

# Water related health risks from climate change

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*Measuring health and nutrition transition considering the role of pollution and biodiversity, Univ Pavia, 5 March 2024*

# Three major global water and health issues

- Infections
- Water scarcity
- Chemical pollutants



A young child is sitting on a boat, surrounded by numerous plastic bottles and other debris. The child is looking towards the camera. The background shows a body of water and some buildings on the shore under a blue sky with clouds. The text "Infectious agents" is overlaid on the image in white, bold font.

**Infectious agents**

# 2 to 3 persons in 10 of the world's population lacked safe drinking water in 2020

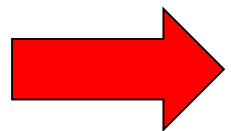
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- **5.8 billion** people have safe water located on premises
- The remaining **2 billion** people do not have safely managed services
  - **1.2 billion** people have *basic* services
  - **282 million** people have *limited* services
  - **368 million** people, unprotected wells and springs;
  - **122 million** people, untreated surface water from lakes, ponds, rivers and streams

# Deaths from diarrhoea are largely preventable (but we don't prevent them)

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- Some 829,000 people are estimated to die each year from diarrhoea as a result of unsafe drinking-water, sanitation and hand hygiene (total global annual deaths are around 60M)
- Microbiologically contaminated drinking water can transmit diseases such as diarrhoea, cholera, dysentery, typhoid, polio
- the deaths of 297,000 children aged under 5 years could be avoided each year if these risk factors were addressed

