



## Decrease in quality and quantity of clean water due to climate change

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### Abstract

Climate change is a world phenomenon that is often discussed recently and has an impact, one of which is an increase in temperature. In addition, previous research says that climate change affects water resources found all over the world, where this temperature change is also enjoyed by the residents. The purpose of this research which means to know the impact of climate change (climate change) on the quantity and quality of hygienic water. Water is one of the natural resources that is needed all the time so that it is a very crucial human need. The method that will be carried out in this research is the mix method, namely the Library Study method and the qualitative method using descriptive lighting. with the impact of climate change which causes an increase in air temperature, causing faster evaporation of water, resulting in rapid reduction of groundwater. Conclusion : This reduced groundwater will affect the quantity and quality of hygienic water on earth. The results of this study are expected to be useful for the government and agencies related to the provision of hygienic water. Besides that, other people can learn to understand why there can be a decrease in the quality and quantity of hygienic water.

**Keywords:** climate change; quality of hygienic water; quantity of hygienic

## 1. Introduction

Water is a crucial and inseparable part of the life of all living things. The human body itself consists of 60-70% water. Water is a basic need for every living creature on earth. Humans depend on water not only to meet domestic household needs but also for needs such as production needs, industrial needs and other needs. Over time, the increase in population is directly proportional to the increasing demand for water, even though based on the hydrological cycle, the amount of water is permanent. To get fresh water from sea water can be done by reverse osmosis, which is a process of filtering marine water using pressure flowed through a filter membrane. This system is considered SWRO (Seawater Reverse Osmosis) and is often used on marine vessels or onshore clean water installations with marine water standards (Trisna, 2018).

Climate change is an event that changes the elements of the climate over a very long time. in the long term, it is feared that climate change that is increasingly extreme can endanger the lives of living creatures. There is a gradual increase in climate elements in the form of air temperature, rainfall, air pressure. Based on increasing the value of evapotranspiration, changing groundwater recharge and reducing water demand it is estimated that climate change is the origin of water availability. Many previous studies have said that climate change will

increase temperatures and have a negative impact on water availability (Iglesias et al; El-Fadel and Zeid in Mizyed, 2008). The increase in air temperature caused by global warming on climate change results in faster evaporation or evaporation, causing groundwater to decrease more quickly. This reduced groundwater will affect the availability of clean water on earth. In addition, extreme climate change causes uneven precipitation. where most areas of the earth have high rainfall, while in other parts of the world it is not ([Pendergrass and Knutti, 2018](#)).

## 2. Methods

The purpose of this study is to find out the existence of global climate change, and identify the availability of clean water used for domestic purposes as well as alternative facilities for providing better clean water to overcome the clean water crisis, so that the results of this study are expected to be useful for local governments in improving clean water services to the community This analysis method is carried out in a mixed manner:

1. The library study method is carried out by studying book references, articles, and browsing the internet, as well as literature reviews related to system analysis. Collecting data by utilizing this bibliography is to better support the object of a study by comparing existing theories with existing practices at the location of the data source.
2. Qualitative method with descriptive explanation. Qualitative research method is a research process that produces descriptive data from people and observed behavior in the form of written and oral. The steps taken to determine community participation in this research are divided into three discussions, namely program planning, program implementation, and knowing the benefits of the program. Data collection is done through observation.

## 3. Results and Discussion

Water is a basic need for every living thing on earth. Humans depend on air not only to meet household domestic needs but also for needs such as production needs, industrial needs and other needs. But at this time there has been a decline in the quality and quantity of clean water. This is the cause:

### 3.1. World Climate Change

The warming that is happening in the Earth's climate system is a very obvious thing, as we use a lot of evidence from observations about rising air and sea temperatures, melting snow and ice in various regions of the world. As the IPCC finds, rising temperatures have accelerated the hydrological cycle. A warmer atmosphere stores more water vapor, as a result it is less stable and produces more precipitation, especially in the form of heavy rain. Greater heat also accelerates the evaporation process. The result of these changes in the hydrology or water cycle is a decrease in the quantity and quality of hygienic water. Simply put, increasing warming temperatures and changing rainfall patterns have had an impact on life ([Nepal, 2019](#)).

### 3.2. Changes in Rainfall

The changes that occur are indicated by the uncertainty of the issue fever, the increase in rainfall during the rainy season, thereby increasing the potential for flooding and landslides ([Widiyaningsih, 2021](#)). On the other hand, too little rainfall results in drought and decreased water availability. in the context of climate and weather are 2 different spaces. Climate can not be predicted personally, it is necessary long term to know the trend. While the weather ranges between temperature, rainfall and wind speed at certain places on certain days or during very short periods of time so that it can be predicted directly ([Suhendra et al., 2020](#)).

