Special Conference 2 on International Cooperation

Resolving the global water shortage

MODEL UNITED NATIONS
THE INTERNATIONAL SCHOOL OF THE HAGUE

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Forum: Special Conference 2 on International Cooperation

Issue: Resolving the global water shortage

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Introduction

"To address the many challenges related to water, we must work in a spirit of urgent cooperation, open to new ideas and innovation, and prepared to share the solutions that we all need for a sustainable future." - Secretary-General Ban Ki-moon

On the 22nd of March every year, world water day is celebrated in order to raise awareness of the importance of water and of keeping water available to humans to meet our demand in a sustainable way. Recently, water scarcity has become of utmost importance to governments everywhere as organizations begin to draw attention to the need to sustainably manage water sources.

Currently, 1.2 billion people (almost one-fifth of the world's population) live in areas of physical scarcity and the number is quickly advancing. At the moment, one-third of the world's populations live in countries where water is scarce in quantity and quality. If we are not careful, this is to rise to two-thirds by 2025. Joint with growing demand due to an increasing population, the need to manage water sources could not be more reiterated. What is important to note is that there is enough water on the planet for 7 billion people; the problem is that it has been so unevenly distributed and ineffectively managed that water scarcity is a problem in many world regions.

The importance of water goes beyond sustenance but also stretches to other areas affecting education, health and even poverty. Increasing population and demand among other factors means that there is urgent need to alleviate water scarcity through effective solutions. There have already been several attempts to do so but the battle against water scarcity is far from over and the lives of over a billion people who live in physical scarcity are a reminder of the need for urgency.

The aim of this research report is to inform on the issue of global water shortage and propose solutions to this issue. Whilst, this is an informative guide, it is advised that all

delegates use this research report as a start to guide research but also not cease to further research using the resources listed in the appendix and/or bibliography as well as other resources from suitable sources.

Definition of Key Terms

Water Scarcity

According to the Food and Agriculture Organization (FAO), water scarcity "occurs when the demand for water from all sectors (agriculture, cities, environment, etc.) is higher than the available resources." Simply, water scarcity is the lack of enough water to meet demand. Water scarcity also involves lack of access to clean water. Water scarcity, therefore, involves the appropriate quantity of water as well as the quality of water.

Water Stress

According to the European Environment Agency, "Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use."

*NB: it is easy to confuse water stress and water scarcity; whilst the two are similar, they are not interchangeable. There are many definitions but for the purpose of the debate of this issue, the UN definition will be used. Water stress is when annual water supplies in an area go below 1700m^3 per person. Water scarcity is when annual water supplies in an area go below 1000m^3 per person. When this goes below 500m^3 per person, the area experiences "absolute" scarcity.

Water Security

According to the UN Human Development Report of 2006, "water security is about ensuring that every person has reliable access to enough safe water at an affordable price to lead a healthy, dignified and productive life, while maintaining the ecological systems that provide water and also depend on water."

Economic Water Scarcity

This is defined as the situation where there is inappropriate management of water sources so there is water scarcity although the water sources may be sufficient to meet demand in that area. This is usually caused by lack of investment in infrastructure or technology.

Physical Water Scarcity

This is when there are insufficient water sources (aquifers, rivers, etc.) to meet demand in a certain area. Arid regions are usually associated with this type of water scarcity.

Water Footprint

This is the volume of freshwater a person uses directly and in the production of goods and services that a person uses.

