



LEARN & ACT Teacher's Guide

Clean Water and Sanitation



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Introduction 1. Water inequality

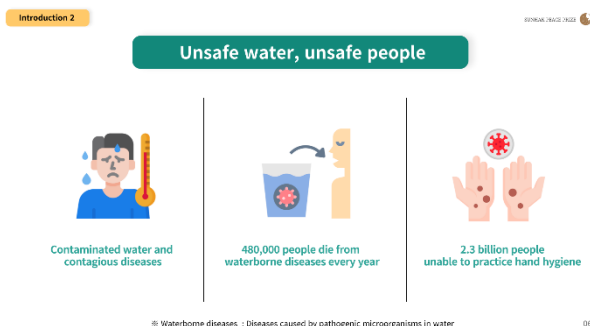


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Water is essential to human life but not available to everyone

What do you need to do to get water? For many of us, we just need to turn on the faucet to run the water we use to cook and drink. Stories of people who suffer from lack of water may sound far away. Hira is a girl from the Baitadi District in Nepal, and she walks 14 hours every day simply to fetch water. She spends 14 hours to carry a total of 50 liters of contaminated water, but she has never drunk clean, safe water. There are many women and children, like Hira, in developing countries who spend on average 6km per day to carry 19 liters of water. Despite their time and effort spent in getting water, they are constantly suffering from thirst and disease. (Source: OXFAM)

Introduction 2. Unsafe water, unsafe people



▶ p.06

A. Water and contagious diseases

Water is the basis of human life, and contaminated water endangers it. Diseases spread quickly through water supply facilities especially in regions with poor sanitation systems, and cholera and typhoid are the most common water-borne diseases caused by contaminated water. Waterborne diseases are diseases caused by bacteria in water or food; symptoms include stomach aches, nausea, and vomit, and may lead to death if not treated properly in the early stages.

B. 480,000 people die from waterborne diseases every year

According to the WHO data in 2019, about 485,000 people die from waterborne diseases every year, and more than 80% of deaths in developing countries is related to unclean water. Waterborne diseases are easily treated with antibiotics and hydration, but these first-aid treatments are unavailable in most developing countries, leading to death in many cases.

C. 2.3 billion people are unable to practice hand hygiene

Hand washing is a simple yet most effective way to prevent the spread of infectious diseases. However, the reality for 2.3 billion people worldwide is that they don't have the facility to wash their hands properly. According to the WHO and UNICEF Joint Report in 2017, one in three people worldwide (2.3 billion people) do not have access to soap and water at home. Moreover, six out of ten people in developing countries live in an environment where they cannot wash their hands at all.

1. Why do people drink unsafe water?

01. Why do people drink unsafe water?



30% of the world's population experiences **water shortage**



Contamination of water



▶ p.08

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A. 30% of the world's population experiences water shortage

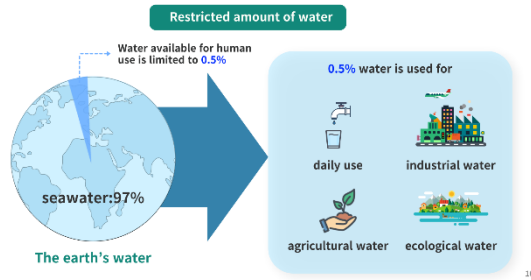
Thirty percent of the global population is experiencing water shortage (UN World Water Development Report 2019). To them, water is more valuable than gold or diamond, and water scarcity causes multiple problems including an increase in infectious diseases, economic crisis, and political instability.

B. Contamination of water

According to the UN Water data, among all freshwater resources, half of the world's rivers and 1/3 of lakes are polluted. Moreover, a variety of pollutants are flowing into groundwater, from pesticides to fertilizers to waste leached from landfills and septic systems. Many people use groundwater for drinking water, which is highly likely to be contaminated.