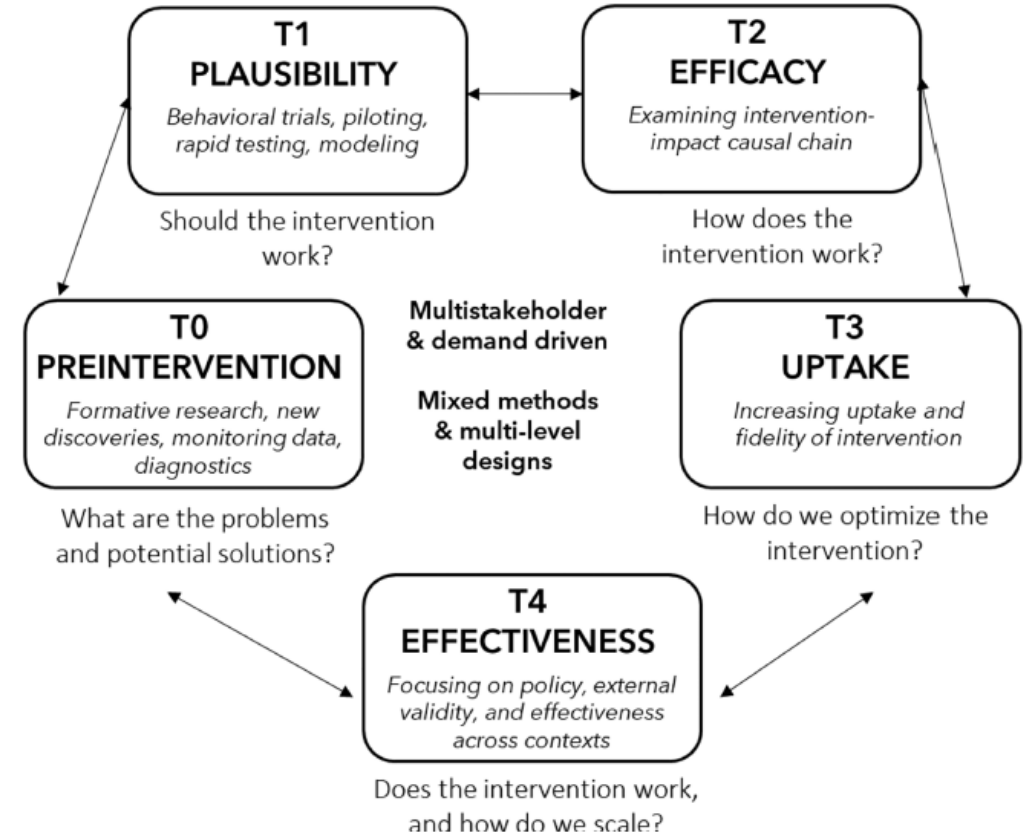


this means 814 deaths per day

# Implementation Science in water and sanitation.

## Translational Phases of Evidence to Practice

- Technologies for promoting health in low income settings frequently do not have an impact because their uptake fails. Still, much of the international funding focuses on investments on new technologies
- Existing evidence-based interventions if adequately applied in complex social context would be more cost-efficient: implementation science



(Haque & Freeman, EHP 2021)

# Much of the discussion on global water has focused on infectious agents

- The health effects are huge
- The ethical issues of global inequities in water and inaction, are huge

*but also*

- the **visibility of the pollutant** determines how much priority it receives. **Highly visible pollutants** and pollutants with **acute impacts**, such as those **related to fecal contamination**, are often the first pollutants a country seeks to limit
- **Water scarcity/climate change** is becoming visible
- **Chemical pollutants** whose **impacts may take years to manifest** in the form of cancer or other chronic illnesses receive less attention, as it is harder to directly link health impacts to exposure to specific pollutants in the past or over time

(modified from R Damania et al, *Quality Unknown: The Invisible Water Crisis*, World Bank 2020)