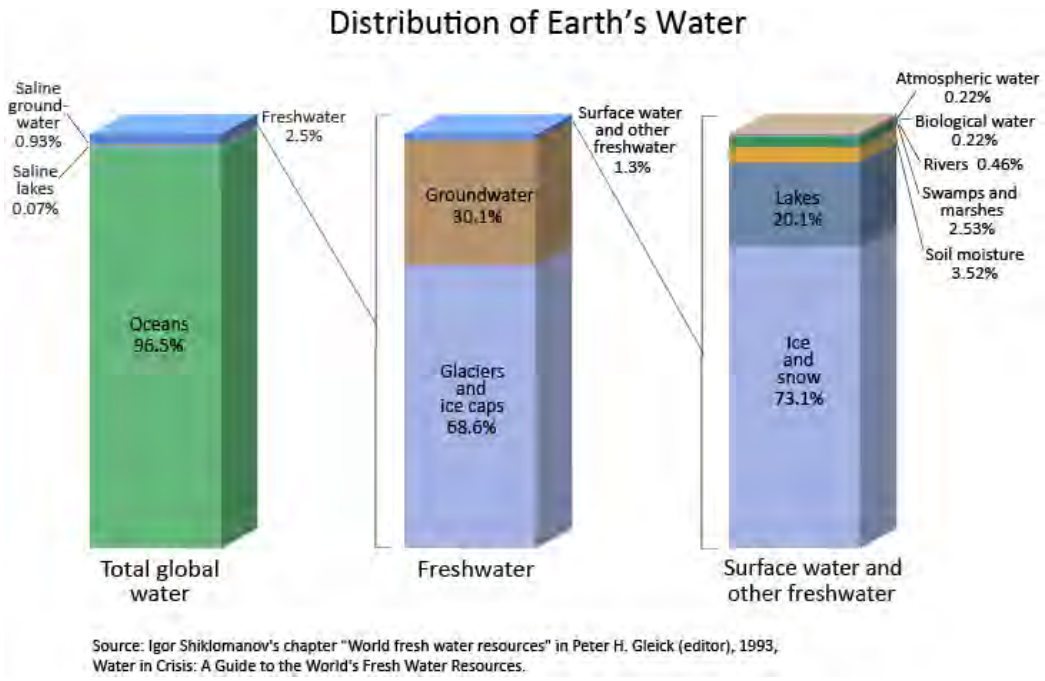
'Grey' Water

This is water that has already been used but can be reused for a different purpose.

General Overview

The amount of water on the Earth is fixed, over a 1000 million cubic kilometres. Of that amount, only 2.5% is freshwater i.e. water available for our use including agriculture and drinking. Of this small percent, only 30.1% is groundwater, stored in underground aquifers. 68.6% is locked in glaciers and polar ice caps. As a result, only 1.3% of this 2.5% is on the surface in rivers, lakes, etc. This is only 93,100 cubic kilometres, a minute fraction (about 1/150th of one percent of total water). This is where most of the water needed for human uses is sourced.