2. What are the causes of water scarcity? (1)

02. What are the causes of water scarcity? (1)



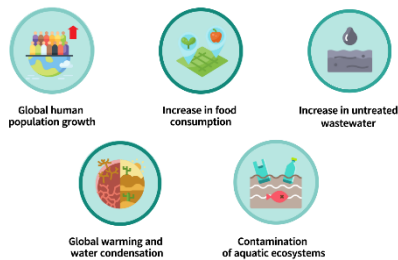
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A. Water available for human use is limited to 0.5%

Earth from afar is a blue planet and more than 70% of its surface is covered with water. However, 97.5% of the earth's water is seawater, which is not suitable for human consumption, agriculture, or industrial use. Excluding glacial water and ice caps leaves only 0.5% of the earth's water for human use.

2. What are the causes of water scarcity? (2)

02. What are the causes of water scarcity? (2)



► p.11

A. Global human population growth

Global human population is steadily growing, marking 6 billion in October 1999, over 7 billion in October 2011, and 7.9 billion in 2022. Increase in human population means increase in water scarcity. In fact, the amount of water usage has jumped 6 times over the past 100 years. Therefore, water shortage is greater now than 100 years ago, and is expected to be more serious in the future. The current human population of 7.9 billion is expected to reach approximately 9 billion by 2025, and the problem of water scarcity will become more prominent because it is difficult to increase the amount of fresh water.

B. Increase in food consumption

According to the OECD-FAO Agricultural Outlook, global food demand is expected to increase 35% by 2030. Agriculture requires large quantities of water. According to the UN World Water Development Report 2021, 70% of freshwater on earth is being used for agriculture. In order to produce 1kg of rice, 1kg of beans, 1kg of wheat and 1kg of potatoes, 3,000~5,000 liters, 2,000 liters, 900 liters, and 500 liters of water are needed respectively (World Wide Fund for Nature, 2006).

C. Increase in untreated wastewater

As water usage increases around the world, amount of sewage and wastewater is also increasing rapidly, polluting rivers and oceans. More than 80% of wastewater from human activities is discharged into rivers or seas without pollution removal, and 44% of household sewage is being discharged untreated (UN World Water Development Report 2021).

D. Global warming and water condensation

Fresh water is drying up due to global warming, and drinkable water source is decreasing as glaciers and ice caps melt, sea levels rise, and salt is introduced into fresh water. According to the WMO report in 2021, the amount of water stored on the surface, underground and glaciers has decreased by 1cm every year over the past 20 years due to global warming. Antarctica and Greenland are directly affected by the current water shortage.

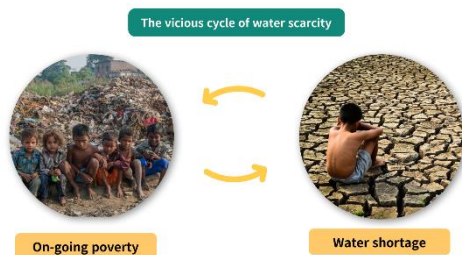
E. Contamination of aquatic ecosystems

Contamination in aquatic environment exacerbates global water shortage. Aquatic ecosystems such as rivers, lakes, and wetlands play a major role in supporting water circulation, and excessive human activity is polluting the ecosystem. In 2016, UN reported that water pollution has steadily worsened in most rivers in Latin America, Africa and Asia since the 1990s, and that one-third of all rivers across these regions are seriously contaminated with pathogens. UN-Water announced in 2021 that more than 80% of the world's wetlands has disappeared since industrialization, and it is estimated that only about 10 million to 12 million km remain.

3. How is lack of clean water related to poverty?

03. How is lack of clean water related to poverty?

SUNHAK PEACE PRIZE



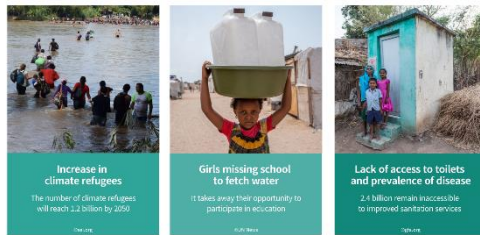
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A. The vicious cycle of water scarcity

Water scarcity negatively affects agricultural production, which in turn leads to food shortages. Food shortages then impact health, education and economic problems, eventually leading to poverty. And lasting poverty again fuels the issue of water scarcity.