# Water Scarcity



Photograph: Arun Sankar/AFP

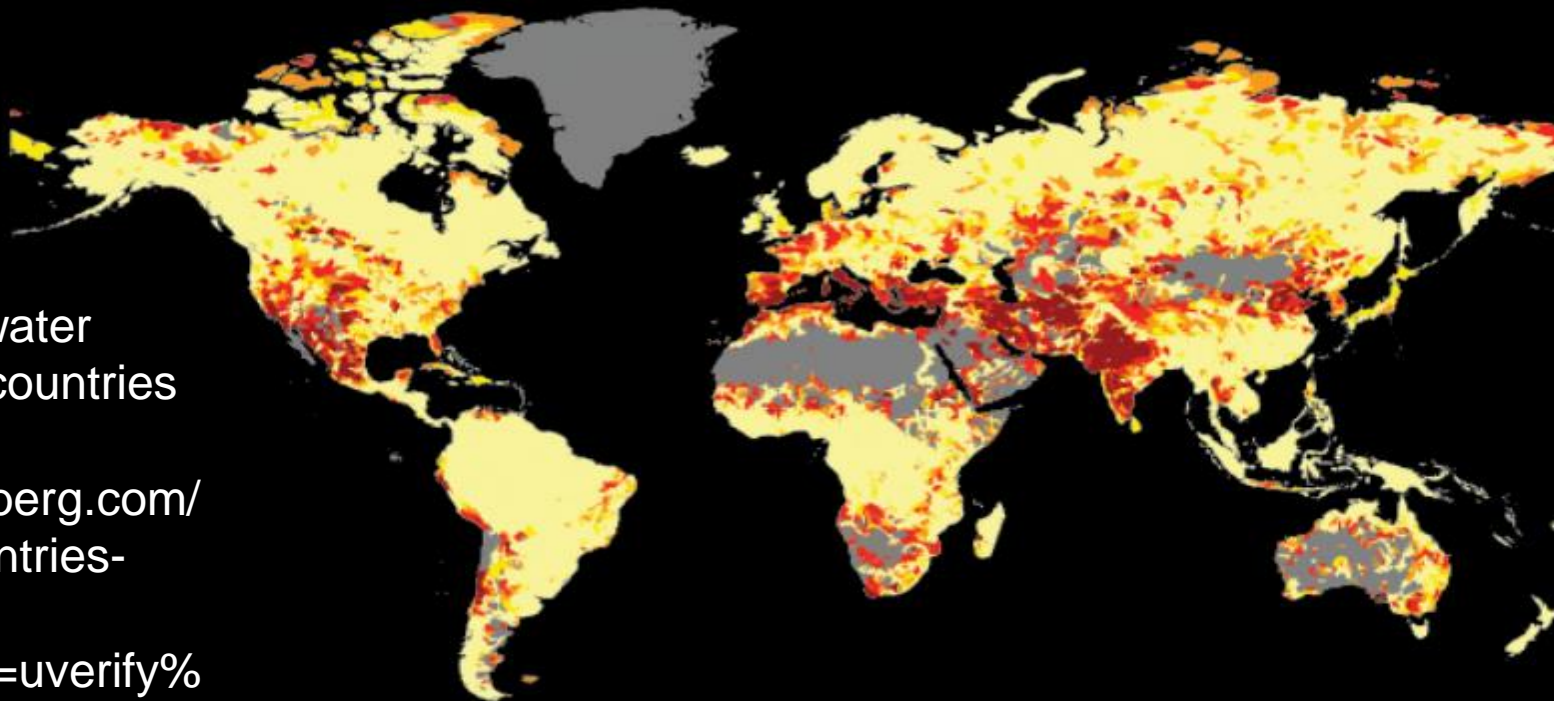


# Water stress

- Countries facing extremely high water stress are using up to 80% of the available surface and ground water supply in an average year, and even small dry shocks, which are poised to increase due to climate change, can have severe effects
- Nearly 1.8 billion people in seventeen countries, or a quarter of the world's population, live in areas with the potential of severe shortages in the next few years

# 17 COUNTRIES FACE EXTREMELY HIGH WATER STRESS

BASELINE WATER STRESS



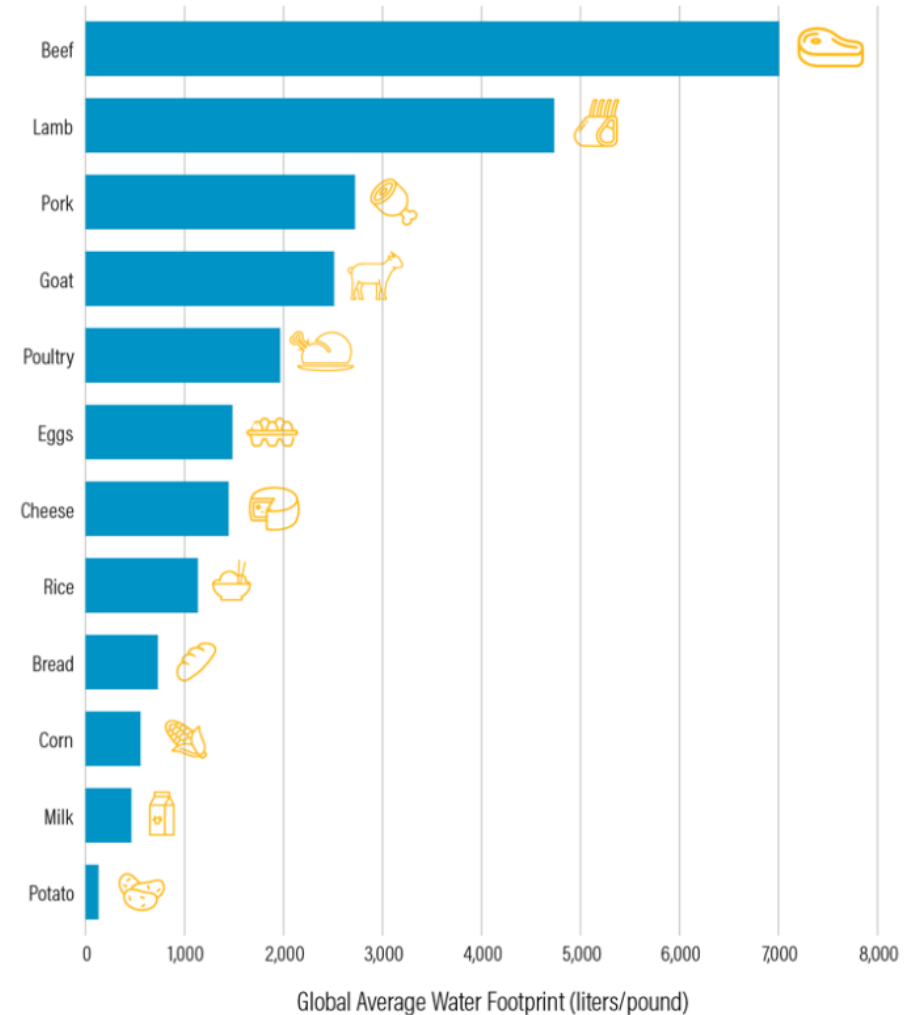
A complete list of water stress risks for all countries can be found here:  
<https://www.bloomberg.com/graphics/2019-countries-facing-water-crisis/?leadSource=uverify%20wall>

