



ماعت للسلام والتنمية وحقوق الإنسان  
Maat For Peace, Development, and Human Rights

# Climate Change Threats

## "Red Alert for Water Security in Africa"



13 CLIMATE ACTION



6 CLEAN WATER AND SANITATION



March 2023

## Introduction:

The impact of climate change on water resources in Africa is one of the biggest crises facing the continent and its population, as climate change threatens the stability of African water resources in a continuous and escalating manner. The more severe climate changes, the more this affects the water crisis, as it leads to a state of instability and major changes in the levels of water in the lakes, affecting river discharge and groundwater recharge, in addition to its role in fueling local and regional conflicts..

On the sidelines of World Water Day, held on 22 March every year, in addition to the United Nations Water Conference in New York from March 22 to 24, and within the framework of its interest in sustainable development, especially Goals 13 and 6, Maat for Peace, Development and Human Rights issues a study entitled "**Climate Change Threats: A Red Alert for Water Security in Africa**" in order to shed light on the issue of climate change and its impacts on African water resources, especially in light of the African crises resulting from the conflict over water resources, such as the Grand Ethiopian Renaissance Dam (GERD) crisis.

In that context, this study sheds light on the impact of climate change on the right to water in Africa, as the limited availability of water resources in Africa is one of the major problems that exacerbate the African water crisis, which led to increasing African conflicts over water, as Africa is still facing several capacity gaps in high-quality and reliable water-related climate services.

While the study also sheds light on the impact of climate change on achieving SDG 6 in Africa, as the African continent faces multiple challenges related to achieving it, such as water scarcity, conflicts over African water resources, water pollution, and the lack of safe and healthy water for all.

Finally, the study explains the effect of water resources scarcity due to climate change on the aggravation of African conflicts over water resources by focusing on the crisis of the GERD (GERD) and the impact of the unilateral measures of the Ethiopian government on water resources in the downstream countries, which are: Egypt and Sudan.

## First: Climate change and the water crisis in Africa... What does reality indicate?

Climate change is a global phenomenon in terms of geographical spread, as the effects of climate change are not limited to a specific geographical area, but rather extend to the entire planet. Although Africa is not one of the parties most responsible for the production of this phenomenon, as it is responsible for about (2-3%) of global greenhouse gas emissions, it is considered one of the parties most affected by the negative effects and repercussions of this phenomenon at various levels. This has a direct impact on the reality of the national state and the continental aspirations targeted in the Africa Agenda 2063.

In West Africa, the long-term decline in river water flow is attributed to increased temperature, drought, and increased demand for water. Certainly, this matter has serious implications for the dependent and water-related sectors. This includes hydroelectric power production, agriculture, health, and access to drinking water.

Also, the limited availability of water resources in Africa is one of the major problems that exacerbate the African water crisis, which led to fueling African conflicts over water, as Africa still faces many gaps in capabilities in the field of high-quality and reliable climate services related to water. As only about (27%) of African countries - which represents about (22) countries - provide climate services related to water, such as forecasting or drought warning services, and reinforce the difficulty of the reality in this regard that it is still about (418) million people lack basic drinking water services and about (779) million people to sanitation, plus some (27) An African State has insufficient capacity to effectively implement the components of integrated water resources management<sup>1</sup>.

Africa faces a more pessimistic scenario with regard to the climate situation, as temperatures are expected to rise between 2 and 4 degrees Celsius by 2040, rendering large swathes of Africa unsustainable, the possibility of a severe drought in southern and central Africa due to high temperatures, so the growth of highly dry and dry regions will change from 3% to 10%<sup>2</sup>.

<sup>1</sup> إنترريجنال للتحليلات الاستراتيجية، ما التأثيرات المحتملة للتغير المناخي على الدول الأفريقية؟، 21 سبتمبر 2022، <https://bit.ly/40jFqx4>  
<sup>2</sup> اليوم السابع، أزمات تغير المناخ وتأثيرها على دول أفريقيا.. دراسة تكشف التفاصيل، 21 يناير 2023، <https://bit.ly/3Z47mEe>

**The Horn of Africa** is among the most affected regions with regard to the water crisis, as the absence of rain for four consecutive seasons caused the worst drought in 40 years, which had repercussions on the food security of about 50 million people. Africa suffers from drought more than any other continent, according to a report by the United Nations Convention to Combat Desertification (UNCCD)<sup>3</sup>.