03. How is lack of clean water related to poverty?



Increase in climate refugees
The number of climate refugees will reach 1.2 billion by 2050

Girls missing school to fetch water
It takes away their opportunity to participate in education

Lack of access to toilets and prevalence of disease
2.4 billion remain inaccessible to improved sanitation services

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▶ p.14

B. Increase in climate refugees

Climate change issues such as global warming, irregular rainfall, and persisting droughts reduce drinking water and grain production, therefore leading to famine and making children vulnerable to disease. According to a 2020 report by the Institute for Economics and Peace, the number of climate refugees will reach 1.2 billion by 2050. Since 2015, 6.5 million people, or 40% of the total population in Malawi, are experiencing hunger due to severe food shortages from the prolonged drought.

C. Girls missing school to fetch water

Children in Africa, where they lack access to clean water, travel at least 30 minutes to 1 hour to fetch water. This daily routine of collecting water takes more than 6 hours of their time every day, which takes away their opportunity to participate in education. Especially in low-income countries, it is the role of women and girls to collect water. According to a UNDP report released in 2021, women and girls in Ghana, a country going through desertification, spend an average of 43.5 hours a week to get water for farming.

D. Lack of access to toilets and prevalence of disease

According to the UN World Water Development Report 2017, 2.4 billion remain inaccessible to improved sanitation services and about 1 billion continue to practice open defecation. Parasites pollute groundwater through open defecation, and people drinking this contaminated water will be infected with cholera and typhoid. Pathogenic microorganisms from feces will again spread and infect more people, which in turn causes a vicious cycle of polluting the surrounding bodies of water.

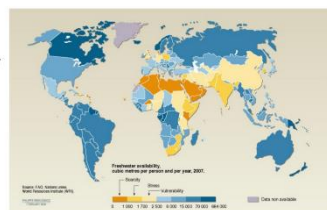
4. Global current status on water shortage

04. Global current status on water shortage

Water Stress Index (WSI)
1,100 tons = Average amount of water used by one person in a year

- **Relative sufficiency** (over 1,700 tons)
- **Water-stressed** (1,000 tons - 1,700 tons)
- **Water-scarcity** (under 1,000 tons)

Approx. 2 billion people

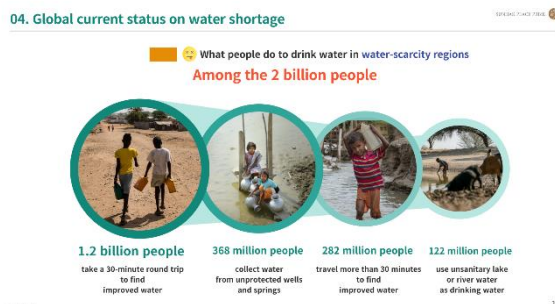


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A. Water Stress Index (WSI)

Water stress index is an indicator used by the Population Action International to assess the scarcity of a country's renewable water supply. Based on the amount of water that one person may use in one year (approx. 1,100 tons), a region is in relative sufficiency if the amount goes over 1,700m³, considered water-stressed if between 1,000~1,700m³, and considered under water-scarcity if threshold drops under 1,000m³. Countries on the African continent including Kenya, Burundi, Algeria, Rwanda, Malawi and Somalia, as well as Middle Eastern countries Saudi Arabia, the United Arab Emirates and Jordan are considered water-scarcity regions.

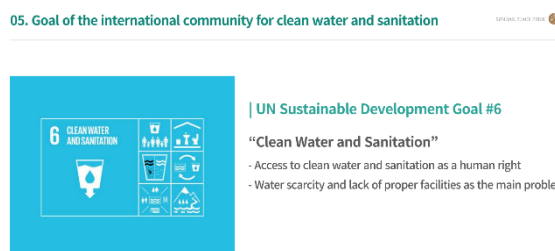


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B. At least 2 billion people drink unsafe water

