



Future Global Water Security in a Changing Environment



Global Water Institute

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Human and Environmental Security Issues

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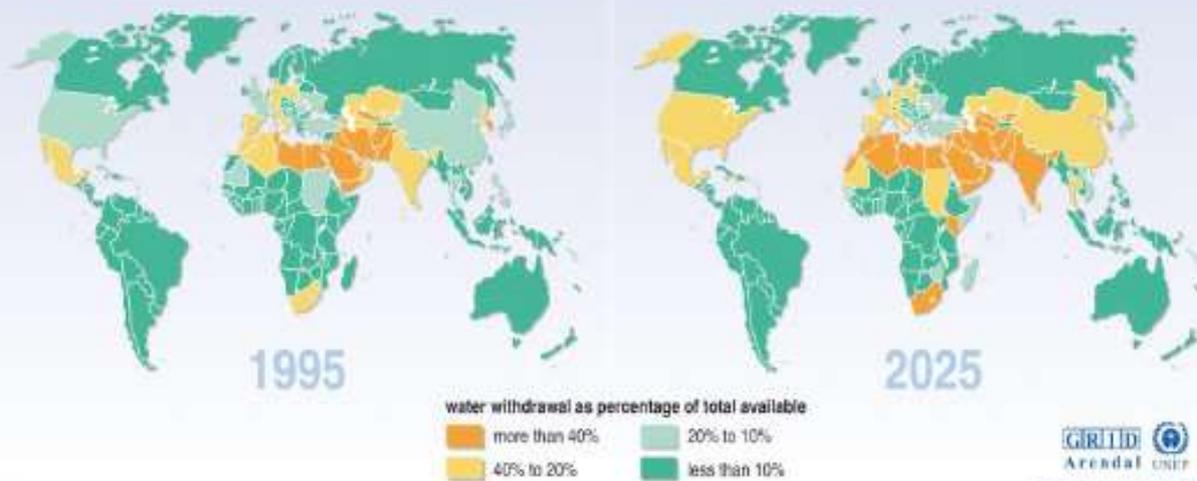
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Human and Environmental Security Issues

- *Water is defined as a natural resource, commonly known as a commodity necessary for sustaining human life.*
- *Water Security is the protection of adequate water supplies for all human needs. It represents a unifying element supplying humanity with drinking water, hygiene and sanitation, food and fiber, industrial resources, energy, transportation and natural amenities, which all depend upon maintaining ecosystem health and productivity.*
- *Environmental Security refers to the area of research and practice that address the linkages among the environment, natural resources, conflict and peacebuilding.*
- *Human Security is a paradigm for comprehending global vulnerability and individuals' susceptibility. It holds that a population centered view of security is essential for national, regional, and global stability.*
- *Global security is the area of research that addresses the linkages among the environment, natural resources, conflict, and peacebuilding.*
- *Effects related to water stress impacts 44 percent of the population in the world. According to the United Nations Environment Programme, global freshwater stress will have accelerated further in a substantial manner by 2025 due to increased population and water use, especially in regions as the north of Africa and the Middle East. By 2050, approximately 5 billion people will have felt the effects related to freshwater scarcity.*

Freshwater stress



Climate Change and adaptation Challenges – One of the most defining challenges in this era is climate change as it puts a substantial amount of stress to both societies and the environment as a whole. Its impacts have effects that are global in scope and offer new challenges—seen in, for example, how food production is threatened by shifting weather patterns and how the chance of major flooding is significantly increased by the rising of sea levels. If action is not taken in a rigorous way, adapting to such impacts of climate change will increasingly become a more difficult and costly process.

Climate change poses a severe threat to decades of development efforts that have been made in order to reduce poverty. Despite its effects being global in scope, they are mostly felt by poor people and in the poor regions of the world. The reason for this increased vulnerability can be related to their reliance on natural resources as well as their limited capability to deal with climate variability and extremes.

Poor communities can be helped in their adaptation efforts and livelihoods that depend on ecosystems. They can be given assistance by restoring and maintaining key ecosystems. Greenhouse gas emissions can be reduced by moving towards more low-carbon societies, which, in turn, can improve human health and well-being as well as creating green jobs.

