation close to their homes and schools, they have a chance to grow up healthy, to gain an education, to break cycles of poverty and inequality, and to live with dignity.

Access to safe water, sanitation, and good hygiene are essential components for other areas of development including: health, nutrition and education. Water, sanitation and hygiene (WASH) are interrelated and mutually reinforcing: It is only when children have all three that they have a chance to survive and grow.

Despite the importance of water, sanitation and hygiene for survival, 663 million people do not have access to safe water, and 2.4 billion people do not use improved sanitation.¹ Nine hundred and forty six million people still practice open defecation.² Without access to these basic services, and in the absence of good hygiene, children are at risk of dying from otherwise preventable diseases. Every day, over 800 children under 5 die from diarrhoea linked to unsafe water, sanitation and poor hygiene.³ The same conditions have been linked to stunting, which reduces a child's physical and cognitive growth. About 156 million children worldwide are stunted.⁴

It is often the poorest and most disadvantaged children who suffer the most, perpetuating the cycle of poverty and exclusion.

Safe water, sanitation and good hygiene are essential for achieving the Sustainable Development Goals



The world is facing a water crisis exacerbated by climate change

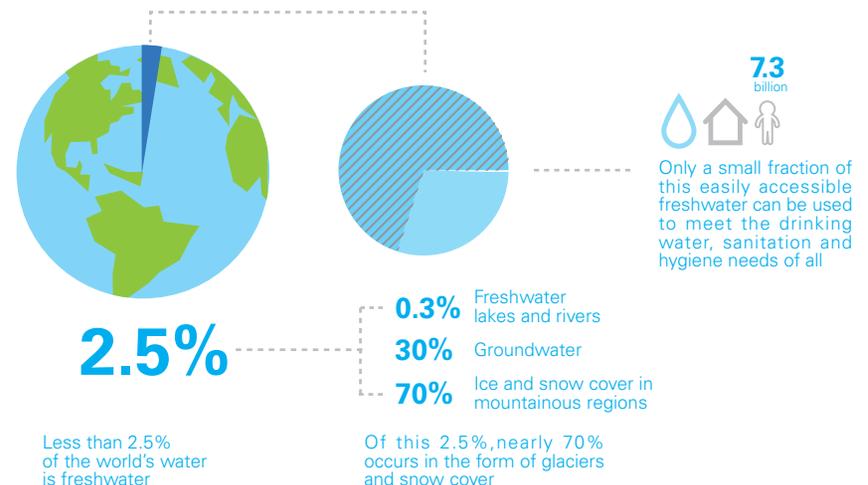
According to the World Economic Forum's Global Risks Report 2016, the water crisis is likely to be one of the greatest risks that the world will face over the next decade. It is now considered a social risk, not just an environmental one.⁵

Currently, less than 2.5 per cent of the world's water is freshwater.⁶ Of this, more than two thirds are trapped in glaciers and ice, leaving very little that is easily accessible.⁷ Of easily accessible freshwater from sources such as rivers, lakes and shallow groundwater, only a much smaller fraction can be used to meet the drinking water, sanitation and hygiene needs of the world's 7.3 billion people.^{8,9}

Moreover, prospects for freshwater availability look challenging. Given growing demands from manufacturing, electricity generation and domestic use, if we keep to our current path, the world is expected to face a 40 per cent shortfall in water availability by 2030.¹⁰ If trends continue, global water demand is expected to increase by 55 per cent by 2050.¹¹