According to the World Health Organization (WHO), at least 2 billion people drink water from a contaminated source in 2020. Among the 2 billion, 1.2 billion people with basic services can find improved water source with a 30-minute round trip carrying heavy containers. 282 million people with limited services have to spend more than 30 minutes to travel to an improved water source. And another 368 million people collect water from unprotected wells and springs. 122 million people without any of these water sources drink untreated water from lakes, ponds, rivers, and streams. (Contaminated water and poor sanitation cause diseases such as cholera, diarrhea, dysentery, hepatitis A, typhoid, and polio)

5. Goal of the international community for clean water and sanitation



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A. UN Sustainable Development Goal #6: Clean Water and Sanitation

Sustainable development goals (SDGs) are 17 global goals adopted by the United Nations General Assembly in 2015 and are intended to be achieved by 2030. The sixth goal is Clean Water and Sanitation, which seeks to guarantee universal access and sustainable management of clean water and sanitation.

B. Significance of clean water and sanitation

It is a human right to be able to drink clean water and live in a sanitary environment. However, increasingly more countries are experiencing water stress and their people are exposed to various forms of danger such as diseases due to lack of proper sanitary facilities. The most vulnerable groups are concentrated in developing countries, further contributing to global inequality.

C. SDGs 6. Targets (p20)

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes

6. Most important tasks for clean water and sanitation



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A. Securing enough drinking water

Two ways to help solve the urgent issue of water scarcity are to save water and proper management of water. Most people do not realize how much water they are wasting and understanding why we need to save water and practicing it daily would be the first step. Moreover, national level efforts and international cooperation to increase efficiency of water use through technological development and guarantee of water supply are in need.

B. Improving sanitation facilities and hygiene awareness

People in many developing countries live without basic sanitation facilities. It is linked to water pollution, which causes diseases and lowers the quality of life. Providing basic sanitation facilities with a toilet and a sink is an innovative starting point for a healthier life. In addition, spreading the habit of washing hand with a soap and supporting female hygiene are some specific activities that can be promoted.

C. Preventing water pollution

Even if we had a sufficient supply of water, we would not be able to use it if contaminated. Water pollution is in progress worldwide, and various types of waste from the sewage and chemicals pollute rivers and seas. The role of the government in preventing water pollution would include developing technologies for sewage treatment and expanding facilities to systematically prevent the discharge of various harmful substances and chemicals as well as establishing infrastructure for water reuse.

D. Smart Water management

Climate change causes water damage such as floods and droughts, making water resource management difficult. In preparation for rapid changes in water circulation patterns, it is important to predict and respond to frequent flood damage by conducting water management in a scientific manner. Using advanced technology such as AI, rainfall radars, and satellites can help to keep track and manage water in a wider range of regions.

E. Water utilization agreement among neighboring countries

Water dispute between regions and countries is a big problem. Conflict between regions that share a single river have long threatened global peace and it is intensified with the current growing water shortage issues caused by climate change. One possible solution is an agreement to fairly allocate water resources according to the degree of water shortage in the upstream, midstream, and downstream regions.

F. Protecting and restoring the aquatic ecosystem

It is very important to protect the aquatic ecosystems to efficiently secure and manage the available water resources. Groundwater that permeates into the ground through water surface and soil in rivers, valleys, lakes, and reservoirs continues to circulate inside the ecosystem. We need efforts to understand the principles of water circulation to prevent natural disasters such as floods and droughts, protect the ecosystem and restore the destroyed ecosystem.

7. International efforts for clean water and sanitation

07. International efforts for clean water and sanitation



1) International organizations and groups



WASH campaign UNICEF

Delivers safe water to disaster-stricken regions
Works to improve hygiene awareness in schools and communities

1) International organizations and groups

A. WASH campaign by UNICEF

WASH is a water and hygiene-related service run by UNICEF. Its activities are mainly to deliver clean water and hygiene services to vulnerable regions around the world, especially delivering safe water to disaster-stricken areas and improving hygiene awareness in schools and communities. Established in 1946, *UNICEF* is a United Nations agency working to provide humanitarian aid to children in poor countries.

07. International efforts for clean water and sanitation



| 1) International organizations and groups



Reinvent the Toilet Challenge

Bill & Melinda Gates Foundation

Reinvent the Toilet Challenge is a project to create a new toilet that requires no without electricity, no sewage system, and very little water.