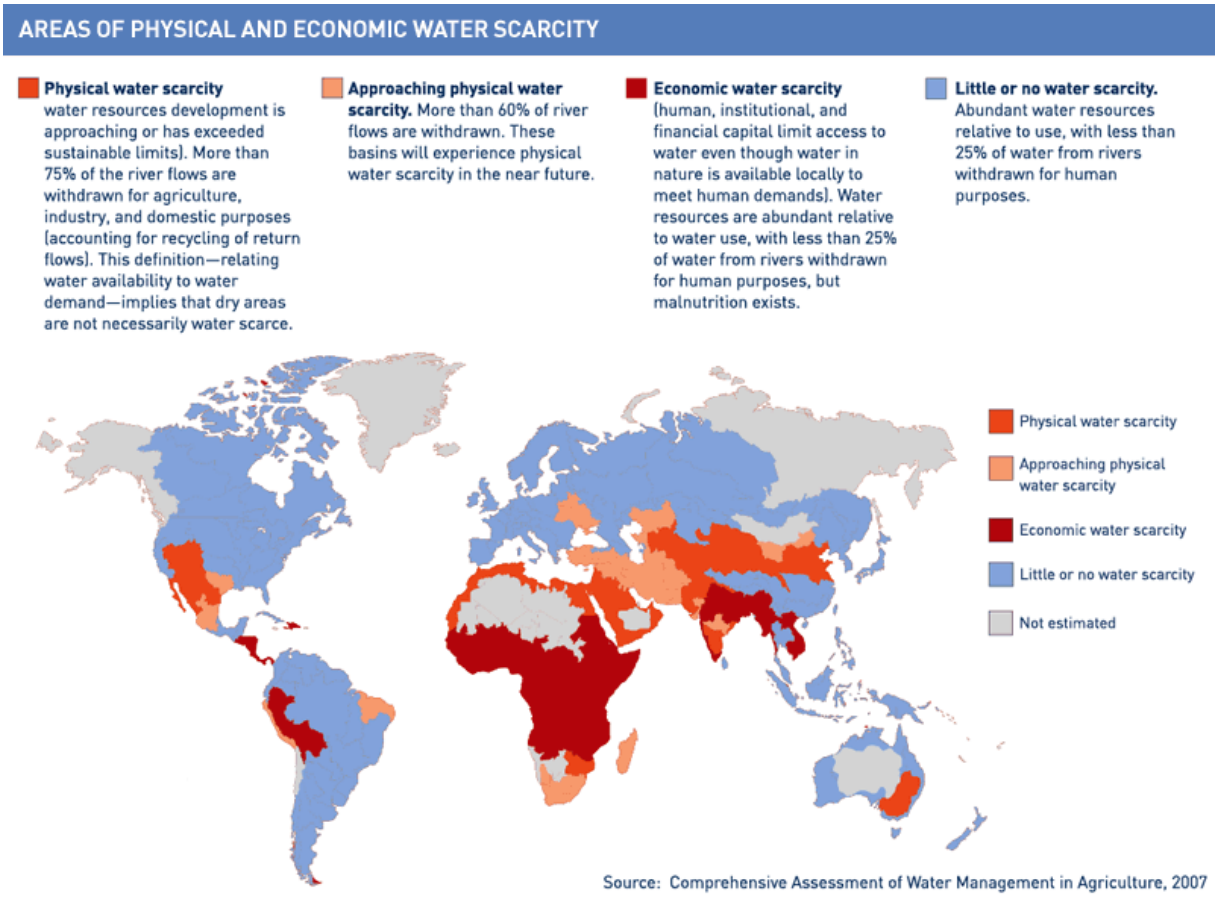
The diagram to the right illustrates the world's fresh water resources. The 1.3% which is surface water is further divided into atmospheric water, biological water, soil moisture and ice and snow (the biggest component)



Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World's Fresh Water Resources.

complicating the abundance of freshwater even more. This effectively conveys the fact that water although seemingly abundant, is limited in supply and thus must be managed carefully to avoid scarcity.

Water scarcity in the world



The diagram above summarizes the situation of water scarcity in the world. Around 700 million people in 43 countries suffer today from water scarcity but 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. Significant is the concentration of economic water scarcity in Sub-Saharan Africa. It has the largest number of countries with water scarcity. The water scarcity in Africa is mainly economic water scarcity showing that abundance of water sources is not the problem but rather the lack of infrastructure advanced in technology to access the water that is available. Another striking correlation suggested in the diagram is the apparent relationship between water scarcity and level of development. Areas with high water scarcity including sub-Saharan Africa, south Asia and parts of South America could be identified as developing countries. Conversely, more developed countries have little or no water scarcity. The number of people living on

less than $1.25 a day roughly equals the number without access to safe water. Although this relationship may be seen as tenuous, it is important to note this as the effect of water scarcity on the poor and marginalized will be discussed further on in this research report.

Even more shocking are the predictions for water scarcity in the future mainly due to increased demand due to increased population. “Water withdrawals are predicted to increase by 50 percent by 2025 in developing countries, and 18 per cent in developed countries,” according to the Global Environment Outlook: environment for development. The United Nations has estimated that with the existing climate change scenario, almost half the world’s population will be living in areas of high water stress by 2030, including between 75 million and 250 million people in Africa. One in five developing countries will face water shortages by 2030. Today, many countries face water scarcity including: Niger, Somalia, Yemen, Sudan and many others.