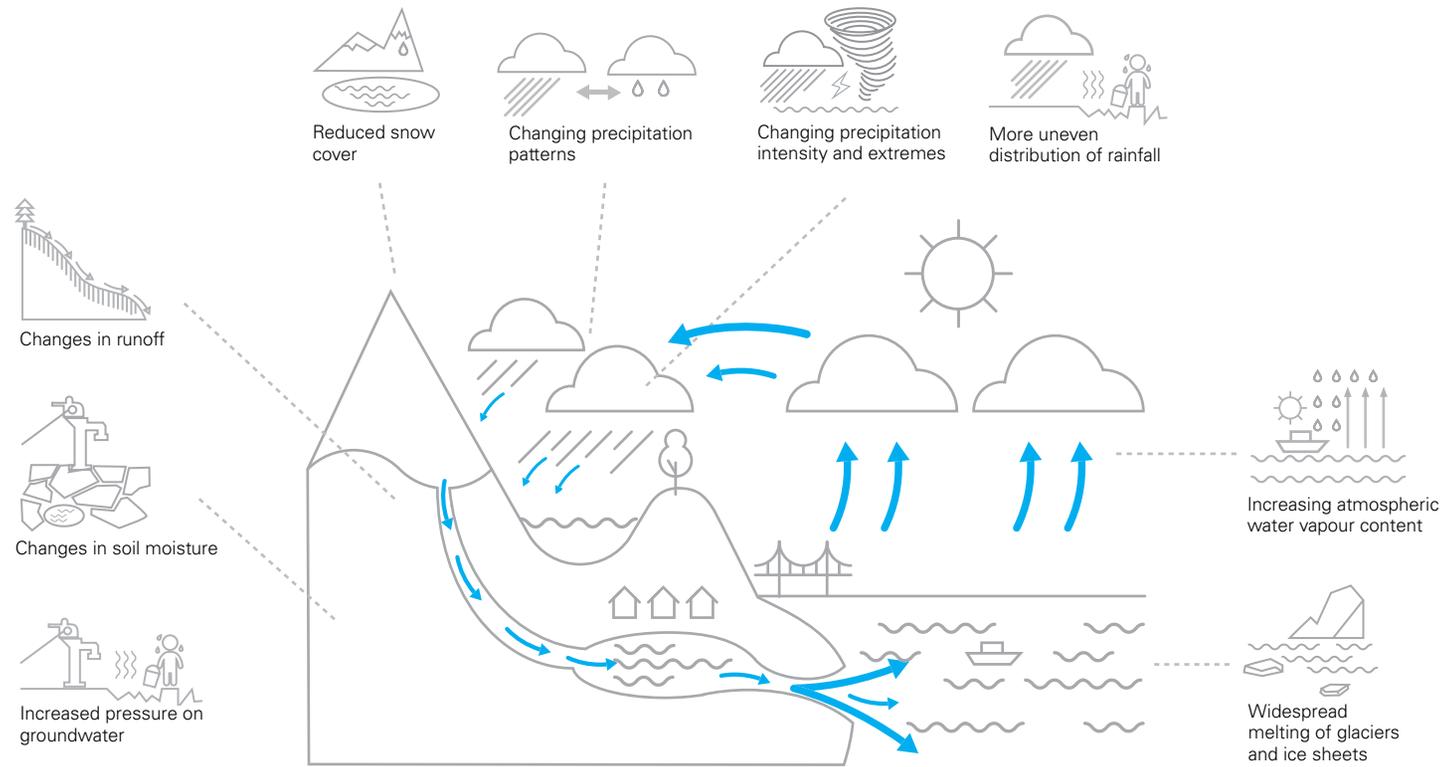
Availability of water impacts sanitation, hygiene, and children's health

The effects of climate change are often experienced through water. Global warming linked to changes in the water cycle include: increasing atmospheric water vapour content; changing precipitation patterns, intensity and extremes; reduced snow cover and widespread melting of ice; and changes in soil moisture and runoff.¹² The frequency of heavy rainfall and storms have increased in most areas.¹³ Meanwhile, globally, the area of land classified as 'very dry' has more than doubled since the 1970s.¹⁴ There have been significant decreases in Northern Hemisphere snow cover and in water storage in mountain glaciers.¹⁵



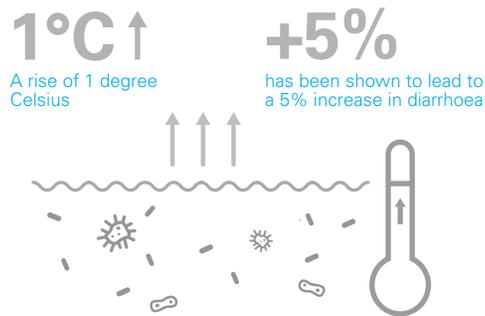
Source: UNEP (2002) *State of the Environment and Policy Retrospective: 1972–2002*
UN Water (2014) *The Volume Of Freshwater Resources On Earth Is Around 35 Million km³*
United States Geological Survey (2016) *Where is Earth's Water?*

