

Forum: SDC 2

Issue: The question of drought resilience and water conservation

Student Officer: Derin Taylan

Position: Deputy President



Introduction

The question of drought resilience has emerged and become one of the major issues of our century as a result of various factors such as climate change, deforestation, overpopulation, and inadequate management policies. By definition drought resilience means “the capacity to withstand or to recover quickly from the adverse impacts of drought” and its increase constitutes one of the goals of DRAMP Framework, whose mission is to collect and present information pertaining to the development and implementation of national drought resilience and water management. The main reason why drought resilience is such an important issue is because of its wide scope. It not only impacts the environment but also the economy, the culture and the society, and the health of the region. Thus, it is imperative that actions aimed to minimize the effects of drought are conducted to ensure that communities can better withstand and recover from the challenges brought about by drought.

Water conservation, which is defined as the practice of using water efficiently to reduce unnecessary water usage, is a term that goes in parallel with drought resilience. One of the best ways to increase drought resilience against unstable or drier climates is by adopting a water conservation plan. However, the concept itself faces some challenges as it is not solving the issue from its root. In a report published in 2021 Green Technologies for the Defluoridation of Water, point out that water conservation can be achieved by three main actions: reducing inefficient uses leading to waste, preservation of water quality, and improved water management practices. In addition, it is important to note that sustainable water management is highly dependent on time and thus, the short term actions have little to no place when discussing ways to increase drought resilience from a sustainable development perspective.

Long-term drought resilience and water conservation are often lacking as a result of the combination of several reasons. Technical and scientific setbacks constitute only one part of the problem, highlighting the importance of social and political issues. This report will touch upon some key factors that invoke droughts, their consequences and provide more detail on the challenges that are faced. Moreover, even though the question of drought resilience and water conservation demand extensive solutions that are intertwined; the use of technology, water management initiatives on a communal basis and efforts that are specifically adapted to reduce the effects of climate change will be further explored.

Definition of Key Terms

Drought

Droughts can be divided into four different categories: meteorological drought, hydrological drought, agricultural drought, socio-economic drought. The first one signifies the lack of rain over a long period of time, the second signifies deficiencies in subwater and surface water supplies, and the third one signifies the insufficiency of soil moisture to the degree in which crops are no longer growing. Lastly, socio-economic drought refers to the surpass of the demand for economic goods over their supply due to water-related limitations.

Water Conservation Strategies

Water conservation provides opportunities for the reduction of water consumption and can be an efficient water management tool when adopted by stakeholders and governments. There are numerous water conservation strategies but some of the most prevalent are fixing leakages, utilizing smart irrigation and water-efficient applications, rainwater harvesting and transfer of water from surplus areas to deficit areas. One of the platforms that take actions to develop these strategies is The Global Water Partnership (GWP), and it focuses on the need for a secure water for sustainable development.

Sustainable Water Management

Sustainable water management should be in the forefront of water conservation approaches since it recognizes the interconnectedness of social, economic, and environmental factors related to water. These factors also constitute the challenges for drought resilience. Therefore, this term could be taken as a basis when conducting research on ways to combat drought.