Of the 134 droughts on the continent between 2000 and 2019, there were 70 cases in the East African region, specifically Somalia and Kenya, which suffered more severe and frequent droughts over the past two decades, which caused a shortage of food, water, and grazing resources. It has led to livestock and wildlife being exposed to malnutrition, disease, and mass mortality, as well as competing with each other for food resources.

The dangers of the current drought wave in the countries of the Horn of Africa, caused by accelerating climate changes, whose direct impacts are expected to affect more than 40 million people in the region and lead to the death of hundreds of thousands of livestock and wild animals. The main reason for the current acceleration of the drought is due to climate changes resulting from irrational dealing with the environment. The accumulation of carbon dioxide in the atmosphere also increases temperature, disturbing the natural balance between temperature, atmospheric pressure, water vapor condensation, and wind movement. Excessive cutting of forests and overgrazing of pasture plants are among the main factors adversely affecting the climate situation<sup>4</sup>.

In February 2023, the African Climate Forecast and Applications Center warned that the countries of the Horn of Africa were hit by the worst drought since 2011, which claimed thousands of lives, and it is expected that the strength of the rainfall will be lower than usual for the sixth season in a row, in addition to the increase in temperatures.

## Second: Climate change and SDG 6 ... Is there an impact?

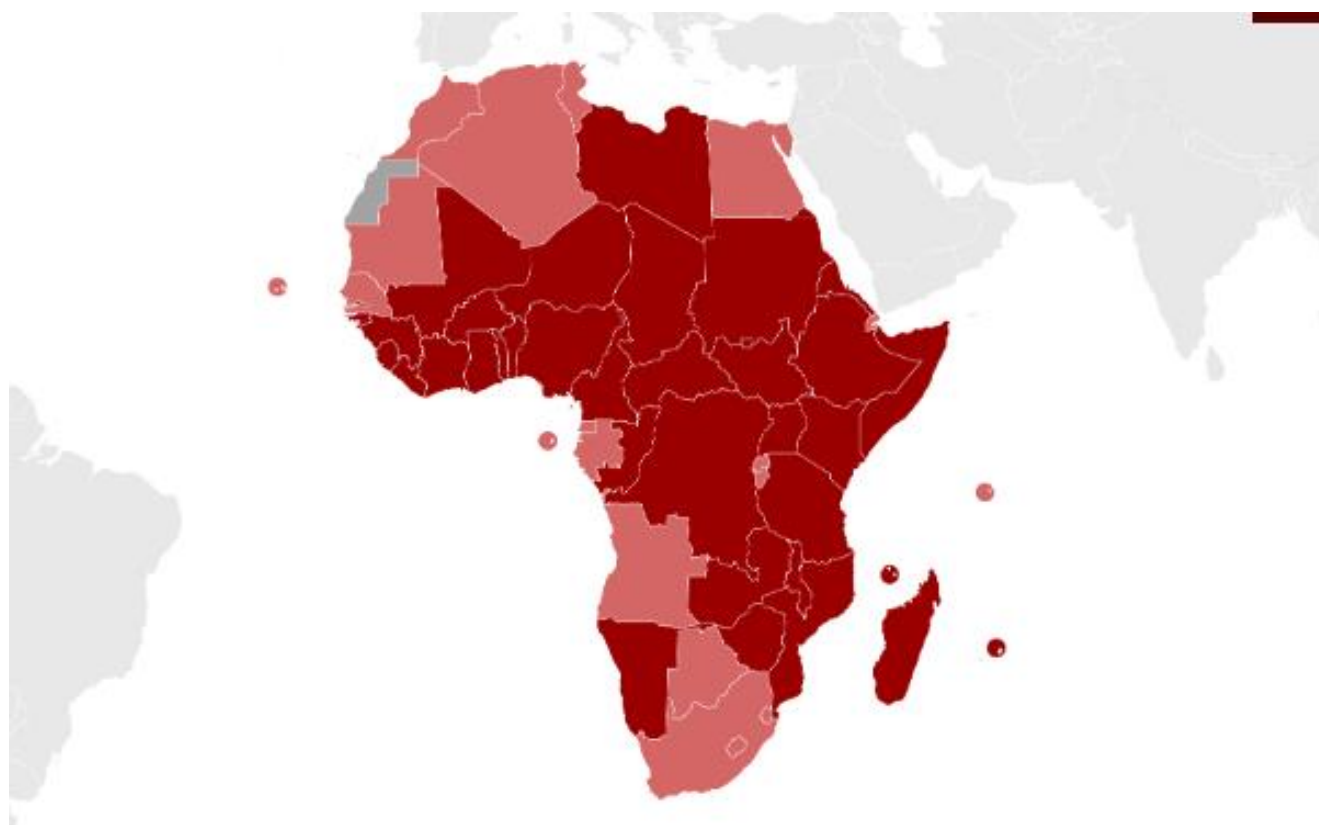
SDG 6 refers to ensuring the availability of water and sanitation services for all and their sustainable management, which is difficult to fully achieve due to the effects