Source: [wri.org/aqueduct](http://wri.org/aqueduct)

# Water footprint

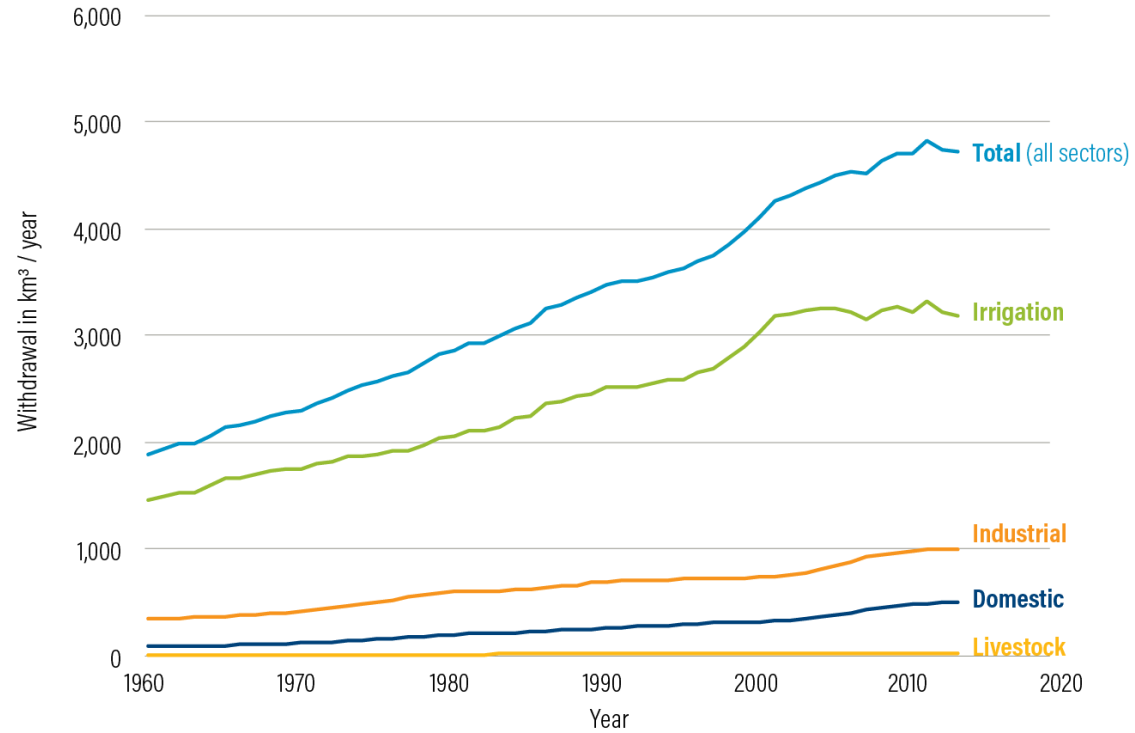
- Water use day-to-day: what comes to mind is drinking, brushing teeth, doing laundry. “Average” person drinks 2 to 4 liters of water a day
- People eat way more water than they drink or use for household tasks. To produce the food that the “average” person eats each day requires 2,000 to 5,000 liters of water
- Agriculture accounts for 70 percent of Earth’s freshwater withdrawals each year.

