

## **Beyond Scarcity: Understanding Physical and Economic Shortages in the Global Water Crisis**

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### **ABSTRACT**

**Tropical forests, providing value through water regulation, purification, erosion prevention, and waste treatment, account for 44% of the total forest value, overshadowing other benefits like carbon storage and tourism. Freshwater systems contribute over \$75 billion in goods and services annually but face alarming degradation, with a loss of 64% of total wetland areas in the last three decades, costing up to \$20 trillion in opportunity costs yearly. The extinction risk for amphibians and the particular vulnerability of developing nations emphasizes the global crisis of water scarcity. This article explores the multifaceted issues contributing to water scarcity and wastage worldwide, with an emphasis on the socio-political dynamics in third-world countries. It proposes an understanding and strategic intervention to transform water from a point of contention to a solution, aiming for global stability and access to clean, safe water.**

**Keywords:** Water Scarcity, Ecosystem

### **INTRODUCTION**

Ironically, while up to 71 percent of earth is covered with water, only about 2.5 percent of it can be safely consumed. Considering the rapid population growth over the past decade, it is undeniable that the world today faces a water crisis. A significant portion of earth's population are completely detached from this vital resource. Unfortunately, those with access to the resource have adopted a routine of wasting this vital resource. Needless to say, an immediate intervention to ease the impact on society is imperative. As opposed to popular belief, water shortage is not entirely physical shortage.

Yet there still exist economic shortages of the valuable resource. Physical shortage of water entails the natural inaccessibility to clean water for drinking. Some regions such as Saudi Arabia, Australia, southwest of the US, and Northern China completely lack the resource. In other areas such as Eastern and Central Africa there is access to the resource though the current supply systems are futile. This effect manifests as an economic shortage of the vital resource. Despite the implication persisting for decades, researchers still lack a consensus on the solutions that may ease ineffective techniques to manage surface water.

## LITERATURE REVIEW

While precipitation is important, it certainly bears its negative consequences on the endeavor to preserve water. It is the land use planning framework that is entrusted to regulate these negative implications. Land use controls programs were enacted as early as 1947 in areas such as Wales and England. In spite of this the effective management of precipitation still persists. This system has been criticized for ineffective and slow response techniques especially following the rapid shift in land use (Inglezakis & Moustakas, 2015). As such, critiques of the system perceive of being incapable of keeping up to date with the emerging challenges thus lacking a reliable protection system. However true the critique is, it does not necessarily stem from conventional drainage ideology. Rather, from unsustainable surface water management. The drainage routine since the Victorian era all through the emergence of urbanization have undoubtedly remained the same (Yukalang, Clarke & Ross, 2017). During the same period challenges presented by effective drainage of surface water have severely evolved creating numerous challenges that cannot necessarily be regulated by the system.

An important consideration by the current system is that standing water is regarded as a hazard. As such, strenuous efforts are being taken to move storm water economically, quickly, and safely into sewers. Despite these extensive measures and the indispensable financial resources, flooding still persists as a critical problem (Modak, Wilson, & Velis, 2015). Though there exists a series of alternative techniques to curb the implication, they still remain in minor use either because of economic reasons or due to their engineering hindrances. Brooks and Conkle (2019), insist that the spread of urbanization is associated with a deterioration of the natural hydrological cycle. Factors that contribute to this change include reduced transpiration and surface infiltration. An alternative option has thus been to divert surface water into drainage systems (Hettiarachchi, Meegoda, & Ryu, 2018). This implication therefore the extensive endeavors by water companies to limit water wastage futile.

Ineffective surface water management has also been linked with severe pollution rates in the ecology. The forms of pollution could be diffuse or point-source pollution. Point-source pollution is the most pervasive as it emanates from industrial and sewage effluents. Diffuse pollution on the other hand is less significant in terms of its sources, mainly being the use of land (Vitorino et al., 2017). Fortunately, the current regulations on transnational and national environmental protection legislations offer reliable solutions. This effect may be ascertained by a significant improvement in water quality by up to 41 percent between 1990 and 2000 in Wales and England. Unfortunately, the legislations have done little to mitigate the implications from diffuse pollution. Thus, the pollution has exacerbated water quality in the respective areas by 20 to 50 percent (Singh, Thind & John 2018). Thus, it is undeniable that diffuse pollution forms the most prominent challenge to eradicating pollution of water sources. Furthermore, more than half of the oil drainage outside Wales and the UK are attributed to emanate from diffuse pollution on surface drainage.