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<sup>3</sup>Bbc التغيير المناخي: كيف أصبح 2022 عام الجفاف وارتفاع درجات الحرارة حول العالم؟، 25 أغسطس 2022، <https://bbc.in/3ItLNpB>

<sup>4</sup>سكاي نيوز، تأثيرات "كبيرة" لأحدث موجة جفاف في القرن الإفريقي، 18 أكتوبر 2022، <https://bit.ly/3JAu1IH>

of climate change on achieving this goal. As previously mentioned, climate change affects not only the availability of water and sanitation services for all, but also directly affects water quality and quantity. Among the countries that are expected to face serious water scarcity are Djibouti, Morocco, Namibia, and Egypt, in addition to the fact that all African countries face great challenges in their endeavor to meet the requirements of the SDG6 development goals. According to African indicators, more than 50% of African countries face a significant challenge in achieving SDG 6.



Source: BBC<sup>5</sup> (Countries in red are those facing a challenge related to achieving Goal 6)

**In Africa**, climate change increases water scarcity. Rising temperatures and record low rainfall threaten all African countries. In some less developed African countries, the increase in the frequency and intensity of extreme weather events has forced families to leave their homes in search of food and water, endangering the health, safety and education of their members. For example, in Somalia, severe drought conditions and conflict made it difficult to obtain safe drinking water; this led to the displacement of

<sup>5</sup> <https://bbc.in/3JviN1O>

millions of people. Women and children on the move are forced to spend more time collecting water, so the possibility of violence increases, which is inconsistent with the achievement and implementation of the targets of SDG 6.

**Conflict in Africa between some countries has also restricted access to clean water and sanitation**, as the pressures imposed by climate change increase. Protracted conflicts have destroyed water, sanitation and hygiene infrastructure, polluted water supplies, and increased the risk of waterborne diseases in parts of the region. For example; shocks caused by climate change and the destruction of water, sanitation and hygiene infrastructure due to conflicts have limited access to clean water, and outbreaks of many diseases such as cholera and HIV which spread in Africa.<sup>6</sup>

With regard to the target (6.1) improving water quality by reducing pollution, stopping dumping of hazardous waste and chemicals, minimizing their leakage, halving the percentage of untreated sewage, and significantly increasing recycling and safe reuse globally, by 2030 ; according to the Office of the United Nations High Commissioner for Humanitarian Affairs, pollution of drinking water sources is a major source of environmental threat to Africans, the matter is the same between urban and rural residents, noting that the majority of Africa's population does not enjoy safe drinking water, and 330 million Africans living in sub-Saharan Africa constitute the largest segment of the world's population who do not enjoy safe drinking water, amounting to a total of 884 million people. .<sup>7</sup>

Consequently, Africa suffers from problems related to water quality and pollution, the problem of water scarcity comes as an additional problem to African problems related to water resources. United Nations experts predicted an increase in the level of water scarcity in Africa from 47 percent in 2000 to 65 percent by 2025. Therefore, Africa faces multiple challenges related to achieving SDG 6 and its targets and indicators of sustainable development goals. The challenges of implementing SDG 6 associated with climate change in Africa as follows:

- A. Water scarcity in Africa.
- B. Conflicts over African water resources.

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<sup>6</sup> ESCWA, SDG 6, <https://bit.ly/3lxluXI>

<sup>7</sup> Youm7, International Report: Pollution of drinking water sources is a major source of environmental threat to Africans, November 8, 2022, <https://bit.ly/3yZ2ISN>

- C. Water pollution and the lack of safe and healthy water for all.
- D. Disproportionately high African population with limited African water resources.

