

Impacts of climate change on human health- the case of flooding in south Sudan

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Introduction

- ▶ Climate change is already impacting health in a numerous of ways, including by leading to death and illness from increasingly frequent extreme weather events, such as heat waves, storms and floods, the disruption of food systems, increases in zoonoses and food-, water- and vector-borne diseases, and mental health issues. Furthermore, climate change is undermining many of the social determinants for good health, such as livelihoods, equality and access to health care and social support structures. These climate-sensitive health risks are disproportionately felt by the most vulnerable and disadvantaged, including women, children, ethnic minorities, poor communities, migrants or displaced persons, older populations, and those with underlying health conditions.

Flooding in South Sudan

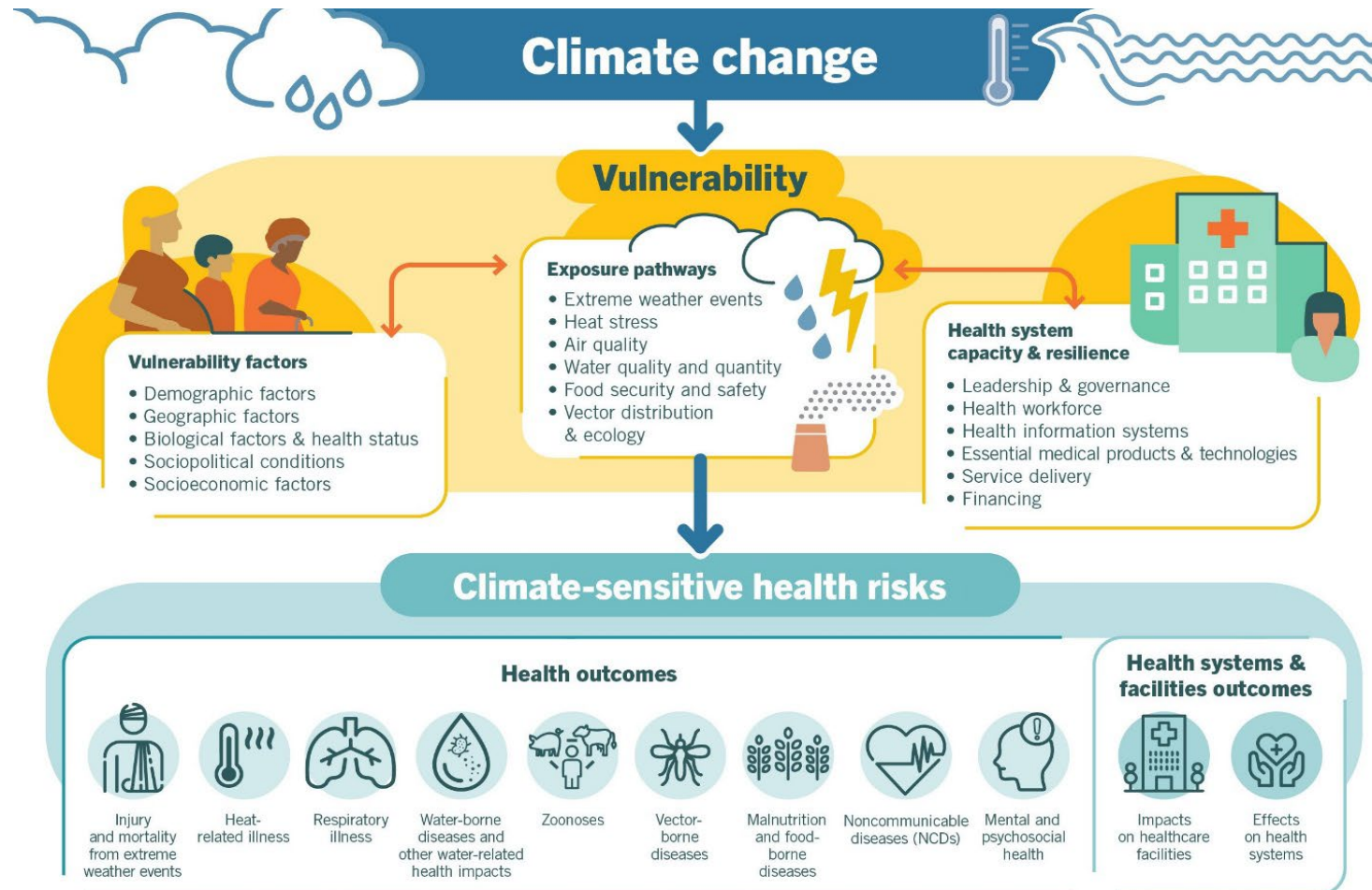
- ▶ Since July 2020, South Sudan has been experiencing heavy rainfall and rising water levels along the White Nile, which resulted in massive flooding in many parts of the country affecting nearly one million people and subsequently resulting in widespread disruption to normal patterns of life in the affected locations. flooding started since 2019 with the worse records of flooding in 2021.
- ▶ In South Sudan, the incidences of floods and droughts have been on the rise. For example, the number of floods in South Sudan over the past thirty years has come close to the total number of flood incidents in the sixty years preceding that; twenty-six incidents of floods were recorded between 1991 and 2021 compared to eighteen incidents between 1961 and 1991 and eleven incidents from 1930 to 1960. This coincides with an increase in the country's temperatures, which have risen by more than one degree Celsius since the mid-1970s.
- ▶ Heavy rainfall and overflowing rivers have flooded thousands of farmlands, homes infrastructure including health facilities in eight states leading to displacement, loss of lives and damaged and loss to properties and increase outbreak of water-born diseases and food insecurity. The impacts of flooding are more severe in Jonglie, Upper Nile and Unity states where thousands of people have been displaced, while others built dikes around their homes and compounds to hold back flood water, but still live in harsh conditions with little access to healthcare and other basic needs.
- ▶ The ground is still saturated with flood water, which has never receded since the onset of floods in 2019 which could lead to more flooding within this rainy season. This will result in displacement of more people as the water is projected to reach higher and drier ground, putting peoples lives at risk.