Climate change impacts the water cycle



Source: IPCC (2008) *Climate Change and Water Cycle*

Climate change is contributing to the world's water crisis and affecting our ability to provide children with safe water and sanitation



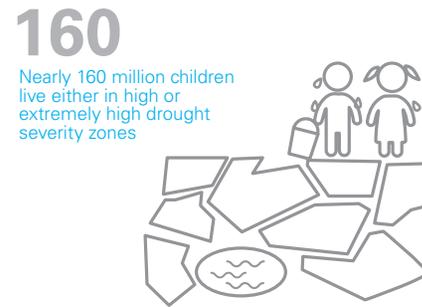
Source: Kolstad, Erik W, and Kjell Arne Johansson. (2011) *Uncertainties Associated with Quantifying Climate Change Impacts on Human Health: A Case Study for Diarrhea*. Environmental Health Perspect

Rising temperatures:

As temperatures in rivers and surface waters rise, water quality can be contaminated, making it unsuitable to drink. Algal blooms favour higher temperatures, creating toxins and pathogens that can damage the liver and nervous systems.¹⁶ These pathogens and toxins contaminate water and can cause the spread of diseases such as diarrhoea.¹⁷ Moreover, the effects are cyclical: Algal blooms absorb sunlight making water even warmer and promoting more blooms.¹⁸

Higher temperatures also cause moisture to evaporate from land and water, creating erratic rainfall trends that can lead to droughts and floods.¹⁹ These erratic trends impact the balance of the water cycle and create increasing demand for freshwater.²⁰

As water evaporates and soil becomes increasingly dry, more water is needed for irrigation and agriculture. This can cause competition for access to water and can potentially lead to conflict.



Source: United Nations Children's Fund, *Unless We Act Now: The impact of climate change on children*, UNICEF, New York, November 2015.

Droughts and water stress:

Climate change can also lead to less rainfall and to droughts. This affects the amount of water available, how water is stored, and the quality of water. It also reduces the base flow of rivers, which can lead to an increase or a concentration of pollutants in water, which can spread disease.

When water is scarce, water supply needs to be managed to avoid conflict. Access to safe water for children and households should be a priority. Without enough safe water, and in the absence of sanitation and good hygiene, many children suffer from diarrhoea and impaired physical and cognitive growth.^{21 22 23}

Food shortages as a consequence of longer and more frequent droughts can lead to famine and widespread hunger – as the poorest families often cannot afford rising food prices. In many areas affected by drought and water stress, children – usually girls – have to walk longer distances to fetch water. In some places, the journey can take up to 10 hours a day.²⁴

530 million

More than half a billion children live in extremely high flood occurrence zones



Source: United Nations Children's Fund, *Unless We Act Now: The impact of climate change on children*, UNICEF, New York, November 2015..

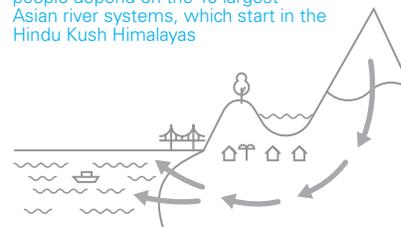
Floods:

Climate change can also lead to heavier rainfall and floods, which can destroy or damage water and sanitation infrastructure. Damaged infrastructure can lead to contamination of water supplies. In some places where toilets are flooded or damaged, communities are at risk of abandoning important sanitation and hygiene behaviours and returning to open defecation.