### Third: Climate changes and regional conflicts. Water security in Egypt and Sudan after the (GERD) crisis

As previously mentioned in the previous axis, climate change impedes the achievement of SDG 6 of the Sustainable Development Goals, and one of the most important factors that increase the challenge of achieving SDG 6 is **the conflict over water resources in Africa**. By highlighting the crisis of the GERD between Egypt, Sudan and Ethiopia in recent years, it is worth noting that the downstream countries of Egypt and Sudan will suffer from double crises related to access to water resources after the construction of the GERD, as the two downstream countries suffer from limited resources mainly due to climate changes since years.

About the water crisis and its various dimensions, which are affected by two factors, namely climate change and the construction of the GERD on Egypt, the Egyptian agricultural sector consumes about 80% of the total quantities of available fresh water, and as a result of the expected rises in temperatures and possible decreases in precipitation rates, it is likely that the demand for water for agricultural purposes is increasing, which will increase the problem of water scarcity in Egypt. Egypt relies heavily on the Nile River for agriculture, and agricultural development will be affected by the effects of climate change on the Nile River.

#### **The impact of climate change on water resources in Egypt and Sudan:**

Water experts expect that the annual flow of the Nile will vary by an increase of 30% and a decrease of up to 70%. These two sharp changes may have serious repercussions regarding the increased risk of floods or droughts in Egypt and Sudan, which will lead to a decrease in food production and an increase in the rate of jobs loss in the two countries. In addition, the annual loss of water due to evaporation only in surface resources in the Nile River and lakes is about 2.5 billion cubic meters annually, at a rate of 3.1% of the total water used, or 4.1% of the total annual resources. These numbers mean that there is a deficit or an estimated gap of about 20 billion cubic meters between the annual revenues and uses of Egypt and Sudan.

Experts expect that Egypt, and the countries of the Mediterranean and North Africa region, including Sudan, will be highly subjected to the risks of climate change, which will put more pressure on water resources, which will in turn affect all sectors of the economy, as agriculture, food production and the environment to health, education and the job market.<sup>8</sup> The countries of the region will also be highly subjected to changes in temperature and precipitation.

The temperature is one of the climate characteristics most affected by climate change, climate modeling research expects that the countries of the region, including Egypt and Sudan, will face an increase in temperature ranging between 2-5.2 degrees Celsius, and that they will face a decrease of up to 20% in precipitation, and an increase in intensity and frequency of heat waves and extreme weather by the end of the century. Increasing temperature affects water vapor concentrations, humidity, wind speed, cloud properties, evaporation rates, precipitation, soil moisture, snowfall and snowmelt regimes. Changes in precipitation affect the magnitude and timing of floods, runoff regimes, dry seasons, and aquifer recharge rates.

At the same time, higher temperatures lead to an increase in evaporative losses from surface waters such as the Nile River and lakes. Climate change not only affects water resources, but also affects consumption, as the rise in temperature leads to an increase in human, animal and plant demand for water, and some crops need more water to grow, thus increasing agricultural water consumption. Increasing temperatures also leads to an increase in evaporation rates in surface water sources such as the Nile River and Lake Nasser, and thus increases water losses. This also leads to an increase in the amount of water needed to maintain the characteristics of the river, waterways and lakes.<sup>9</sup>

According to the study prepared by the Organization for Economic Co-operation and Development, the degree of confidence regarding the value and direction of change in rainfall in the Nile Basin countries in the future is limited. However, it is expected that there will be a rise in the average annual sedimentation rate at the headwaters of the Nile. The study predicts that an increase in the average annual temperature by one

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<sup>8</sup> According to the preliminary assessment of the Network of Experts Concerned with Climate and Environmental Changes, issued under the title "Risks Related to Climate and Environmental Changes in the Mediterranean Region"

<sup>9</sup> Egypt 360, Climate Change and its Impact on Egypt's Water Resources, June 4, 2022, <https://bit.ly/3TA0LQK>.



degree Celsius would cause an increase of 1% in the average annual precipitation rate, and an increase of 1.4-2.5 degrees Celsius would lead to an increase in the annual precipitation rate by about 2.1 and 3.7% respectively. In addition, the rise in temperature will lead to an increase in evaporation rates, and therefore, it is expected to lose half of the flows that come to the Sudanese swampy areas, in addition to an estimated decrease of about 10% of the Nile flows that reach the Aswan High Dam reservoir.

