Ensuring the fair distribution of water on a fluvial scale

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Issue: Ensuring the fair distribution of water on a fluvial scale

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Introduction

Although rivers make up only 0,49% of surface freshwater on earth, they are one of the most used resources for humans in order to get clean water. Therefore, the immense role that rivers play in ensuring the continuation of human life is undeniable since water is a fundamental need for humans. Furthermore, fair and equitable water distribution holds great importance for populations around the world for a number of reasons such as; ensuring the basic human need for water, promoting sustainable development, maintaining ecological balance, preserving biodiversity, and diminution of poverty. For these reasons, cooperation in the international community must take place so that water can be provided for the whole world population. Additionally, as water usage continues to increase in an ever developing world, it has become even harder to ensure the equitable distribution of water between countries. Since water is a source that is extremely unevenly distributed around the world, many countries, especially those in vulnerable environments, have seen much difficulty in providing their populations with clean water and specifically, clean drinking water. Hence, the even distribution of water among rivers and fluvial systems is crucial for the populations of each country, especially those who share a fluvial system such as Ethiopia, Sudan, and Egypt who are all sharing The Nile River. Solutions to this crucial issue require the utmost cooperation between countries and even though it is a difficult task to achieve, it is feasible and possible.

Definition of Key Terms

Fluvial system

The collection of all rivers and streams in a region, in other words, a river basin

Hydrological cycle

The continuous cycle of water on earth, involving seven stages; evaporation, condensation, precipitation, sublimation, transpiration, runoff, and infiltration.

River basin

The area where all of the rivers meet up, a drainage basin, fluvial system.

Spatial distribution of water

The total space taken up by water, linked to factors like climate change and weather patterns, the physical location in which things occur.

Temporal distribution of water

The change of water distribution over time.

General Overview

Fluvial systems are a set of systems made up of rivers and streams that all make up a critical part of Earth's hydrological cycle but also contribute massively to the economic activities of humans. With the usage of rivers for agriculture and various industries such as large power plants and other industrial facilities, economic activities are supported and developed. Therefore, the crucial role of these systems in the lives of humans is unquestionable. For these reasons, ensuring that water is evenly and efficiently distributed throughout these river basins is extremely important in order to continue both the economic activities but also the daily lives of populations. However, it is vital to also understand the factors that are influencing the uneven distribution of water in rivers.

Global Warming

Global warming plays an immense role in causing the uneven distribution of water in fluvial systems. With air temperatures rising all over the world, the hydrological cycle of the earth is hindered and greatly disrupted. With the hydrological cycle interrupted, precipitation patterns changed and regions that were getting rainfall started to see a fall in precipitation in a matter of time. Thus, it can be said that global warming has a direct effect on this issue at hand. The changes in temporal and spatial distribution in the last 60 years in Wujiang River Basin can be taken as example. In the basin, the patterns of rainfall in different areas have changed over the years due to differences in temperature caused by global warming. Furthermore, with global temperatures rising, there has been a rise and acceleration in the melting of glaciers in certain regions of the world. Subsequently, with changes in the melting patterns of glaciers,

flowing of rivers in these regions can be disrupted and changed. Hence, global warming causing extreme changes regarding temperatures is enormously affecting the equitable distribution of water in different fluvial systems.

Changes In Land Use

As the economic activities of humans have started to immeasurably alter the ecological landscape, disruptions in the flows of rivers have taken place as well. Deforestation, urbanization, and unregulated and uncontrolled agriculture are all factors that play a role in this disruption. For example, with extreme deforestation, it is possible that a region might lose its ability to retain as much water as it did, subsequently affecting the water flow of the area. When it comes to urbanization, it can be observed that human activities significantly alter the balance of the environment. Various Turkish towns and cities can be taken as examples. The natural flow of rivers and streams is changed to make place for housing and different amenities. These constructions lead to either a suppression of the river flow or a complete change in the flow. However, because of this, extreme floods have taken place in some parts of the country and therefore, it is impossible to talk about a fair distribution of water in those areas. As a consequence of changes in land usage, countries not being able to find a certain balance between the necessities for economic development and the protection of the environment, especially river basins, experience immense problems ranging from natural disasters to a lack of resources. Thus, it is indispensable that the flow of rivers is respected and well taken care of.