How Much Water Does it Take to Make Food?



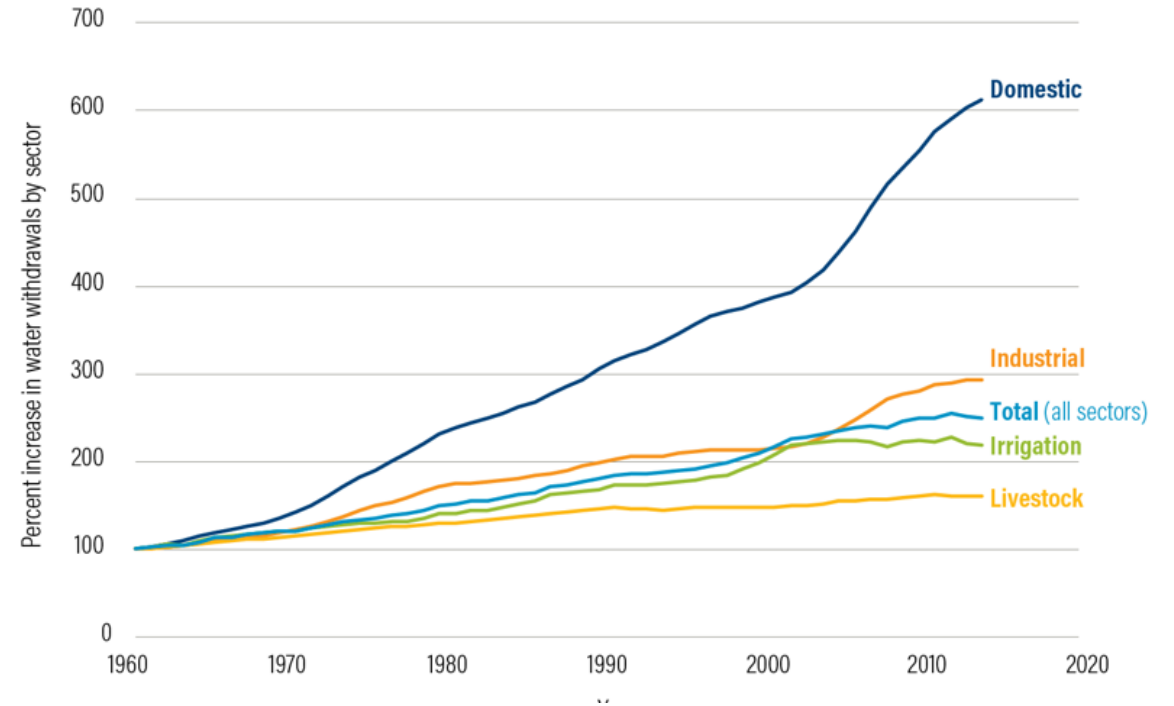
Source: Water Footprint Network.