Causes of water scarcity

The main causes of water scarcity include the increasing world population, urbanization and industrialization. The world population is expected to reach 9 billion by 2040. An increasing population means increase in demand for food. Agriculture is the biggest user of water, accounting for 70% of all water withdrawals. According to the FAO, while the daily drinking water needs of humans are very small - four liters per person - the water required to produce a person's daily food is much higher: it varies between 2000 and 5000 liters. Increasing affluence also increases the demand for water; as people get richer, they tend to use more water through their household devices e.g. washing machine or simply through a more luxurious lifestyle e.g. taking a bath instead of a shower. Also, water pollution arising from fertilizers, pesticides, etc. reduces the amount of water available for human use. Inefficient management of water sources may also be a cause of water scarcity as it results in waste of water available for human use; this could also cause economic water scarcity. Furthermore, climate change is increasing aridity affecting supply of water. This is because climate change leads to potential effects including: reduced precipitation, higher evapotranspiration, increased pollution of water sources due to increased flooding and reduced water supplies and consequently increases costs due to silting which is caused when there are lower stream flows but higher evaporation rates. The causes of water scarcity are, therefore, partially human and partially physical. The abundance of the cause of water scarcity perhaps increases the difficulty in solving the global water shortage as different solutions tackle different causes.

Impacts of water scarcity

Careful attention has been paid by the UN on the effect of water scarcity on the poor and marginalized in the society. When people have limited access to adequate and clean water, other aspects of their lives are affected. Water affects health as many diseases are water-borne such as cholera. Access to water can also increase food security and even break the vicious cycle of poverty as better access to water results in more secure yields and healthier people. This results overall in a more productive society as the people are able to work rather than if they were sick. This represents an increase in quality of life. This increase in quality of life further results in an increased standard of living if the individual is able to earn a more secure income. According to the UN Human Development Report of 2006, water insecurity "violates some of the most basic principles of social justice" including fair distribution and equality of opportunity. Fair distribution is a problem in countries with high disparities in wealth as "water usually runs downhill, but it always runs uphill to money" according to an article in the *Scientific American* called 'Facing the fresh water crisis.' If this unequal distribution festers, there is a loss of equality of opportunity as access to water, as simplistic as it sounds, affects other key elements of life i.e. health and income. Water scarcity can also lead to sanitation problems which can further affect health. There many also be a relationship between access to water and education as in many developing regions, girls have to get up early to fetch water (sometimes walking long distances) before they go to school. Improved access to water means the children do not walk such long distances and consequently are not worn out by fetching water. Shorter distances also mean they are more likely to get to school earlier.

Major Parties Involved and Their Views

There are many organizations involved in resolving the water shortage but a few are listed below.

UN water

The UN has been thoroughly involved in the quest against global water scarcity in numerous ways that will be discussed later on in this research report. UN water was endorsed in 2003, helping member states reach the Millennium Development Goals related to water and

WaterAid

WaterAid is an international organization which aims to improve access to sanitation and clean water worldwide. WaterAid works with local partners to provide clean water for the poor. They also urge governments to provide solutions to water scarcity, working with governments to develop national strategies to provide clean water for all citizens.

Water.org

Water.org is a non-profit organization that uses projects that are sustainable to provide water for people in developing countries. It partners with local people as it believes local people best know how to solve their problems. It also uses the WaterCredit initiative which mixes water, sanitation and microfinance. Its aim is to give small loans to people who do not have access to credit facilities in order to solve their water problems more directly.

Somalia

Somalia is one of the top countries most affected by water scarcity. This is largely due to the lack of water sources in Somalia and the lack of investment in infrastructure. Only 30% of Somalis have access to safe water. Drought, population pressure and changing weather patterns have reduced water sources available to Somalis. Insecurity arising from the ongoing conflict also reduces safe water access. UNICEF and the International Committee of the Red Cross (ICRC) are involved in alleviating the water shortage in Somalia.