While traditional sources of pollution are easy to identify and devise solutions, the same may not apply for diffuse pollution. Often, there lacks a consensus on the key facets that propagate the phenomenon and the solutions that may yield noteworthy results (Prechthai, Parkpian, & Visvanathan, 2018). A key component for this trend is that diffuse pollution often develops

from phenomenon beyond current conceptual frameworks. Thus, there lacks a definite approach to not only understanding the issue but also enacting long term solutions. A routine tradition in western civilization involves incorporating a storm water sewer system to keep off the sanitary treatment from the system runoff (Thi, Kumar, & Lin, 2015). It is this routine that renders the endeavor to address diffuse pollution futile. Besides, solely adopting typical drainage techniques is highly unlikely to solve diffuse pollution menace.

Water is considered as one of the most important resources for life and it is safe to say that a majority of humanity is losing or running out of available water. Which is very important for people to understand that every drop of water that is lost through leaking taps for a long period of time can you lead up to gallons of water being wasted (The World Bank, 2012). Therefore, people should take the appropriate amount of time on their showering or washing dishes or doing other household chores that require the use of water. Even though the surface of the art is 70% water only a small percentage of it can be used. This is because there has been an increase in pollution of the water as well as marine life. Water crisis can be said to be brought about by water waste and pollution and many parts of the world are being affected by the crisis (Seng, Fujiwara & Spoann, 2018). Human beings are said to be the leading cause of the water crisis through wastage and pollution. As it is it is very important for world bodies to take action to ensure that every person has access to clean water. In the future it is likely that the crisis of what time we move into our homes and this is likely to cause life changing illnesses and, in some cases, even death. As it is only 10% of water that occupies the surface of the earth can be used and is considered freshwater. The lack of clean and fresh water causes issues of sanitation in sickness is and those who do not have access to clean water in safe water tend to be more prone to illnesses such as Cholera, dysentery and in some instances even death (Sasaki & Araki, 2014). The demand for fresh water is a lot higher than the supply and this means that there is likely to be a shortage in clean water soon. Unfortunately, even the technology that we have today cannot help alleviating the water crisis that is being experienced in major parts of the world today.

### **METHODOLOGY**

Secondary data was mostly used in this research. There was extensive use of literature and research that had already been carried out of a similar nature. Of major importance were the research by the reputable organizations all over the world such as the United Nations and the World Food programs. The organizations have been known to carry out extensive research on the environment, food, and water in general. For this reason, they were bound to have a lot of information on the topic under discussion. At the same time, it was important find other research that have been carried out by other scholars in the field. This is because they tend to provide further insight on the topic at hand. They are likely to have different perspectives that would ultimately lead to different opinions on the issue that is at hand. The research journals must be peer reviewed and written within the last ten years as this would indicate that the latest methods of research have been used and that the results will be applicable to the current situation.

The findings that were obtained from the different literature indicated that the population of people living in areas where there is water scarcity has increased by almost 16-fold. The entire population on the other hand has increased by only 400% since the 1990s. The per capita water

consumption has also increased significantly to match the number of people living in the world. It is safe to say that the higher the number of people in the planet, the higher the amount of water that they would need to use. The topic of water scarcity has been discussed extensively as well as various suggestions that have been written on the topic.

### DISCUSSION

Water is important in the world today in there is need to come up with various methods of not only preserving but also recycling it in a way that is useful to human life. There is need to come up with a natural step of not only recycling water but also educating people on ways of saving water in their day-to-day activities restore infrastructure that are related to water as well as reduce the water pollution and these are the aspects that are very important in reducing the water crisis that is being experienced in many parts of the world today (Manaf, Samah, & Zukki, 2019). Technology is an important aspect when it comes to recycling water. Technology has helped a lot of people to come up with different methods or doing things in a much better and efficient manner and for this reason technology can be used to find ways of recycling water so that it can be used in other important activities. In many counties when the water infrastructures are built within the cities they were left in blue maintenance and therefore overtime they have come to be damaged and are in urgent need of repair. In some areas the pipes that transport what are said to be almost 70 years old and therefore are not as far with the world as it is today and may not be able to serve the needs of the people mostly due to the increase in population and even the change of lifestyles. Therefore, as the infrastructures that are geared towards water collapse so does the water crisis increase. In the case where the infrastructure is urgently repaired then it is likely that water will be used in a much more efficient way (Brown & McGranahan, 2016). It has been noted that amount of water that is being wasted every day could be enough to supply people who do not have a regular supply of clean water every day and as the population increases so will the demand for water. Therefore, money should be channeled towards repairing the infrastructure for water and hence increasing the supply of water that people have in their households. According to the American water works Association the utilities are behind \$23 billion, and this is because of expensive treatment and technology upgrades that are needed for the federal regulation (Wagner, 2012)