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▶ p.24

B. Reinvent the Toilet Challenge by Bill & Melinda Gates Foundation

Reinvent the Toilet Challenge is a project to come up with a new toilet that requires no electricity, no sewage system, and very little water. the *Bill & Melinda Gates Foundation* started this challenge to help improve the reality that 40% of the world's population cannot use flushing toilets which require a lot of water, electricity, and sewage treatment facilities. Many inventors and designers participated in the competition and showed off their ideas for a large prize money. Bill & Melinda Gates Foundation continues their efforts in providing toilets and sanitation facilities to help solve problems arising from outdoor defecation and waterborne diseases from contaminated water.

07. International efforts for clean water and sanitation



| 2) Campaigns



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2) Campaigns

A. World Water Day

World Water Day is celebrated annually on March 22. It was initiated by the United Nations to raise awareness about the importance of water and help solve issues of water shortage and contamination. This day is observed to recognize the seriousness of water-related issues, and the government, international organizations, NGOs and private sectors are working together to resolve global water crisis. On December 12, 1992, the UN General Assembly adopted the *Protection of the Quality and Supply of Freshwater Resources* proposed during the UN Conference on Environment and Development in Rio and declared World Water Day.

B. Global Handwashing Day

Global handwashing Day is observed on October 15 every year. Simple handwashing with soap can prevent pneumonia, a respiratory disease, and waterborne diseases such as diarrhea, dysentery, and cholera, which can lead to death in severe cases. Global Handwashing Day is supported by the Global Public-Private Partnership for Handwashing (PPPHW) and government agencies, international organizations, private sectors, NGOs, and businesses around the world. This day was appointed by the UN General Assembly on October 18, 2008.

C. World Toilet Day

World Toilet Day is celebrated annually on November 19. It is a day initiated by the UN to raise awareness about the importance of sanitation and hygiene and increase the supply of toilets. Toilet is considered a high-risk space with viruses and germs, and hygiene management is important. Worldwide fundraising events take place on this day to help provide new toilets to people in poor sanitary conditions.

07. International efforts for clean water and sanitation

REPUBLIC OF KOREA

| 3) Various ideas



Immediate & safe drinking water!
LifeStraw



Rollover water container!
Q-Drum

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▶ p.26

3) Other ideas

A. Immediate safe drinking water with LifeStraw

LifeStraw is a portable water filter straw designed by the Swiss-based Vestergaard Frandsen, a global social enterprise. The LifeStraw filter removes almost all waterborne bacteria and parasites from contaminated water, and it is very useful in countries with lack of access to safe drinking water. One can insert the straw into the contaminated water to drink filtered water and hang it around their neck when not in use.

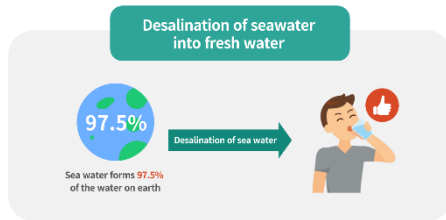
B. Rolling water container, Q-Drum

Q-drum is a water transport tool to help reduce the burden of carrying water over long distances. It was co-invented by Hans Hendrikes and Pierre Hendrikes, designed to carry up to 50 liters of water and can be pulled with a string. It is widely used by children whose days were spent on transporting water instead of going to school and by those who suffer from back, shoulder, and neck pain.

07. International efforts for clean water and sanitation



| 3) Various ideas



▶ p.27

C.Desalination of seawater into fresh water

Sea water forms 97.5% of the water on earth. If we can desalinate a significant portion of this water to be used as drinking water and for industrial usage, it would contribute tremendously to the water shortage problem. Desalination of sea water is emerging as the only alternative to cope with water shortages in regions where freshwater resources are scarce, such as Africa and Middle East. More regions are installing desalination technology as the demand continues to increase worldwide.

8. Brainstorm ways to help provide clean water and sanitation for everyone

What can we do to help provide clean water and sanitation for everyone?

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▶ p.29

What can we do to help provide clean water and sanitation for everyone?