### 3.3. Increase in Temperature

(Ge et al., 2019) stated that GHCN\_CAMS and JRA-55 were relatively good at representing SUP in the tropics of the Indochina Peninsula. However, this is not relatively accurate when compared to using air temperature data on the island of Java. Visual analysis shows that GHCN\_CAMS is good enough to represent the air temperature in areas with higher values, but it is highly overestimate in areas with low temperatures such as highlands. JRA-55 is not relatively good at representing both, underestimates in areas using high temperatures but still slightly overestimates in areas using low temperatures such as highlands. Meanwhile, ERA-lima is relatively good at representing variations in air temperature on the island of Java. Spatial variation from several modeling shows that SUP on Java Island has increased in the period 1990-2019 ([Armadi et al., 2019](#)).

### 3.4. Hygienic Water Crisis

The clean water crisis is a topic that is still hot to talk about. In recent times, many regions in Indonesia have experienced a hygienic water crisis caused by natural factors, namely drought. As many as 198,795 family heads in West Java were affected by a shortage of hygienic water in the 2019 dry season. The West Java Regional Disaster Management Agency (BPBD) recorded that the amount of clean water distributed reached five,196,600 liters ([Trisna, 2018](#)).

Head of the Rehabilitation and Reconstruction Section of the West Java BPBD, Budi Budiman Wahyu, assessed that the impact of the drought in the current issue of the drought this time was not severe. "If a percentage comes from the number of villages and sub-districts in West Java, I don't think it's too bad," he said, Friday, September 6 2019. Budi estimates that the number of areas affected by the drought will reach 10 percent in all of West Java. He said the number of villages affected was only 457 villages from 215 sub-districts spread over 22 regions throughout West Java. The condition of the lack of clean water is recognized as fairly evenly distributed throughout the province. however, he made sure the impact was still under control ([Amalia and Sugiri, 2014](#)).

The impacts of the water crisis that can occur are ([Pahrudinsyah and Permana, 2020](#); [Widiyanto et al., 2015](#)):

1. Towards the environment  
Animal and plant life as disturbed, damage to natural beauty and changes in the ecosystem.
2. Against social  
Can cause many diseases due to reduced quality of clean water and also in drinking water that is not safe to use. Generally this disease is easily transmitted in small children. the disease model is diarrhea, diarrheal disease in Indonesia is the main cause of death for 88% of deaths in children due to diarrhea ([Widiyaningsih et al., 2021](#)).
3. Against the economy  
The reduced quantity and quality of hygienic water can have an impact on residents in the lower middle class, because they have to pay for water more expensive than before. For them it is very difficult.

### 3.5. Clean Water Assistance

Meanwhile, the distribution of clean water donations continues, but only in a few areas. For example, in Purwakarta Regency. The Purwakarta Regency Fire and Disaster Management Service has so far distributed 156,900 liters to 18,111 families who lack clean water. from the observation of the public's mind, a number of lakes or lakes in the Purwakarta area have been very dry. one of them is Situ Cikumpay in Campaka District which is usually used to irrigate rice fields more or less ([Yati et al., 2021](#)).

#### 4. Conclusion

Many climate changes have occurred in various regions, thus causing a decrease in the quality and quantity of clean water. Water is a basic need for living things on Earth. Even the human body requires 60%-70%. The reduction in the quality and quantity of water occurs due to climate change. The impact in hydrology causes a decrease in the quality of clean water. In addition, changes in rainfall also cause reduced water availability. Because at this time in various areas there has been a change in high rainfall which causes floods and landslides. Not only changes in rainfall, but also an increase in temperature on the island of Java which has increased since the period 1990-2019. Which causes a decrease in the quality of clean water. Even as time goes by, the increase in air temperature causes the melting of snow and ice in various places in the world. There are many impacts due to the water crisis, such as on the environment, social and economic.

Solutions to improve the quality and quantity of clean water that can be implemented:

1. Make water savings such as turning off the water faucet when the water is not used.
2. Limiting excessive use of fertilizers to farmers, which can hamper water resources.
3. Applying reuse and recycle principles as an option to anticipate potential water crisis.
4. Desalinating sea water for areas that are very close to the sea.

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#### Author Contribution

Conceptualization, J.A.W., Y.I.M.; Methodology, J.A.W., Y.I.M.; Validation, J.A.W., Y.I.M.; Formal Analysis, J.A.W., Y.I.M.; Investigation, J.A.W., Y.I.M.; Resources, J.A.W., Y.I.M.; Data Curation, J.A.W., Y.I.M.; Writing - Initial Draft Preparation, J.A.W., Y.I.M.; Writing - Review and Editing, J.A.W., Y.I.M.; Visualization, J.A.W., Y.I.M.

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#### Conflicts of Interest References

The authors declare no conflict of interest.

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