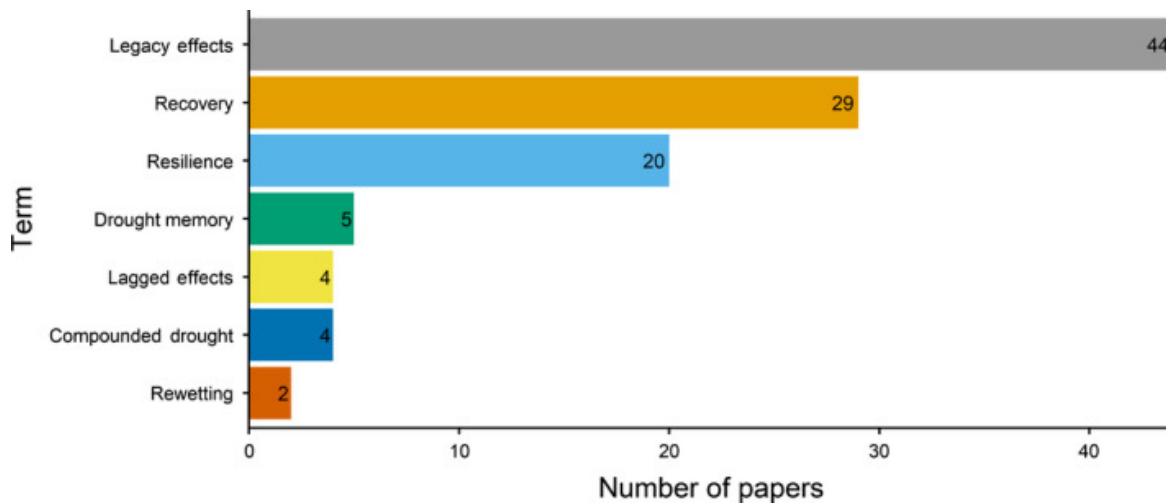
Integrated Water Resources Management

Integrated Water Resources Management is a key principle of sustainable water management. Due to the insufficiency of the traditional fragmented water management, an integrated water management technique becomes essential as it provides more holistic approaches to counter the challenges of inadequate supply. The term which was made the main goal of several discussions, is defined as “a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” by the Global Water Partnership.

Post-drought period

Post-drought period designates the ecosystem responses that are observed after a drought event. Such observations are essential to collect data and to assess where the problem lies. The latter is even more important since it may pinpoint the locations or infrastructure deficiencies that make it harder to increase drought resilience in that specific region. Furthermore, when the information about the impact

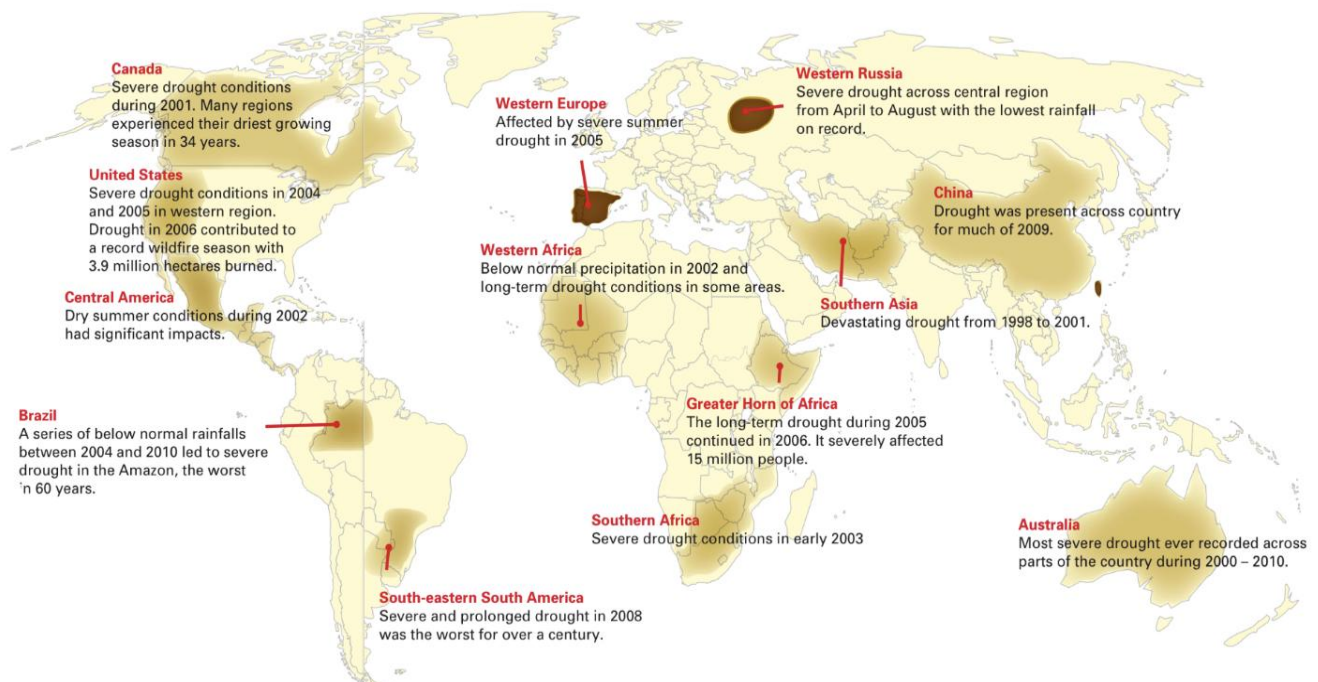
of drought on primary industries or surface and groundwater levels are collected, policy makers and further researchers may work more efficiently.