Causes of flooding in South Sudan

- ▶ South Sudan is divided into six ecological zones; namely the green belt, ironstone plateau, hills and mountains, flood plains, the Sobat and Nile corridors and the arid and pastoral zone. As climate changes more frequent, intense and severe extreme climate events such as heat waves, droughts and floods have been experienced and continue to increase in the country in an expected way. Most of South Sudan lies within the Nile Basin and the flood plains and is therefore vulnerable to floods. Floods are caused by heavy rainfall that is triggered by the excessive evaporation generated by high temperatures.
- ▶ Floods mostly originate from the Ethiopian Highlands through the Sobat River, which joins the Nile at Malakal in South Sudan, from Uganda through the White Nile River, from the Central African Republic (CAR) and Congo through the Bhar Ghazal River and its tributaries, and from the runoffs of local torrents. Rise in the water levels of Lake Victoria has been the single most devastating climate phenomenon facing South Sudan and countries downstream of the White Nile. The current flooding episode in the Nile Basin countries was caused by heavy rainfalls leading to the rising water levels in Lake Victoria, which were caused by an unprecedented increase in the sea surface temperatures of the India Ocean.

Impacts of flooding on human health

- ▶ Floods can directly and indirectly affect human health in both the short and long term. Additionally, it's not just communities who have experienced flooding whose health is at risk. Disaster responders, humanitarian workers, healthcare professionals and critical service providers can also be affected.
- ▶ Health effects observed during and after floods include injuries, infections, poisoning and greater mental-health problems. The longer-term health effects result from displacement, shortages of safe water, injuries, disruption of access to health services and delayed recovery.



Health effects

Vector-borne Diseases

- ▶ Vector-borne diseases are illnesses that are transmitted by disease *vectors*, which include mosquitoes, ticks, and fleas. These vectors can carry infectious pathogens, such as viruses, bacteria, and protozoa, from animals to humans. Changes in temperature, precipitation, and extreme events increases the geographic range of diseases spread by vectors and can lead to illnesses occurring earlier in the year.
 - Mosquitoes thrive in certain climate conditions and can spread diseases like . Extreme temperatures—too cold, hot, wet, or dry—influence the location and number of mosquitoes that transmit diseases like malaria
- ▶ The spread of climate-sensitive diseases will depend on both climate and non-climate factors such as land use, socioeconomic and cultural conditions, pest control, access to health care, and human responses to disease risk. The United States has public health infrastructure and programs to monitor, manage, and prevent the spread of many diseases. The risks for climate-sensitive diseases are much higher in poorer countries that have less capacity to prevent and treat illness.

Water-Related Illnesses

- ▶ People can become ill if exposed to contaminated drinking or recreational water. Climate change increases the risk of illness through increasing temperature, more frequent heavy rains and runoff. Health impacts may include gastrointestinal illness like diarrhea, effects on the body's nervous and respiratory systems, or liver and kidney damage. Climate impacts can affect exposure to waterborne pathogens (bacteria, viruses, and parasites such as *Cryptosporidium* and *Giardia*); toxins produced by harmful algal and cyanobacterial blooms in the water; and chemicals that end up in water from human activities.
- Changing water temperatures mean that waterborne *Vibrio* bacteria and harmful algal toxins will be present in the water. Runoff and flooding resulting from increases in extreme precipitation.
- Eutrophication result from so much nutrients being washed to water bodies through runoff from agricultural and other industrial activities, cause reduction in dissolved oxygen which affects aquatic organisms like fish. Through food change many contaminants and pollutants including heavy metals are passed to human and are responsible for causing cancers, cardiovascular and respiratory illnesses.

Climate change and Mental Health

Mental health consequences, ranging from minimal stress and distress symptoms to clinical disorders, such as anxiety, depression, post-traumatic stress, and suicidality, can result from exposures to short-lived or prolonged climate- or weather-related events and their health consequences. These mental health impacts can interact with other health, social, and environmental stressors to diminish an individual's well-being. Individuals whose households experienced a flood or risk of flood report higher levels of depression and anxiety, and these impacts can persist several years after the event. Disasters present a heavy burden on the mental health of children when there is forced displacement from their home or a loss of family and community stability. Increased use of alcohol and tobacco are common following disasters as well as droughts.



► **Other Health Impacts**

- Other linkages exist between climate change and human health. For example, changes in temperature and precipitation, as well as droughts and floods, have affected agricultural yields and production. these impacts have compromised food security and threaten human health through malnutrition,

Mitigation and adaptation mechanisms

- ❖ Establishment of early warning systems for extreme events
- ❖ Taking steps to reduce vulnerabilities among populations of concern
- ❖ Raising awareness among healthcare professionals
- ❖ Ensuring that infrastructure is built to accommodate anticipated future changes in climate. Understanding the threats that climate change poses to human health is the first step in working together to lower risks and be prepared.
- ❖ Building resilient communities
- ❖ Relocating people to higher grounds
- ❖ Building dykes and other barriers
- ❖ Stablising retention areas
- ❖ Plant more trees to absorb water and water loss through evapotranspiration
- ❖ Conservation of Sudd wetland