Cholera, for example, spreads through contaminated water and can kill children within hours if the disease is untreated.²⁵ The risk of vector-borne diseases also rises with heavy rainfall. That risk escalates with floods – especially where there is a lack of drainage systems, which create stagnant water.²⁶ Stagnant water increases dangers because it creates favorable breeding conditions for the mosquitoes that transmit vector-borne diseases such as malaria, dengue or Zika.²⁷ Young children are particularly at risk. Of the 438,000 people who died from malaria in 2015, 65 per cent were children under 5 years old.²⁸

1.3 billion

Currently, more than 1.3 billion people depend on the 10 largest Asian river systems, which start in the Hindu Kush Himalayas



Source: ICIMOD (2009) *Himalayas-Water for 1.3 Billion People*

Melting ice:

Glaciers are a major source of freshwater for many communities. Glaciers store and release fresh water seasonally, replenishing the rivers and groundwater that are essential for our survival and for ecosystems. When ice caps melt at faster rates due to the effects of climate change, the seasonality of river flows is affected. This leads to sudden and dangerous increases of river levels and drastically reduces water availability in the long term. Currently, more than 1.3 billion people – including children – depend on the 10 largest Asian river systems. These systems start in a single water source: the Hindu Kush Himalayas.²⁹

Studies show that with a 1 degree Celsius rise in global mean temperatures, small glaciers in the Andes will disappear completely, threatening water supplies for 50 million people.³⁰

2°C↑ 130 million

A rise of 2 degree Celsius in global temperature

can cause coastal flooding, affecting more than 130 million people each year



Source: Strauss, B. H., Kulp, S. and Levermann, A. (2015) *Mapping Choices: Carbon, Climate, and Rising Seas, Our Global Legacy*. Climate Central Research Report.

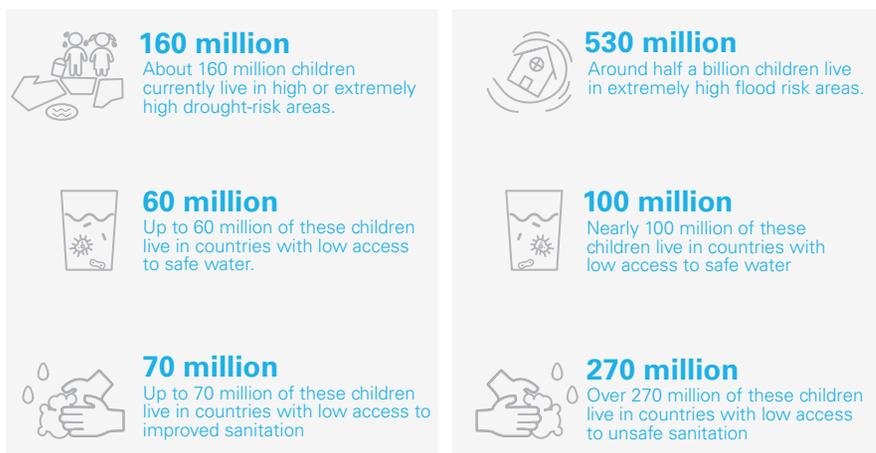
Rising sea levels:

One quarter of the global population lives in coastal regions.³¹ Melting glaciers and thermal expansion due to higher temperatures contribute to sea-level rise. In the past century, the global average of sea levels has risen by 10 centimetres to 20 centimetres.³² We are already witnessing the impacts of the rise in sea level, especially in low-lying areas and small islands. Projections indicate that sea levels will rise another 9 centimetres to 88 centimetres by the year 2100.³³ In coastal areas, the rise in sea levels exacerbates salinisation of groundwater. This happens because of landward and upward movement of seawater in coastal aquifers, affecting both the quality and quantity of freshwater resources. Small Island Developing States especially struggle with saltwater intrusion of freshwater resources.³⁴

Other climate change related trends such as increasingly frequent and intense floods, droughts and storm surges exacerbate the situation.³⁵

Climate change affects us all, but it is the poorest and most disadvantaged who suffer the most

The most flood and drought-prone regions are often in areas of extreme poverty where levels of access to water and sanitation are already low. This undermines the ability of children and their families to adapt to climate change and prepare for climate-related disasters. In times of drought or flood, families rely on unsafe water, which causes illness and can lead to death.

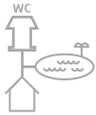


Source: United Nations Children's Fund, *Unless We Act Now: The impact of climate change on children*, UNICEF, New York, November 2015.