The graph shows the different terms that are used in a number of papers, all meaning the post-drought period.

Background Information

Drought has affected more than 2 billion people since 1900. Even though we still face several drought events, when compared with earlier droughts which lasted more than a century, today's examples become relatively minor. Most frequently, the duration of a drought event and its impact on the environment is directly proportional. Thus, the earlier events such as the one that took place in the Sahel region, resulted in a radical ecosystem change. In this example, the water level in Lake Bosumtwi has substantially lowered, which gave way to trees growing on the lake's edges and forming a forest. Luckily, drought does not necessarily mean that the region is suffering from water scarcity. With correct water management practices, impacts of drought can be mitigated and water's availability can be prolonged. These actions not only build resilience against the impacts of drought but also cut down the yearly spendings that go to rebuilding the region's resilience. Due to its long duration and widespread impacts such as agricultural losses and energy production challenges, drought becomes one of the costliest weather-related disasters. A figure demonstrating these statements is the case of California, in which the State has lost about 2 billion-dollars a year since 2014. Some countries that have also experienced drought events between the years 2000 and 2010 are shown in the image:



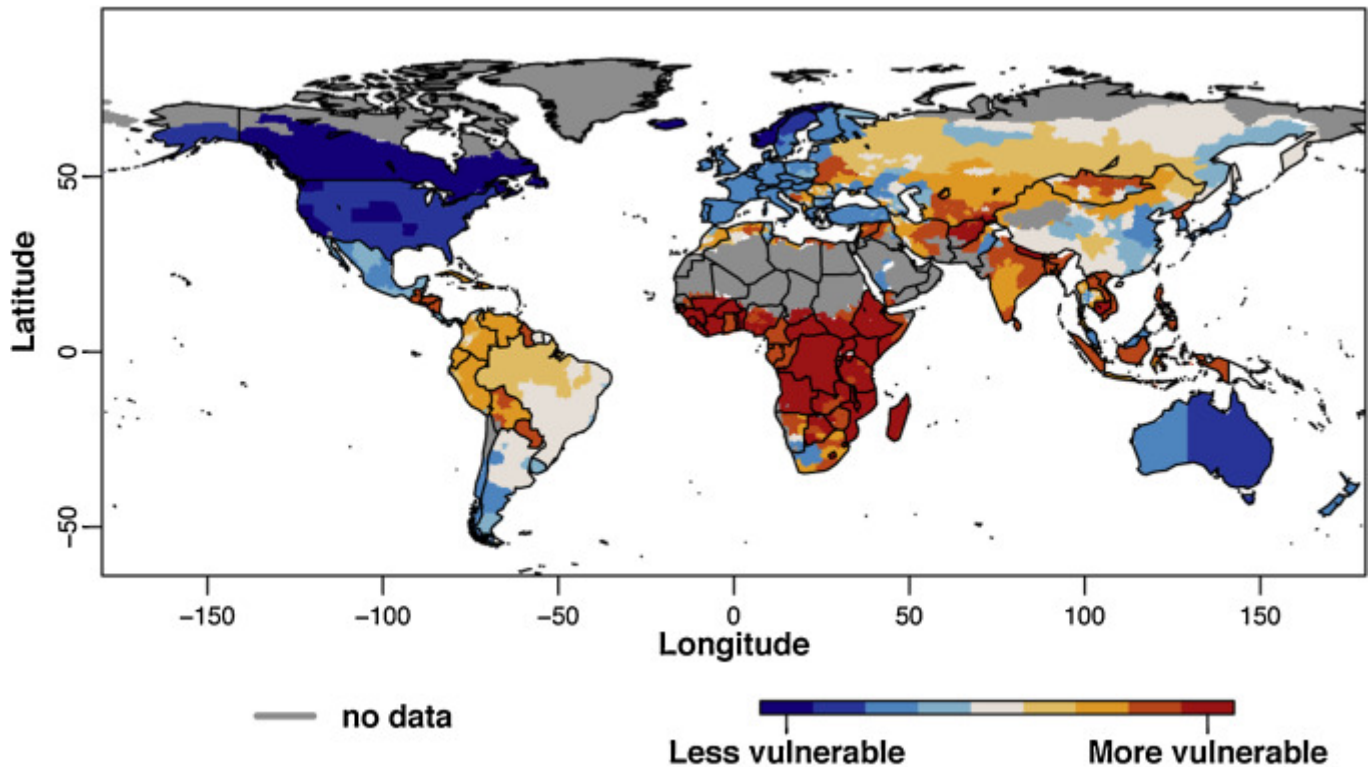
Causes and Impacts of Drought

Causes of drought can be studied under two main titles which are natural causes and human-induced causes. Natural causes include climate change and natural variability. These two suggest the effects of naturally occurring events like volcanic eruptions, sun's activity, seasonal changes or short term weather events, which have an equally powerful role as the human-induced causes in promoting droughts; however as population increases, human activities are gradually becoming the prominent reason behind droughts. Deforestation, which is among human-induced activities, was actually first seen in ancient Greeks. At the time, numerous people believed that humans had the ability to change temperatures and the quantity and time of rainfall, if they were to chop the trees, plow fields or irrigate a desert. Idea that rain following the plows eventually became discredited thanks to the Dust Bowl of the 1930s. The Dust Bowl which took place in the Great Plains, United States lasted from 1930 to 1936. It had its most severe period between 1934 and 1935, and according to present-day studies 1.2 billion tons of soil were lost across 100 million acres. As a result, the ecosystem and biodiversity of the region was affected and agricultural production was hindered. Furthermore, people were forced to displace and were suffering from malnutrition, which also was putting their health at risk.