Water Management

The managing of water resources by humans is critical in assuring that there is an equal distribution on a fluvial scale too. Water infrastructure projects like dams, reservoirs, wastewater treatment plants, and water supply and sanitation systems all play a role in the flow of various rivers. Since these infrastructures affect water storage, release and also distribution for various purposes, it is important to note that they have a direct impact on this issue. For example, while dams can be perfect for water storage, they require careful planning and consideration in order to minimize their possible negative impacts on the environment. Whilst water availability can increase in the upstream parts of a dam, the downstream flow of rivers can be greatly altered. Although it is possible to control the downstream flow and regulate it in a way that benefits communities who live downstream, dams can impact ecosystems and biodiversity adapted to natural flow regimes of the river. Consequently, it can be understood that water infrastructure needs to be planned out carefully and attention should be given to the environmental impacts it can have.

Case Studies

There are a multitude of different examples existing right now that can be connected to the agenda item at hand, these include but are not limited to;

The Mekong River in Southeast Asia which spans China, Myanmar, Vietnam, Laos, Thailand, and Cambodia and is the world's 12th largest river is an example of efforts to ensure sustainable development and also protect the environment surrounding the basin. Providing rich resources and arable land for its inhabitants, the Mekong River is vital for the population living there. Nevertheless, the area experiences various problems including challenges of upstream-downstream dynamics, with dams and water infrastructure impacting water flow, urbanization and industrialization which are transforming the basin, and climate change impacting the flow patterns. To combat these problems, The Mekong River Commission (MRC) has been created, to ensure coordinated and effective development in the area.

Just like the Mekong River, the Nile is also shared by various countries. Egypt, Sudan, Ethiopia, Uganda, Kenya, Tanzania, Burundi, Rwanda, and the Democratic Republic of Congo all make up the river which is considered the longest in the world spanning 6,650 km. Unlike the case of the Mekong River though, there are numerous disputes over the Nile, causing a variety of problems for all of the countries. Unequal access to its waters and disputes over the resources have generated tensions among the countries in history. Furthermore, climate variability of the region and the conflicting demands of each country have made the fair distribution of water in the basin difficult to achieve. For this reason, the Cooperative Framework Agreement (CFA) or the Nile Basin Initiative (NBI) have taken place. The initiative "seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security". (Institutional Settings and Livelihood Strategies in the Blue Nile Basin: Implications for Upstream/Downstream Linkages, n.d.). With this cooperative approach, the imbalances in the distribution of water in the Nile are aimed to be reduced to a minimum.

The Indus River, which is shared by both India and Pakistan is a crucial water source for both of the countries, however, due to historical disputes that are still in continuity, it is still difficult to say that there is a cooperative relationship between the two countries to ensure the fair distribution of water. The impact of climate change can be seen in the basin as well, with glaciers melting and disrupting the water

flow in various areas. Despite the historical tensions between the two countries, The Indus Waters Treaty has been signed. A landmark treaty that ensures the fair distribution of water between the two countries.

Timeline of Key Events

Date	Event
24th of May 1993	Eritrea gains independence
5th of April 1995	Mekong River Commission (MRC)
February 1998	Nile River Basin Commission (NRBC) is enforced
September 2000	Millenium Development Goals are established - Agenda 2015
2003	Establishment of UN-Water organization
2005	UN focuses on water and sanitation development, called the “Water for Life”
May 2010	Cooperative Framework Agreement (CFA) is adapted by the NBI
19th of November 2013	UN establishes World Toilet Day to raise awareness for people who lack access to drinkable waters
25th of September 2015	Resolution on SDGs is enforced
2018	2.1 billion people live without access to clean water

Major Parties Involved

Ethiopia

According to a UNICEF report from 2022 on “Countries with worst drinking water”, every 8th person in Ethiopia has access to drinkable and safely managed water. After 1993, Eritrea gained independence, taking away the only coastline of Ethiopia, therefore limiting its access to the Red Sea. In total, there are currently over 100 million Ethiopian citizens who lack access to clean drinking water. In the aforementioned report, Ethiopia is ranked 7th.

