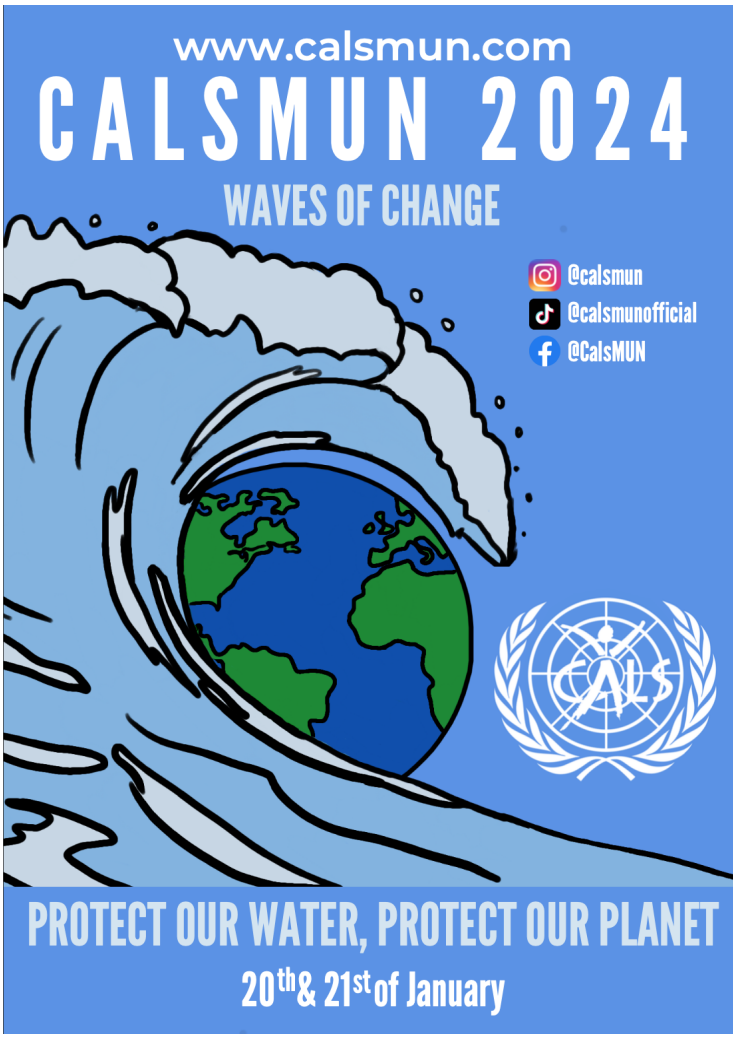


Waves of Change

CalsMUN 2024

Research Report

Forum: World Health Assembely

Issue: Combating the Adverse Effects of Water Scarcity on Agricultural Productivity and Public Health, and Addressing the Resulting Issue of Malnutrition

Chairs: Lorenzo Diana and Varun Sachar

Introduction

Water is the most important resource for life, and has rightfully been a prevalent topic of debate among politicians, both nationally and internationally. It is an issue that affects the majority of the world's population. Many people throughout the world don't have reliable access to water in sufficient quantities and qualities. In fact, UNICEF estimates that four billion people experience severe water scarcity for at least one month each year.

Water scarcity can be the direct cause of several issues, such as poor harvests for farmers, disease spread by waterborne pathogens, and malnutrition. Unfortunately, this issue will only worsen over time for numerous reasons; the first one being the rise in global population, meaning that the current water supplies will soon not be adequate to provide water for a higher population. Another reason being the impact of climate change, which will decrease the available quantities of water itself.

This issue has many consequences. Naturally, this slows down economic development, as the population is suffering, and the agricultural sector is nowhere near as efficient as it could be. However, water scarcity can also increase political tensions and possibly even spark a conflict to gain control over water reserves. While this has never yet happened, it has had a role in worsening relations between countries, as can be seen between Egypt, Sudan, and Ethiopia on the Nile River Basin.