Perhaps the most advantageous approach to enhance water security for the purpose of human and environmental security is to establish local, regional, national, and global dialogues to address pertinent questions, such as:

1. What effects does water scarcity and climate change have on a local, regional, and global level?
2. With the continued water scarcity, what will happen in terms of local governance and both human and environmental security?
3. What will happen if there is a continued lack of water? (think locally and then globally)
4. What are the consequences if women are the mostly negatively affected by the lack of access to water and sanitation?
5. Suppose the global financial crisis perpetuates, who will take the risks of supporting water development in countries where water is scarce?
6. Who is able to support a doubling population with increased water withdrawals?
7. With the current ineffective wastewater management, how will future wastewater collection and treatment be operated efficiently?
8. Are there strategies available in water scarce and climate-affected areas for the next 10 to 20 years?
9. What should be the contingency plan for governments in 2025? In what should governments be investing today?
10. The primary threats to water security are population growth, industrialization, conflicts (caused by the depleting natural resources), and climate change (e.g. sustained drought and natural disasters). Such threats can be inter-dependent. What are the best procedures for developing comprehensive strategies to address them?

GWl's Goal

The following data on water security and climate change are made available to help developing countries in strengthening their ability to integrate water security and climate change responses into effective national governance development as well as human and environmental security processes.

GLOBAL WATER SECURITY

The earth's combined supply of salt and fresh water totals 1.4 billion km³, 97.5% of it is oceanic.

The remaining 2.5% (35 million km³) is fresh water, of which 70% (24 million km³) is frozen, 30% (11 million km³) is groundwater, and a mere 0.3% (105,000 km³) is accessible as surface water.

Of available renewable freshwater resources, about 54% is already appropriated by humanity for various uses—irrigated agriculture (70%), industry (22%), and domestic use (8%).

Water use has grown at more than twice the rate of population increase over the last century.

By 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity, and two-thirds of the world's population could be living under water stressed conditions.

By 2025, water withdrawals are projected to increase by 18% and 50% in the developed and developing world, respectively, as a result of population and industrial growth.

At this moment, 1 in 8 people worldwide do not have access to safe and clean drinking water.

The proportion of the African population at risk of water stress and scarcity will increase to 65% in 2025. This could generate conflicts over water, particularly in arid and semi-arid regions.

90% of river basins and lakes in Africa are transboundary—the Nile has more riparian states than any international river basin in the world.

In Ethiopia, drought and politics are the two leading causes of water shortage.

Colonial era treaties granting rights to water from Nile tributaries to Egypt left Ethiopian farmers over 50 decades without access to irrigation. As dry seasons become longer, the worsening access to water is exacerbated by weapons proliferation from neighbouring Somalia.

42% of the Ethiopian population has access to clean water supply and only 11% has access to adequate sanitation services. In rural areas of the country, only 12% has access to safe drinking water and 7% to basic sanitation.

1 in 10 Ethiopian children die before the age of one because of water borne diseases, such as cholera or diarrhea—the leading cause of death in children under five years old.

Only 45% of kids attend primary school in Ethiopia.

Across the Ethiopian border, internally-displaced people rely on government and foreign assistance while remaining entrenched in poverty and dispossession.