Indonesia

According to the same report, Indonesia is ranked 13th but consists of the highest amount of people, who lack access to clean, and safe drinking water. Only 30% of the population has access to safe waters, and almost 200 million Indonesian citizens do not have that access. Although the country is mostly surrounded by water, many of the citizens cannot afford the high costs of filtrated or clean drinking water, whilst living on wages of only $3.20 a day. Another problem for some Indonesian citizens is the distance that separates them from the nearest water source.

Iceland

As of 2021, Iceland is the second-best country with the cleanest waters as per the Berkey. This can be attributed to their national policy, which focuses on closely checking for various chemicals and minerals contained in the waters, which are most commonly found under the Earth's surface. Furthermore, Iceland is an extensive Island, North West from the United Kingdom, and is mostly surrounded by waters, hence providing access to waters for the Icelandics.

Switzerland

Switzerland is a small country, located in the middle of the Alp mountain chain, with no direct access to any coastline like the Mediterranean Sea, but they are still considered to be one of the best countries, with the cleanest waters in the world. Similarly to Iceland, 80% of all Swiss tap water, comes from underground sources, whilst the rest of the water comes from the Swiss lakes. Besides, the high quality of water in Switzerland is closely screened by the local government, with the support of the Environmental Protection Agency (EPA), whose main focus is reviewing the levels of chemicals within the country's waters.

Possible Solutions

Fair distribution of water on a flaval scale, is part of the Sustainable Development Goal (SDG) number 6. It seeks for the member states to have fair accessibility and ensures the proper use of water. Throughout the debate, the delegates could look for previous actions undertaken by the United Nations, about achieving the aforementioned goal. Therefore ensuring the rightful use of water, for the people of a country, and for reasonable transportation, or migration between states. Furthermore, the delegates

could find further details about the pollution in the international waters, and how it could potentially affect human beings, and species living in the region of the crisis.

Furthermore, across the globe, there are multiple organizations especially UN-based, which focus on collecting worldwide data, regarding the population's accessibility to clean waters, and its rightful management. One of them is UNICEF, which often presents information on worldwide issues and the struggles of the population. Using their data, delegates could focus on the areas of issues, or even countries, to narrow down the area of focus. Additionally, finding solutions to support the countries mentioned in the study cases should not include any financial aid, without a clear plan, as money could be distributed elsewhere by the governments, and the leaders, Therefore delegates should propose solutions that include plans on how infinite UN budget could be used as an extra hand for the countries in need.

On the other hand, access to clean waters can be a struggle for many of the poorer countries, or those located in the center of the continent like the Central African Republic. Therefore their water access limits to the river flow, or other water channels. Unfortunately, many of these waters are unable to be consumed by the citizens due to high levels of the chemicals within them. Delegates have in disposal the EPA, which has the authority to screen the waters and look for present chemicals. Therefore governments and other international bodies could use their data to solve the problems of dirty waters or provide solutions to creating more access to clean water.

Further notice, according to UNICEF data, by 2040, 1 in 4 children will not have access to safely drinkable water. Therefore many countries must take action now, to prevent the development of such issues worldwide. The long-term solutions can be crucial in preventing these issues from occurring further in the future. Delegates should consider finding solutions for the Less Economically Developed Countries (LEDCs) as well as the countries that struggle with access to clean waters, to prevent the clean water scarcity. Although the UN established Agenda 2030, as the deadline for improving living standards, the next decade, could also be crucial, to making positive steps, to create a safe world for future generations.