### **Dam crisis and climate change together on Egypt and Sudan:**

The construction of the GERD will exacerbate the situation and may lead to water disputes in the region. Although Egypt did not participate in the planning or implementation of the dam, it agreed to cooperate with Ethiopia and Sudan in assigning international consulting offices to conduct the necessary technical studies to assess the design of the dam and its impact on the two downstream countries (Egypt and Sudan); studies have not yet been completed.

It is expected that the dam-filling process will affect the availability of water in Egypt, decrease the per capita share of water, and affect various economic activities, especially if Ethiopia fills the dam reservoir in an uncooperative way.

If the filling process took only five years - as Ethiopia planned - the cumulative shortage of water from the Aswan High Dam will increase to 92 billion m<sup>3</sup>, distributed over several years, and soon the water level in Lake Nasser will drop to 147 m, so it is not possible to compensate for the loss of water due to Evaporation caused by climate change.

The filling and operation of the GERD will have a negative impact on the High Dam's production of hydroelectric power; For example, if the filling process of the Renaissance Dam took five years, the cost associated with the decline in the High Dam's production of hydroelectric power ten years after the filling process will reach about \$16.4 billion; It will hinder Egypt's ability to ensure that everyone has affordable access to reliable and sustainable energy services<sup>10</sup>.

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<sup>10</sup> مصراوي، تقرير رسمي يكشف تأثيرات خطيرة لسد النهضة وتغير المناخ على مياه مصر، 11 يناير 2022، <https://bit.ly/3JA9Og1>

The first report of the Intergovernmental Panel on Climate Change in 2007 confirmed that one of the repercussions of global climate change on the headwaters of the Nile River in Ethiopia is that rainfall may decrease by 70% or may increase by 30%, with the possibility of North shift of precipitation.

It seems that the last two things have been achieved, and for the sixth year in a row 2022, the flood waters increased 2022 in large proportions, and some of them were displaced to the north to flood eastern, central, and northern Sudan, and to reach for the first time the city of Aswan on the Egyptian-Sudanese border. With this increase, the balance of the three Nile rivers that originate in Ethiopia, namely, the Azraq, Atbara, and Sobat, increases by at least 50% over their average flows, so that the Blue Nile flows alone reach 75 billion cubic meters instead of 50 billion on average. It also increases the flow of the Rahad and Dinder rivers, which originate from the Sudanese-Ethiopian border behind the GERD, by 100%, to reach 10 billion cubic meters instead of 5 billion. Likewise, the waters of the Atbara and Setit rivers in northern Ethiopia have doubled (12 billion cubic meters) to northeastern Sudan in large proportions.<sup>11</sup>

Although Ethiopia stored about 16 billion cubic meters in front of the Renaissance Dam, the torrential rains and floods of the Azraq, Atbara, and Sobat rivers that flow from Ethiopia turned eastern Sudan into torrential rains and torrential river flows, which have killed more than 100 citizens so far. It also caused the demolition of thousands of homes, and the erosion of agricultural lands due to the slope from the Sudanese east on the Ethiopian border in the direction of the capital, Khartoum, and then in the northern direction towards Egypt, which increases the speed of movement of rainwater pools and turns them into severely damaging torrential torrents, due to This decline, which increases its destructive capacity, causing thousands of acres and the homes of villages that lie in the path of the torrent to be washed away and destroyed with its speed.

Given the fragility of the regions of eastern and central Sudan to adapt to climate changes and torrential rains, these rapidly sloping torrents wash away everything that stands in their way of weak infrastructure, homes, agricultural lands, electricity, water, and communications lines, which increases the severity of the losses in eastern and central Sudan, which increased this year rates than the past five years. A large part of the water of this rain reaches the course of the three rivers of the Nile, the Blue, Atbara,

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<sup>11</sup>RT ، خبير مياه يتحدث عن تأثير التغيرات المناخية على منابع النيل ومخاوف من انهيار سد النهضة، 6 سبتمبر 2022، <https://bit.ly/3lxxEkr>

and Sobat, and the latter flows into the White Nile in southern Sudan, which increases the balance of the unified Nile water that flows into the High Dam lake in southern Egypt, which extends for a length of 150 km inside Sudan. And about 350 km in Egyptian territory; This increases the Sudanese-Egyptian fears about the possibility of a partial or total collapse of the GERD built on the Ethiopian-Sudanese border, in the direction of a significant decline inside Sudanese territory to the capital and from there to Egypt, which increases the destructive capacity of the water stock in the Ethiopian Dam lake, which reaches At the end of the filling to 75 billion cubic meters may destroy everything in its path within Sudanese territory, all the way to the High Dam in Egypt<sup>12</sup>.