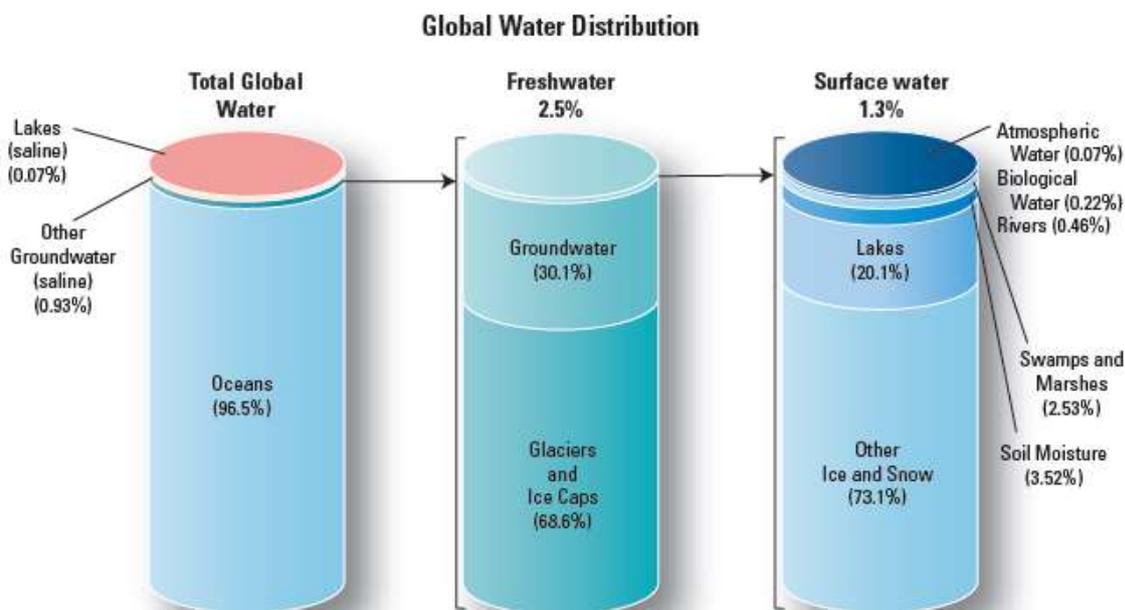


Figure 1. Data taken from United Nations Educational, Scientific, and Cultural Organization. 2006.

WATER AND CLIMATE CHANGE

Warming of the climate system has been termed “unequivocal” in recent decades.

Future changes in climate are projected to lead to a further acceleration and intensification of the hydrological cycle.

Climate change could profoundly alter future patterns of both water availability and use, thereby increasing levels of water stress and insecurity on a global scale.

Extreme variability of precipitation is expected to place 2.8 billion people at risk of water shortages.

In addition to precipitation changes, increased CO₂ levels and higher temperatures will affect crop growth, which will have consequences on the volatility of food markets.

For regions that are already highly vulnerable to climate variability, the potential impacts on all sectors that depend on water—from water for domestic and industrial use to water for agriculture and ecosystem sustainability—could strain economies and livelihoods.

Worldwide, agriculture represents about 70% of water withdrawal; in Sub-Saharan Africa this number is 87%.

Water is the primary medium through which people in Africa are already experiencing climate change impacts.

An increase in surface temperature will affect the livelihood of the 70% of Africans who depend on rain-fed agriculture.

Yields from rain-fed agriculture could be reduced by up to 50% by 2020 in some African countries.

Sub-Saharan Africa is already experiencing serious consequences of climate change on its water resources, despite the region only accounting for a mere 1.59% of global greenhouse gas emission.

Estimates have been made that between 75 and 250 million people in sub-Saharan Africa will not be able to meet their water needs if a warming in the atmosphere continues and these numbers could increase to 350-600 million by 2050.

Mechanisms for people’s resilience and adaptation to climate change must be found or improved.

WATER AND SANITATION

Over 1.5 billion people do not have access to safe, clean water and over 2.6 million lack adequate sanitation facilities.

Half of the world's hospital beds are filled with people suffering from a water-related disease while water borne illness is the leading cause of death in children under five years old.

Bad (unclean) water and sanitation causes more deaths through disease than war.

Over 80% of the disease in developing countries is related to poor unsafe drinking water or bad poor sanitation.

90% of wastewater in developing countries is discharged into rivers or streams without any treatment.

Nearly 1 out of every 5 deaths under the age of 5 worldwide is due to a water-related disease.

In sub-Saharan Africa, a child's chance of dying from diarrhea is over 500 times greater than in West Europe and North America.

Less than 1 in 3 people in sub-Saharan Africa have access to a proper toilet.

Hand washing with soap at critical times can reduce the incidence of diarrhea by up to 47%.

Every US\$1 spent on water and sanitation generates \$8 as a result of saved time, increased productivity, and reduced health care costs.

STATUS OF WOMEN AND CHILDREN

Women comprise 43% of the agricultural workforce in developing countries, yet they have less access to productive resources and opportunities.

In developing countries, Rural women are responsible for water collection in almost two-thirds of the households.

In Africa, 90% of the work of gathering water and wood—for the household and for food preparation—is done by women.

In Sub-Saharan Africa, women collectively spend roughly 40 billion hours a year collecting water—the average distance that women in Africa walk to collect water is 4 miles and the average weight that women carry is approximately 44 pounds.