Yemen

Amidst the ongoing conflict in Yemen, there is also a water crisis. 50% of the population struggle daily to find enough clean water to drink or grow food. The water crisis has heightened due to an increasing population and poor water management. The capital Sana'a could run out of water by 2017. Yemen's solution was initially rainwaer harvesting but later turned to drilling which is more modern but puts too much pressure on the groundwater.

Niger

Niger neighbours the Sahara desert and as a result there is very little rainfall so the people rely on groundwater for water supply. UNICEF and the World Bank have programs in Niger to provide clean water to its inhabitants.

Timeline of Events

The timeline below highlights the key events that have occurred in attempt to solve the global water crisis. Most, if not all, of the events listed below involve international

cooperation. This is paramount in solving the water shortage as it is a global and not local issue. Although there are some countries which are not necessarily suffering from water scarcity, the global water shortage is important to all countries and requires international cooperation. It is significant, therefore, that the UN chose to delegate 2013 as a year of water cooperation.

Date	Description of event
14th – 25th March, 1977	United Nations Water Conference
31st January, 1992	International Conference on Water and Sustainable Development (Dublin Conference)
3rd – 14th June, 1992	United Nations Conference on Environment and Development (UNCED) or Earth Summit
5th – 13th December, 1994	United Nations International Conference on Population and Development
1st February, 2001	2003 declared by the UN as the International year of Freshwater
26th August -12th September 2002	World Summit on Sustainable Development
	General Assembly formally recognises the human right to water and sanitation
July 2010	
11th February, 2011	2013 declared by the UN as the International year of Water cooperation

UN involvement, Relevant Resolutions, Treaties and Events

The United Nations has been thoroughly involved in the global water shortage and the issues that arise with it. This is supported by the numerous conferences that have been organized to discuss the global water shortage. Some of the resolutions relating to water scarcity are listed below:

- Follow-up to and implementation of the Mar del Plata Action Plan of the United Nations Water Conference, 18 December 1979, **(A/RES/34/191)**

- Proclamation of the International Drinking Water Supply and Sanitation Decade, 10 November 1980, **(A/RES/35/18)**
- International year of Freshwater, 1 February 2001, **(A/RES/55/196)**
- International Decade for Action, "Water for Life", 23 December 2003, **(A/RES/58/217)**
- The human right to water and sanitation, 28 July 2010, **(A/RES/64/292)**
- International year of water cooperation, 11 February 2011, **(A/RES/65/154)**

Evaluation of Previous Attempts to Resolve the Issue

The Millennium Development Goals (MDGs) created by the UN in 2000 are one of the key attempts to resolving the global water shortage. MDG target 10 states: "Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation." This is a sub target of the MDG 7: Ensure environmental stability. This target was met 5 years ahead of the deadline, 2015. There are still, however, 783 million people (or 11% of the global population) without access to an improved source of drinking water according to the Millennium Development Goals Report 2012. There are also some regions which are more affected than others, for example, in sub-Saharan Africa, over 40% of the population lack improved drinking water.

The several conferences aforementioned are also attempts to resolve the issue. During the Mar del Plata UN Water Conference in 1977 water was recognized for the first time as a human right in the Action Plan. In 1992, the Earth Summit endorsed the Action Plan from the 1977 UN water conference. These conferences are successful mainly because they involve international cooperation where many countries seek to solve the global water shortage together.

To increase awareness of the water shortage issue, the UN proclaimed the period 2005-2015 as the International Decade for Action, "Water for Life." This was relatively successful as, according to the UN, the Decade "helped some 1.3 billion people in developing countries gain access to safe drinking water." Furthermore, 22nd March was set aside as World Water Day to maintain awareness of the global water scarcity.

A relatively recent milestone was the UN resolution of 2010 recognizing the human right to water and sanitation. This recognized the right to access to sufficient water (50 -100

liters per person per day) which must be “safe, acceptable…affordable and physically accessible.”

And also are the several different approaches to resolving the global water shortage made by non-governmental organizations. The scale, however, of these are often much smaller than that of the UN and governments. These NGOs often work at a grassroots level and while their impacts are often positive and rewarding, one must not forget the size of the results in comparison to the bigger situation globally.