Definition of Key Terms

Agriculture
The practice of cultivating the soil, growing crops, or raising livestock for human use Water scarcity: a condition where water demand exceeds available water supply

Pathogens
A bacterium, virus, or other micro-organism that can cause disease Economic development: the process whereby simple, low-income national economies are transformed into modern industrial economies

Groundwater
The water found underground in the cracks and spaces in soil, sand and rock. It is stored in, and moves slowly through, geologic formations of soil, sand, and rocks, called aquifers

Aquifer
A body of porous rock or sediment saturated with groundwater

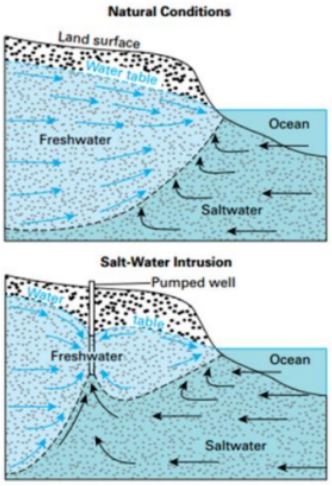
Drought
A period of time when an area or region experiences below-normal precipitation

Glacier Runoff
The amount of water produced by glacial melt

General Overview

Causes of Water Scarcity

There are various reasons as to why there is an increase in water scarcity across
the world, some of the most important are:



- Saltwater Intrusion
  When the groundwater reserves are being pumped out by wells at a higher rate than precipitation can replenish, the underground border between freshwater and saltwater recedes, causing the well to start pumping saltier water. The diagram to the right illustrates what happens. An area in which this happens is the American state of Florida.
- Growing Demand for Water
  Increases in water demand often follow population growth and
  economic development. In the past 100 years, global demand for water
  has increased by roughly 600%, and is currently estimated to be
  increasing by 1% each year. The world population is predicted to grow to almost 10 billion people by 2050; this will put even more stress on the already strained groundwater reserves, which will inevitably cause aquifers to shrink, and increment the rate of saltwater intrusion in coastal areas.
- Droughts and Climate Change
  Climate change is causing an increase in average global temperatures and in the frequency of extreme weather, such as drought. An increase in the duration and regularity of drought directly affects water scarcity as there is less water that can seep into aquifers. Additionally, lower air humidity and higher temperature leads to a higher rate of evaporation of moisture in soil at the surface.
  The rise of temperatures increases water scarcity in other ways too. Such as by decreasing glacier runoff. This can be seen with the Yangtze River in China, where glacier runoff decreased by 13.9% since the 1990s.

Effect on Agricultural Productivity and Malnutrition

Water is of utmost importance to farmers. Plants need it for many crucial processes such as photosynthesis, and livestock needs to drink it. The lack of water can be the cause of many issues as farmers cannot irrigate their crops and water their animals. If agricultural productivity decreases, particularly with growing populations, there is a risk of a famine occurring, which can potentially cause the death of millions. While there has not yet been a famine that has solely been caused by water scarcity, there have been times in which mass hunger was, in part, caused by the lack of water. Having to choose less profitable but more drought-resistant crops can lead many farmers to quit their jobs, as it simply became too much of an economic burden. Alternatively, some farmers might simply just immigrate to other, more water-secure countries, and use their skills there.

Effect on Public Health

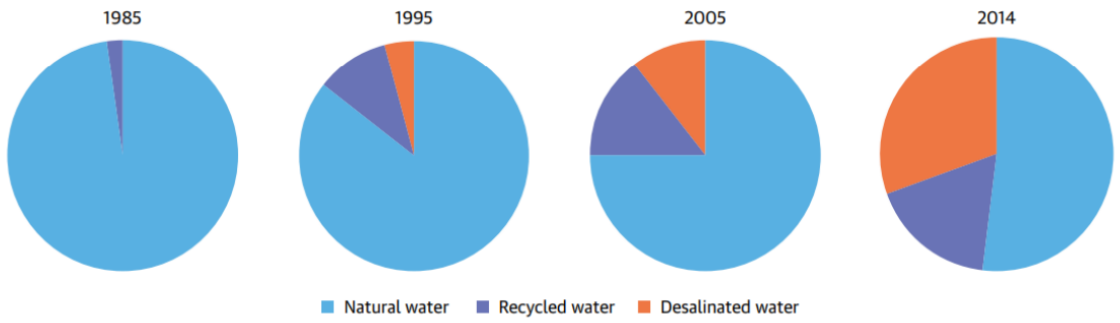
Water scarcity also has an important effect on public health; estimates suggest that 80% of illnesses in the developing world are linked to inadequate water and sanitation. Water can cause several diseases, the most common one being diarrhoea, which kills roughly 1 million people each year. One reason as to why water scarcity can cause so many problems is the fact that people who suffer from it often ignore basic hygienic procedures,

such as handwashing, to minimize water used. Further, when there is not enough water, sewage systems can fail, leading to an outbreak of disease such as cholera.