Luckily, as the issue gains more attention more and more countries started to focus on building resilience and consider water management strategies. Water demand and supply is believed to have been developed by the french water engineer Jules Dupuy in 1844, however a more influential paper highlighting the importance of protecting natural resources was discussed in Krutilla 1967.

The map below shows the regions who are more or less vulnerable to droughts. It could be

concluded that the wealthiest regions are not always the most resilient when faced with drought.



Sub-topic 1: Using Innovative Technologies For Drought Resilience and Water Conservation

One of the ways to build drought resilience and promote sustainable water conservation is through using innovative technologies. These technologies include smart irrigation systems to reduce water consumption in agriculture. This may be ensured with either soil moisture sensors or weather-based irrigation sensors, both of which utilizes the data that they have collected to adjust the amount of water they provide. Desalination technologies can also be used to take advantage of salted water bodies like seas or oceans. Currently Reverse Osmosis and solar desalination are among the ones that have the greatest potential of realizing this process and Israel already gets its significant portion of freshwater supplies using this technique. Since water recycling and reusing is a part of water conservation, using technology in this field is equally crucial. One of the systems that render water conservation more sustainable is decentralized water reclamation. By encouraging local water supplies, it reduces the demand on centralized water supplies and therefore better allocates the resources. Along with this, another point that is considered when trying to adopt a plan for water conservation is leakages. Leaks waste millions of liters of treated water in water distribution systems around the globe. Thus, sensors that could detect the incidence of leaks are widely used by some governments, such as the municipality of Los Angeles. Lastly, since online platforms or apps have the greatest potential of raising awareness of the public, they are often used by individual developers. Although, they are not mandated or mentioned in any policy making step. All of the strategies being mentioned, challenges that they have should also be recognized. Some of the key issues are their high costs, lack of

specialized knowledge to implement such technologies in some areas, need of significant amounts of energy, policy barriers and backlash from the society.