Possible Solutions

The issues with global water shortage are both demand and supply side. An obvious problem is the increasing demand but other problems also include the fact that we are using up faster than replenishment, the degradation of world’s water supplies and inefficient management. These are the issues that solutions must resolve. Another important aspect is distinguishing from physical and economic water scarcity. A good resolution should, therefore, have solutions that tackle these problems listed but also cover the two types of water scarcity. Possible solutions are discussed below.

In the free market system, price is used to ration goods and services. Accordingly, water could possibly be rationed using higher prices as these higher prices would cause people to think more carefully about their use of water and reduce demand. Higher prices would also possibly instigate the reuse of water (‘grey’ water), recycling of water and investment into more efficient household devices. The problem with this solution is that many people see water as a free good and so this might not be favored. This is also unfair to people of low income and may only increase water scarcity for these people.

More efficient agricultural practices are also a possible solution. Agriculture is the biggest user of water and irrigation is extremely inefficient. Using more efficient irrigation methods conserves water so it can be used to serve a need elsewhere and reduces the amount of water used by agriculture. Drip irrigation is a better irrigation option. It is up to 95% efficient. It, however, requires investment which is more expensive than less efficient types of irrigation e.g. surface irrigation.

The individual governments also play a crucial role in resolving the global water shortage. Their role includes: providing good infrastructure (pipes, etc.) to prevent leakages and waste of water, educating the people on the global water shortage and ways to conserve water and delivery of safe water to the people. Investment into water development and

research also needs to be provided to provide more efficient ways to use water. The governments, therefore, need to be urged to play their part. This role, however, is costly as education, maintenance and investment cost money. It is therefore reasonable to consider where developing countries, where alleviating water scarcity is not highly prioritized will get the capital needed to improve the government's role.

Desalination plants are a possible solution to the water shortage that has been implemented in the Middle East. These distil saline or sea water. A by-product of desalination is salt which is also useful. Desalination also has no effect on the water levels in rivers. Desalination plants are, however, expensive and so are only suitable for the richer countries.

A more drastic option is reducing population growth in order to reduce demand. These would possibly involve anti-natal policies which are often very strict. Reducing population might, however, not reduce demand for water by much as another factor which increases demand for water is increasing affluence. This can still occur if there is no population growth and so it is still possible for water scarcity to not decrease if a population is reduced.

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Appendices

Appendix I

Policy brief published by UN water on water quality. It contains facts on water quality as well as numerous solutions to improve water quality on different scales:

http://www.unwater.org/downloads/waterquality_policybrief.pdf

Appendix II

Summary of the Dublin Conference of 1992. It contains the principles and the action plan that resulted from this conference:

http://www.un-documents.net/h2o-dub.htm

Appendix III

Summary of the Earth Summit of 1992:

http://www.un.org/geninfo/bp/enviro.html

Appendix IV

UN world water development report volume 1. It focuses on the causes of water shortage looking at industry, cities and demand. It also touches upon some regional situations:

http://unesdoc.unesco.org/images/0022/002257/225741E.pdf

Appendix V

UN world water development report volume 2. It is a very detailed description of the global water situation. Although it is a long read, the contents page helps to guide to more specific issues and in more specific regions in the world:

http://www.zaragoza.es/contenidos/medioambiente/onu/789-eng-ed4-v2.pdf

Appendix VI

Volume 3 of the UN world water development report. This is a continuation of volume 2 and gives detailed descriptions of the water situation in various regions using case studies:

http://www.zaragoza.es/contenidos/medioambiente/onu/789-eng-ed4-v3.pdf

Appendix VII

Summary of the water shortage in Somalia:

http://www.somwe.com/waterissues.html

Appendix VIII

Explanation of the water crisis in Sudan as well as the Water Project's approach to helping solve the issue:

http://thewaterproject.org/water-in-crisis-sudan