When water is scarce so will their amount of money that people would be required to pay for it. Therefore, when enough money and effort is put towards saving the infrastructure it is likely that the scarcity of water and the water it will go down in the future. According to the American Association it is estimated that water infrastructure should be four times larger than the county's Interstate highway system and this is the only way that it can serve the population of any County (Lim, Lee & Wu, 2016). Therefore, it is a big question as to why counties have not taken steps to ensure that they have proper infrastructure to supply citizens with safe and clean water.

Pollution is also another factor that must be considered when it comes to the water scarcity issue and water crisis. As much as technology has advanced a lot over the years it has also increased their pollution through chemicals that are disposed of into the water bodies. When the water is polluted then the marine life also is at risk since they are unable to get enough supply of oxygen as they did before. The death of the marine life inside the water bodies also causes a lot more pollution into the water hence ultimately endangering the lives of people.

There is also is when chemicals are pumped into the soil so that plants can grow (Inglezakis, & Moustakas 2015). When the chemicals are in excess the normally drip into the drainage which are laid into water bodies. The entire ecosystem and plants are also at risk for the scarcity of water and since water is very important to human life and every other aspect in the planet there is need to change the way people produce plants. This can be true using manual and fertilizer that is environmentally friendly and those that will not harm the environment (Chiemchaisri, Juanga & Visvanathan 2017).

Urbanization is a huge part of water pollution. This is when companies are started and in the manufacturing process, they tend to dispose of their waste into the water bodies. Some countries such as China that have extremely high rates of urbanization also have extremely high rates of pollution since they have a lot of factories and do not have proper mechanisms of disposing of their wastes which end up into water bodies. When the water resources are contaminated with human pollution then the amount of fresh water that is available for human use is drastically reduced as well. This means that there is need to come up with purification methods that would make water safe for human consumption (Bing et al., 2016).

Pollution not only destroys the environment but also water and this consequently leads to illnesses that could very well cause an end to human life. Some researchers have also stated that water can be polluted so much so that it is rendered unusable even if it is recycled. Therefore, there is need to come up with better methods of recycling and purification of water to an extent that can be safely used by human beings.

Pollution ultimately has caused climate change which has had a very big influence on the reduction of water sources around the world. Since the temperatures of the earth are getting warmer and warmer so has water been evaporating on the surface of the earth. There are areas in the world that receive very minimal rainfall and hence have to deal with severe droughts and famine from time to time. When the rainfall is too little then the main natural was associated are depleted eventually as the dry up. Water crisis in the West can be said to be a factor that people should be worried about (Babu et al., 2016). According to scientists the rainfall that is experienced throughout the world could reduce by almost 25% in the coming years and roads are expected to be much longer and severe.

Climate change and global warming have also caused the groundwater levels to drop drastically because they are being used at a much faster rate than nature is producing it. Some places particularly in the third world countries, the lack of technology make groundwater their only source of water hence making it prone to scarcity in the near future (Owen, Bessant, & Heintz, 2013). Since the resources of groundwater and amount of groundwater are getting lesser and lesser, the water crisis is likely to escalate. Pollution must also be dealt with more thoroughly or else people will not be looking for ways of treating illnesses and exposure to toxic materials (Ashraf, Yusoff, Yusof, & Alias, 2013). Fresh water is extremely important because it is usually required in nearly all activities that human beings partake in and therefore being so essential for human life it is important that various ways of protecting each other established and implemented. Some of the ways that promote clean water include decrease of water waste reserve water usage and conservation efforts regardless of human resistance.

### RECOMMENDATIONS

There is no single path that can be said to completely eradicate the issue of scarcity of water and there are many parts that may lead to the desirable feature in regard to water. A major important feature of the future will be existence of healthy ecosystems which eventually require water. As other users of water have been considered to be in contrast with the need of water to maintain the left ecosystems (Sempels, & Hoffmann, 2013). Moreover, there is need to allocate water for different maintenance of ecosystems and it will be necessary eliminate the discharges of human industrial wastewaters which are being released into the environment without consideration whatsoever of the effects that they have in their environment. Therefore, it is recommended that there is need to find ways of increasing water into the ecosystems as it is very important to life (Hargadon, 2015). When the water is poisoned, it is likely to lead to the death of many organisms within the ecosystem that make human life bearable. There is need for further research into this and how it can be done in an effective way.