Water withdrawals by sector, 1960-2014



Water withdrawals by sector, 1960-2014

Domestic water withdrawals increased more than 600% since the 1960s



Source: Authors.  
20.2.10



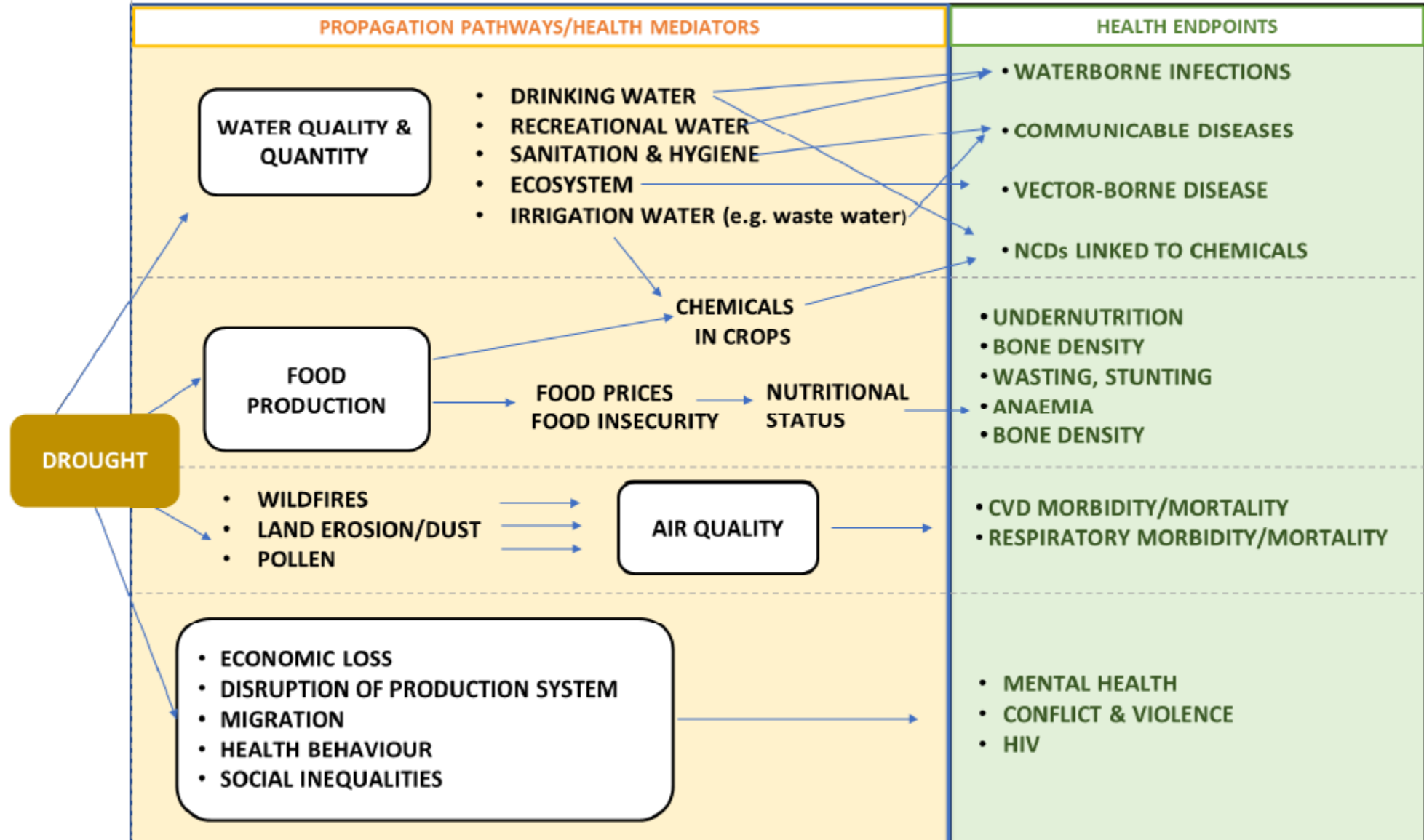
# Anticipated water-related health impacts of climate change