Every year, around 60 million children in the developing world are born into households without access to sanitation facilities.

Children carry the main responsibility for collecting water in 12% of households, with girls under the age of 15 being twice as likely as boys their age to be the family member responsible for obtaining water.

Every 20 seconds a child dies of a water-related disease. Unclean water and poor sanitation services constitute the world's second biggest killer of children.

Over half of the developing world's primary schools do not have access to water and sanitation facilities. Without toilets, girls typically drop out of school at puberty.

Lack of adequate sanitation in schools results reduced attendance among girls, which perpetuates the cycle of gender inequality and poverty.

443 million school days are lost each year due to water-related diseases.

In Sub-Saharan Africa, a child's chance of dying from diarrhea is over 500 times greater than in Europe.

WATER AND CITIES

Currently half of the world's population lives in cities and by roughly 2030, this figure will grow to 60%, particularly in Africa and Asia where urban populations are predicted to double between the years 2000 and 2030.

The UN estimates that 80% of the global population will be living in urban areas by 2050.

828 million people currently live in slum conditions, lacking basic services such as drinking water and sanitation. This number is increasing by 6 million each year and will reach a total of 889 million by 2020.

Every second, the urban population grows by 2 people.

1 out of 4 urban dwellers does not have access to improved sanitation facilities.

Urban growth is the fastest in the developing world, where cities gain an average of 5 million residents every month.

Between 1990 and 2004, Africa saw an 85% increase in its urban population while the number of urban dwellers without access to water and sanitation doubled.

According to the FAO, the number of people living in cities in sub-Saharan Africa will reach approximately 600 million by 2030, almost double that of 2010.

62% of the urban population in sub-Saharan Africa live in slum conditions.

Today, water costs 5 to 7 times more in developing cities in Africa than the average price paid in the United States or Europe.

WATER AND CO₂

Since global climate recordkeeping began in 1880, climatologists have recorded the 25 warmest years. 10 of the warmest years have been observed since 1996.

Global warming is caused by the accumulation of heat-trapping greenhouse gases and other pollutants in the atmosphere. CO₂ accounts for 63% of such gases, methane (CH₄) 18%, and nitrous oxide (N₂O) 6%, with several lesser gases accounting for the remaining 13%.

CO₂ comes mostly from electricity generation, heating, transportation, and industry. Human-induced methane and nitrous oxide emissions stem largely from agricultural practices.

Atmospheric concentrations of CO₂ are considered to be the principal driver of climate change, which have climbed from nearly 280 parts per million (ppm) since the beginning of the Industrial Revolution around 1760 to 386 ppm recorded in 2008.

The annual rise in atmospheric CO₂ level results from the emissions on a scale that is overwhelming in nature's capacity to absorb carbon.

The rising of CO₂ levels is the world's most predictable environmental trend.

In 2008, some 7.9 billion tons of carbon were emitted from the burning of fossil fuels and 1.5 billion tons were emitted from deforestation, for a total of 9.4 billion tons per year in oceans, soils, and vegetation. The remainder stays in the atmosphere, pushing up CO₂ levels.

Arctic soils contain more carbon than currently resides in the atmosphere. The combination of permafrost melting, the release of methane and CO₂, and the rising temperature create a self-reinforcing situation, known by scientists as a "positive feedback loop."

Atmospheric brown clouds (ABCs) consist of soot particles from burning coal, diesel fuel, and wood fire, which affect climate in three ways: first, by intercepting sunlight and thus heat the upper atmosphere; second, given they also reflect sunlight, they have a dimming effect, which lower the earth's surface temperature; third, if ABCs particles are deposited on snow and ice, they darken the surface and accelerate melting.

The impacts of ABCs can lead to worrying situations as they are at the source of the melting of high-altitude glaciers, such as the Kilimanjaro in Tanzania.

Both global CO₂ emissions and atmospheric CO₂ concentrations have exceeded the 2007 projections made by the Intergovernmental Panel on Climate Change: "if we continue our business as usual, the projected rise in the earth's average temperature from 1.1 to 6.4 degrees Celsius, during this century seems too possible."

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The Global Water Institute (GWI) strives to remain the most highly valued institution for its pioneering and specialized action in the reintegration of ex-combatants through water-related programs. GWI is based in Brussels and focuses primarily on post-conflict countries.

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