UNICEF works with governments and partners on innovative solutions to address the water crisis and climate change

The worst impacts of climate change are not inevitable, but we need to act now to safeguard access to safe water and sanitation



Communities and people: Building climate resilient water and sanitation

Over time, communities have adopted behaviours and coping strategies to deal with changes in rainfall, including recurrent floods and drought, to secure their daily need for water and sanitation. With the increasing effects of climate change being felt, reinforcing those coping strategies can help to protect children's health and development. Water and sanitation services and behaviours need to be more resilient to the impacts of climate change. For example, a flood-damaged toilet needs to be rebuilt in a way that allows it to withstand future floods. To prevent communities from reverting back to practicing open defecation, behaviour change and social norms should be reinforced. If a safe water source is contaminated, an alternative source needs to be identified or water needs to be treated. These practices need to continue until the safe water source is restored and barriers to protect contamination are put in place. To build more resilient services, better preparation and planning is key. For example, water storage options should be considered in water scarce areas.

UNICEF is already working on innovative ways of storing water to bridge dry spells or extended droughts. In Ethiopia, UNICEF uses remote sensing and hydrogeological data to target groundwater resources for deeply drilled boreholes – sources that can supply

pastoralist communities with safe water during drought. Smart water and sanitation solutions adapted to community needs and desires can help to avoid infrastructure damage and water source contamination during floods and storms. Community water safety and security planning has helped vulnerable communities in Fiji and Vanuatu better develop and upgrade their water and sanitation systems and allowed the countries to recover quickly after a climate shock. Innovative water and sanitation services such as solar powered water supply systems offer more sustainable and economically beneficial solutions. They also help reduce the water and sanitation sector's carbon footprint.

Keeping the water flowing: Quantity and quality



In areas with an increasingly dry climate, competition for limited resources between agriculture, energy and household use can lead to conflict. When water supply is short, the allocation of available water needs to be planned and managed to avoid potential conflict. Making sure children have enough drinking water and water for household use should be a first priority.

UNICEF supports the State Government of Maharashtra in India with a decision-making tool that predicts droughts based on community-provided data. This helps them to plan for water allocation and maximize use for multiple purposes. In low-lying areas such as the Bangladesh coastline, storm surge and sea-level rise threatens the water quality of an already over-exploited ground water resource through

salt-water intrusion. UNICEF is working with partners and governments on innovative approaches to store rainwater underground through artificial groundwater recharge in order to secure access to drinking water for coastal communities.



Putting the vulnerable first: Understanding and managing climate risks

Different countries face different climate risks, and threats will vary over time. Climate disasters have a wider and more acute impact in countries with low levels of access to safe water and sanitation. People living in low-lying land, near wastewater and drainage channels, or in urban slums are particularly vulnerable. Governments should set standards for climate-resilient water, sanitation and hygiene, allocate resources accordingly, and manage the risks to the most vulnerable.

UNICEF works with governments and sector stakeholders to assess these risks and to come up with action plans for resilient water and sanitation development. In Madagascar, for example, UNICEF will support the government to integrate climate change risks and actions in the revision of the national water law and in the water and sanitation master plan for three out of six watersheds in the country.

Advocacy and global action



The link between human water security, health and climate change has received relatively little attention compared to other water-using sectors such as agriculture and energy. UNICEF and partners are exploring ways in which different global policy processes, including the Sustainable Development Goals, the United Nations Framework Convention on Climate Change and associated financing mechanisms, can better incorporate access to safe and sustainable water and sanitation. Advocacy also plays an important role in generating evidence, engaging the public, and empowering people to be part of the global action needed to address climate change. Children should be at the heart of our climate activities and policies so that we can reach every child with climate-resilient water and sanitation services.

Safe water and sanitation are the foundations of child survival and development. We cannot safeguard a child's access to safe water and sanitation without addressing climate change. To help protect children now and in the future, we must address climate change, water and sanitation as a whole. Only then can we create a brighter future for every child.

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**To help protect children, we must safeguard their
access to safe water and sanitation, especially in the
face of climate change. Only then can we create a
brighter future for every child**

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