Major Parties Involved

- Food and Agriculture Organisation (FAO)
  The FAO is an organization primarily focused on achieving food security across the world, however it also hosts the “The Global Framework for Action to Cope with Water Scarcity in Agriculture in the Context of Climate Change”, abbreviated to WASAG, which brings together nations throughout the globe to “tackle the collective challenge of using water better in agriculture to ensure food security for all”. This meeting is important as it aims to minimize and handle usage of water in a very high water-consuming sector. It is estimated that, on average, 70% of all global freshwater is used in agriculture.
- World Health Organisation (WHO)
  The WHO “works worldwide to promote health, keep the world safe, and serve the vulnerable”. It provides guidelines and recommendations related to water scarcity. In 2015, in collaboration with UNICEF, it developed the “Water and Sanitation for Health Facility Improvement Tool”, or WASH FIT, which aims to guide primary health-care facilities in lower and middle income countries to improve by providing assessments and targeted actions, among other things.
- Israel
  Israel is a country that frequently suffers from drought and water scarcity. Over half of the nation is covered in desert, but it still manages to handle the situation despite its extreme scarcity. It uses both conventional and non-conventional water management techniques to gain its water. The conventional method is simply just using freshwater lakes and rivers such as the Lake of Galilee and the Jordan River, along with large underground aquifers. Unfortunately, due to Israel’s growing population and economic development these resources cannot suffice, and other, non-conventional techniques had to be used to acquire water.

These non-conventional techniques primarily being desalination and water reclamation. The former being the conversion of salt or brackish water into freshwater, while the latter is the conversion of sewage, also into freshwater. These methods saw great success in Israel, who now even has enough water to provide water to neighboring countries such as Jordan. Below is a series of pie charts showing the change in water sources in Israel from 1985 to 2014.



Recycled water is reclaimed water. Note figures have changed since 2014

Previous Attempts at Solving the Issue

There have been several attempts at solving the issue of water scarcity. These efforts generally do not expand to much more than national projects. Many times, solutions focus on lowering demand, so minimising the use of water, rather than maximising supply by finding alternative ways to gain water. The United Nations, and along with other international organisations have set up summits which involve many countries around the world to discuss the issue of water scarcity and climate change as a whole. Additionally, guides have also been made to aid nations in managing water in times of scarcity.

Possible Solutions for the Issue

There are many possible ways to reduce stress on nations to supply water. It is important to remember, though, that these efforts should be done by a large amount of people. A small group is not capable of making a significant change on such a pressing issue.

Encouraging Drip Irrigation

As previously mentioned, 70% of all freshwater is used in agriculture. Unfortunately, a lot of this water is wasted due to runoff and evaporation. Unlike sprinkling, which applies water from above as if it is rainfall, drip irrigation slowly “drips” water into the soil at the root zone. It has several benefits. One being that it is significantly more efficient (90% efficient compared to sprinkling’s 65-75%). Additionally, it can also reduce disease by minimising the water’s contact with other parts of the plant, such as the leaves, which may carry a pathogen.

Rainwater Harvesting

Rainwater harvesting is the collection of rain, rather than letting it runoff. It could reduce stress on governments to provide water as it is already partially covered in local households. Currently, there are not many places in which rainwater harvesting is mandatory, however there are certain nations, such as Germany, where it is often encouraged, and grants and subsidies are provided.

Desalination Plants

For countries who have access to a high volume of seawater, desalination plants may be a viable solution as it can convert saltwater to freshwater. However, it is important to remember its negative effects, such as its high energy consumption and its release of toxic chemicals. Therefore, while it is a good option now, it should be improved on even more in the future.

Major Parties Involved

World Health Organization (WHO):

As a global leader in health advocacy, WHO is positioned to spearhead initiatives promoting hygiene education worldwide. Collaborative efforts with member states and non-governmental organizations (NGOs) can amplify the impact of hygiene education campaigns and foster a global commitment to public health resilience.

Timelines of Relevant Events

1869	First patent for a desalination process granted
14th to 25th March 1977	First UN Water Conference is held in Mar Del Plata, Argentina
22nd December 1992	UN designates the 22nd of March as "World Day of Water"
28th July 2010	Resolution A/RES/64/292 passes, which defines the right to safe and clean water as a human right that is essential for the full enjoyment of life
2012	Sustainable Development Goals are born, which includes Goal 6, "ensure access to water and sanitation for all"
22nd March 2018	UN designated "Water Action Decade" begins

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