The climate change impact on increasing African conflicts over water resources and impeding the achievement of Goal 6 of the Sustainable Development Goals, especially regarding the GERD issue, where the downstream countries, Egypt and Sudan, suffer from double challenges due to the presence of climatic effects on the limited and scarce water resources, in addition to the crisis of building the GERD due to the unilateral measures of the federal government in Ethiopia. Therefore, Egypt and Sudan need to increase water resources due to the many crises facing the freshwater sector in both countries; there is an urgent need to stop the unilateral Ethiopian moves that affect the downstream countries.

## Recommendations:

After highlighting the current conditions of the African continent regarding water resources and their limitations, especially by highlighting climate changes that have an impact on African water scarcity and that pose a threat than any other threat to countries, in addition to its effects on obstructing the achievement of Goal 6, and finally, the crisis of the GERD, which all undermine the safe and healthy water for all the inhabitants of the African continent, some recommendations can be made as follows:

**First:** Maat for Peace recommends the governments of African countries to work together under the framework of the African Union to take unified measures to address climate change to urgently stop the decline of African water resources

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<sup>12</sup> تحليلات دكتور نادر نور الدين؛ خبير الموارد المائية حول تأثير سد النهضة على مصر والسودان، <https://bit.ly/3lxxEkr>

and to issue a joint African memorandum for African cooperation to limit the impact of climate change on all resources.

**Second:** Studies on the effects of climate change on precipitation, evapotranspiration, and groundwater quality and quantity in the African continent, especially Egypt and Sudan, are still limited. Therefore, Maat calls on water experts in Egypt and Sudan and water-related research and studies centers in Africa for more research to assess the different scenarios of climate change and its effects on the revenues of the Nile River.

**Third:** Most adaptation measures mentioned in the official papers and literature are general, descriptive, and not quantitative. Therefore, Maat stresses the urgent need for water-related research and study centers to do more research on improving forecasting methods, early warning systems, rain harvesting techniques, modern irrigation techniques, and agriculture, seawater, saline crops, and the importance of further research to assess adaptation measures for both optimistic and pessimistic scenarios.

**Fourth:** In light of the unilateral measures taken by the Ethiopian government about the Renaissance Dam, which has already affected the lives of thousands in Egypt and the loss of hundreds of lives in Sudan in the past year, Maat draws the attention of the Ethiopian government to those effects and repercussions that occurred on the two downstream countries because of these The measures taken by the government, calling for cooperation between the Ethiopian government and the two downstream countries, and the need to complete negotiations between the three countries for the interest of the three countries and their peoples.

**Fifth:** In light of the challenges that impede the achievement of Goal 6 of the Sustainable Development Goals in the African continent, Maat calls on the governments of African countries to work together to create a work program for the countries of the African continent on how to reduce the impact of climate change on African water resources to achieve Goal 6 of the African Continent Sustainable Development Goals.

**Sixth:** Marginalized and vulnerable groups receive less attention in measuring the effects of climate change on their access to safe and healthy water resources. Therefore, Maat recommends that the governments of African countries include these groups explicitly in their national plans concerned with achieving the sustainable development goals in general and Goal 6 in particular and work to ensure that these groups have access to the various water resources without leaving anyone behind. The National Statistical Center also recommends providing the government with recent statistics on how these groups have access to water resources.

**Seventh:** The impact of climate change on water resources in Africa does not receive enough attention in international and regional forums. Therefore, Maat calls on those in charge of international conferences such as the United Nations Water Conference, Africa Climate Week, the High-Level Political Forum, and all stakeholders concerned with issues of Climate change and water by dedicating sessions on the impact of climate change on water resources in Africa in particular and coming up with effective, realistic and quickly applicable recommendations.