It is also important to find ways of ensuring that water is enough to feed a growing and much more stable population so that all aspects of human life are supported adequately. What are needed for production and distribution of other goods and services and therefore it will be better for the continent if they were able to produce a more crop per drop or more jobs per drop or even a better environment but drop among many others goals (Marcus, 2015). As it is one could say that the continent is headed towards using a lot more water pay job and hence leading to the scarcity of water that is being experienced today. In the case that human needs are not met then it is likely to be a challenge in the future. It is a major challenge to consider the human needs and at the same time the terrestrial ecosystems (Bhatti et al., 2018). Therefore, there is need to find ways of addressing these concerns and this can be said to be a multidisciplinary research effort.

There is need to come up with different methods of preventing a severe water management crisis. If people continue the way that we, are it is likely that we may end up in a situation where the current predictive models may not be applicable. Therefore, there is need to identify establish and then set motion systems of governance and regulations that will create a path towards long term sustainable development (Tidd, & Bessant, 2015). There is also need to research on how to deal with financial and environmental challenges. As it is the major concern as at now is to have necessary conditions for human creativity so us to have success in politics, science, and culture (Aderoju, Dias & Gonçalves, 2018). There is need for all the leaders in all dimensions to place water as one of the most important factors in their genders before they are forced by circumstances to have it as a priority. That is for the need to identify and come up with long term solutions for the water management problems that could threaten the future of humanity.

The gap between the rich and the poor exists and is wide and increasing by the day. Access to safe and clean water is still very hard for almost a billion people to access easily. Almost 2.5 billion people over the world lack proper access to safe sanitation and in the last 15 years food insecurity has increased regardless of continuous increase in aggregate global per capita food production and supply. There has been food insecurity that can be attributed to lack of clean water in proper sanitation (Al-Khatib, Abu Hammad, Sharkas, & Sato, 2015). For this reason, it

is important to ensure that there is proper access to water for farmers and people even those in the third world countries.

These kinds of issues are not only seen in with water in food but also in other aspects of life and other resources. There is a strong connection between food water energy and environment and the wellbeing of human beings and therefore an imperfection in one sector of human life is likely to lead to imperfections in others as well. These imperfections affect everyone and the natural resources and the earth's environment (Russo, 2010). As water continues to be scarce it is necessary to identify how to use the technical capacity and human ingenuity to reduce the production and supply chain inefficiencies that are being experienced today. It is necessary to reduce losses and waste that arise from growing in production of plants and other resources. So far, the practices that have been put in place have not been sufficient to tackle the issue of water scarcity in the world.

### CONCLUSION

The article established that freshwater depends on healthy and functioning ecosystems and therefore it is important and necessary to understand their water cycle process so as to achieve sustainable water management as well as preserving the ecosystem services that human beings depend on. The water related services that are provided with tropical forests include the regulation of water flows water purification erosion prevention waste treatment end all of this account for value of almost 44% of the total value of forests and this is much more than the value of carbon storage recreation food tourism services and timber combined. The freshwater systems provide more than \$75 billion in goods and ecosystem services for people every year and at the same time help to maintain the life of many species including 25% of all vertebrates. In the last three decades 64% of their total wetland areas have disappeared and this degradation costs the world up to 20 trillion U.S. dollars in opportunity cost both ecosystem services every year (Ali, Wang, Chaudhry, & Geng, 2017). As it is almost 30% of the amphibians in the world are at risk of extinction and in some areas this number goes up to 50%.

Countries particularly those in the third world all developing nations have a higher need for access to clean water. This is because they experience great water in fragility challenges especially in terms of the politics and general well-being of the citizens of the country. This article greatly discussed issues that cause scarcity of water in all areas of the world and steps that can be taken to reduce wastage of the same. If stability is achieved in the third world countries, then this is said to be a global public good and policy goal. Therefore, the role of water in this instance is to improve social and political dynamics within the regions. It is necessary to understand the dynamics in a much better way so that water does not become another issue of contention but rather act as a bond and a solution to some of the problems that they face. Therefore, this article is the first step towards addressing the growing challenge of water scarcity and waste management all over the world. In the case that the recommendations that have been suggested are implemented, then it is likely that the water issues that are being experienced in the world today will reduce significantly and people will have access to clean and safe water.

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