 Inexistent quantitative estimates of potential health impacts

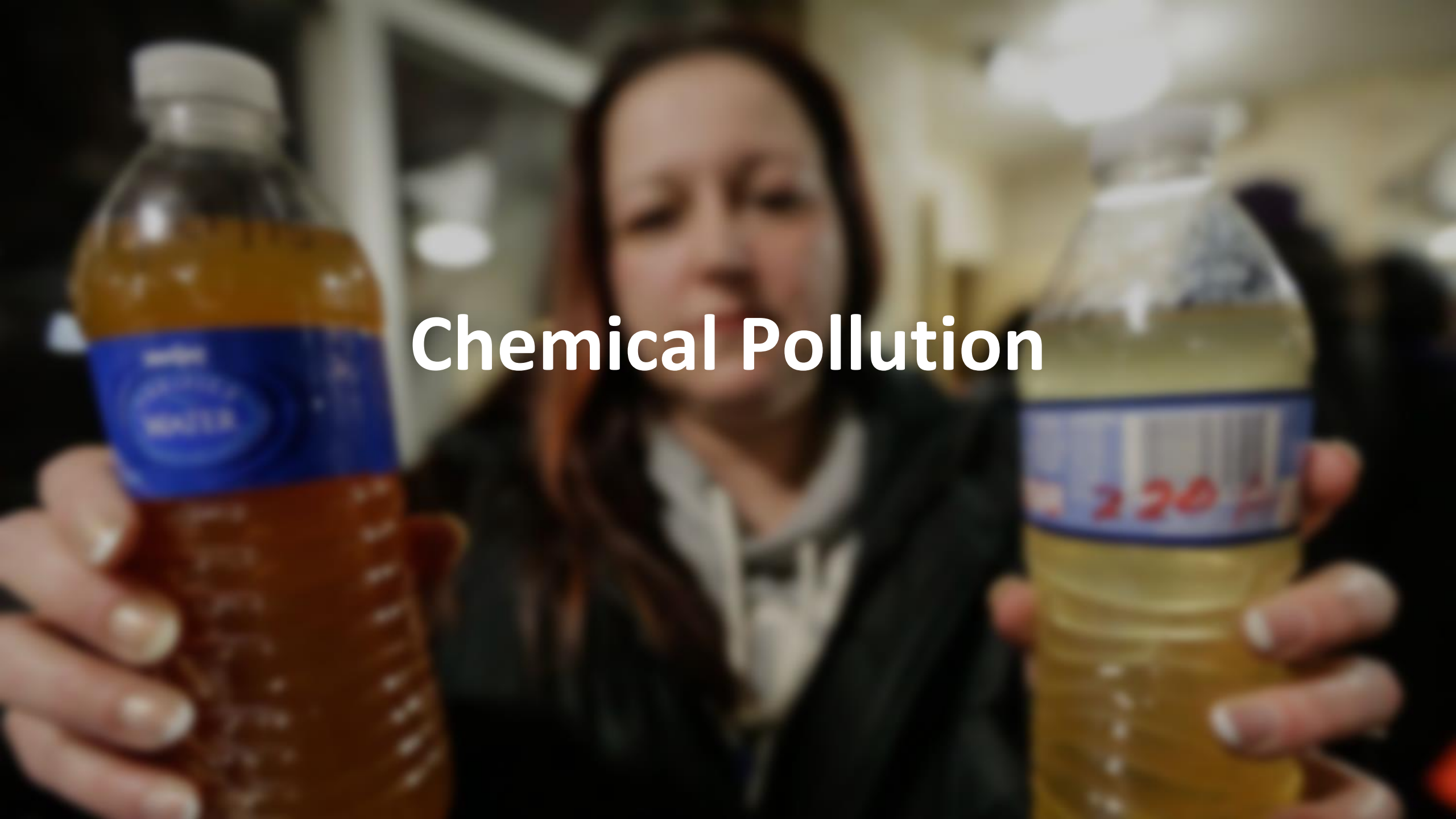
- food-, water- and vector-borne diseases
- deaths and injury associated with extreme weather events such as coastal and inland flooding
- undernutrition as a result of food shortages caused by droughts and floods
- increased exposure to pathogens, toxins or chemicals in drinking water

(Modified from UNESCO, UN-Water, 2020)

# Links between drought and human health



# Chemical Pollution



# Global water: the main health issues

- Globally, at least 2 billion people use a drinking water source contaminated with faeces. Microbial contamination of drinking-water continuous being a huge risk for health
- Over 2 billion people live in water-stressed countries, which will be exacerbated in some regions as result of climate change and population growth
- Chemical risks in drinking water including nitrate, arsenic, fluoride and DBPs are well recognized. Major emerging contaminants of public concern include pharmaceuticals, pesticides, per- and polyfluoroalkyl substances(PFASs) and microplastics