Bibliography

Barret, S. (1994, May 31). Conflict and cooperation in managing international water resources. https://econpapers.repec.org/paper/wbkwbrwps/1303.htm

Çelik, R. (2018, June), Impact of Dams on Groundwater Static Water Level Changes: a Case Study Kralkızı and Dicle Dam Watershed, 1-8, https://doi.org/10.29137/umagd.442483

Diamanti, M. (2023b, February 24). Wastewater resource recovery can fix water insecurity and cut carbon emissions. European Investment Bank. https://www.eib.org/en/essays/wastewater-resource-recovery

Institutional settings and livelihood strategies in the Blue Nile Basin: implications for upstream/downstream linkages. (n.d.). Google Books. https://books.google.com.tr/books?id=4woyikQZoMcC&pg=PA64&redir_esc=y#v=onepage&q&f=false

Kilgour, D. M. &. D. A. (1995). Are stable agreements for sharing international river waters now possible? ideas.repec.org. https://ideas.repec.org/p/wbk/wbrwps/1474.html

Syme, G. J., Nancarrow, B. E., & McCreddin, J. (1999). Defining the components of fairness in the allocation of water to environmental and human uses. Journal of Environmental Management, 57(1), 51–70. https://doi.org/10.1006/jema.1999.0282

Wang, J., Peng, T., Xiang, Y., Yin, Z., & Qi, H. (2023). Analysis of the Characteristics of Uneven Spatio-Temporal Distribution in Wujiang River Basin over the Last 60 Years. Atmosphere, 14(9), 1356. https://doi.org/10.3390/atmos14091356

World Health Organization: WHO. (2018, February 19). *Millennium Development Goals (MDGS)*. https://www.who.int/news-room/fact-sheets/detail/millennium-development-goals-(mdgs)

Water scarcity. (n.d.). UNICEF. https://www.unicef.org/wash/water-scarcity

Global Water Crisis - Water scarcity facts & how to help | World Vision Australia. (n.d.). https://www.worldvision.com.au/global-water-crisis-facts

Indonesia's Water Crisis - Indonesia's water Problems | Water.org. (n.d.). Water.org. https://water.org/our-impact/where-we-work/indonesia/

Intrepid Travel. (n.d.). *Is water safe to drink in Iceland? | Intrepid Travel*. https://www.intrepidtravel.com/eu/iceland/is-water-safe-to-drink-in-iceland

Lincopines, C. (2023, April 10). *Which country has the cleanest water in the world? Top 10 countries with the best tap water quality*. The Berkey. https://theberkey.com/blogs/water-filter/which-country-has-the-cleanest-water-in-the-world-top-10
-countries-with-the-best-tap-water-quality

Matshanda, N. (n.d.). *Landlocked Ethiopia wants better sea access: a port deal with neighbours could*
benefit the region. The Conversation. https://theconversation.com/landlocked-ethiopia-wants-better-sea-access-a-port-deal-with-neighbo
urs-could-benefit-the-region-211759

Gilligan, C. (2023, September 25). Countries with the worst drinking water. *US News & World Report*. https://www.usnews.com/news/best-countries/slideshows/countries-with-the-worst-water-supply?o
nepage

The distribution of water on, in, and above the Earth | U.S. Geological Survey. (2019, October 25). https://www.usgs.gov/media/images/distribution-water-and-above-earth

Martin. (2023, October 19). *Water and Sanitation - United Nations Sustainable Development*. United
Nations Sustainable Development. https://www.un.org/sustainabledevelopment/water-and-sanitation/

Wikipedia contributors. (2023, October 29). *UN-Water*. Wikipedia. https://en.wikipedia.org/wiki/UN-Water

Wikipedia contributors. (2023a, July 5). *Nile Basin Initiative*. Wikipedia. https://en.wikipedia.org/wiki/Nile_Basin_Initiative

Un-Water. (n.d.). *UN-Water | Coordinating the UN's work on water and sanitation*. UN-Water. https://www.unwater.org/

Aslan, A. (2013). FLUVIAL ENVIRONMENTS | Sediments. In *Elsevier eBooks* (pp. 663–675). https://doi.org/10.1016/b978-0-444-53643-3.00111-4