Sub-topic 2: Highlighting Community-based Water Management Initiatives For Drought Resilience and Water Conservation

Initiatives to improve water supply and quality do not always succeed in many parts of the world due to the lack of community participation. Therefore a community-based approach that creates solutions tailored to the specific needs and conditions of a particular region or community is considered to be essential to ensure that everyone is entitled to improved drought resilience and water conservation aligning with the universal right to access sustainable water resources. Several initiatives regarding this approach already exist in the world. Community engagement and participation is one of these. It encourages community participation in decision making processes and gives them a sense of responsibility. In parts of Africa, citizens participate in forums and meetings to discuss water related issues. In addition to these, local communities also lead water conservation practices such as afforestation, water harvesting and terracing. Communities often have their own practices to conserve water and build resilience which are credible. However, capacity building and training are often provided globally to provide training to farmers and indigenous people on water-efficient practices. Some challenges faced when highlighting community-based water management initiatives are the rate of population growth, climate variability and land use conflicts. Such barriers make it difficult to sustain one management initiative and leave some communities disadvantaged, while benefiting others. This further enlarges the gaps between communities and elicits different drought resilience in different communities.

Sub-topic 3: Combatting Exacerbating Effects of Climate Change on Drought Resilience and Water Conservation

Climate change poses adverse effects on the availability and quality of water resources. To mitigate these impacts and enhance drought resilience and water conservation, it is crucial to take initiatives that directly address climate change. Climate change has been in the forefront since the Industrial Revolution and due to its great impact, the event is considered as one of the major problems of our society. There are some drought resilience building approaches and water conservation methods that provide quick and short term solutions such as excessive groundwater pumping however these are not viable and sustainable. Therefore when solving these issues, SDG goals and major events like Climate Change are kept in mind to offer better lasting solutions. Such efforts involve a combination of technological innovations, policy interventions, community engagement, and sustainable water management practices and one of the best examples is the integrated water management which takes the whole water cycle into account. There are regions that adapt to the changing environment like Australia, more specifically Melbourne but this does not make the ones that lack the adaptive capacity

forgettable. Due to insufficient financial resources, infrastructure, transboundary water agreements or technical capacity people who live in drought vulnerable areas are only expected to face more frequent, intense, and longer lasting droughts.

Major Countries and Organizations Involved

Australia

Australia experienced an extended drought starting in 2003, called the “Millenium Drought”. As a result river ecosystems and irrigated and dryland agriculture in Victoria and the Murray-Darling which is Australia's largest river system was highly affected. In 2015, the country agreed to the Sendai Framework for Disaster Risk Reduction 2015-2030 - the global blueprint for building the world's disaster resilience. Moreover they are engaged in several water initiatives such as The Australian Water Partnership (AWP), the Global Water Security and Sanitation Partnership (GWSP) and The Indonesia Australia Partnership for Infrastructure (KIAT).

Portugal

Portugal was affected by a severe drought in 2004-2005. The primary impacts that were identified as a result of the government's assessment were related to agriculture and cattle. Thus, almost 70 percent of Portugal's annual water resources are generated in Spain, its neighbor to the north and east. Due to its temperate continental climate, Portugal is subject to water scarcity events and therefore it has adopted integrated management practices for its water resources and environmental policies that acknowledge the entire water cycle. One of these practices is the creation of Águas de Portugal (AdP) which is a state-owned holding company with a specific mission of designing, building, and managing water supply and wastewater systems.

United States

The United States is one of the countries that take great measures to build water resilience at an international level. The America the Beautiful Initiative has reconnected more than 1300 miles of streams and rivers and restored more than 1900 acres of wetlands. Furthermore, at the 2023 UN Water Conference, they announced 49 billion dollars in commitments to address global water insecurity, and in 2022 White House published an action plan on global water security.

UNCCD (United Nations Convention to Combat Desert Desertification)

UNCDD has the primary goal of promoting practices that avoid land degradation. To this regard, they are engaged with different subjects from biodiversity to peace and security. In terms of building drought resilience they have developed a Drought Toolbox. This tool helps drought-prone countries to

develop national drought resilience plans, access monitoring and risk assessment tools and identify degrading ecosystems.

Global Watership Program (GWP)

The Global Watership Program operates in 180 countries and promotes the effective, efficient, and sustainable management of water resources by cooperating with more than 3000 water organizations. They also pursue implementing IWRM to reach the Sustainable Development Goal 6.5.

Timeline of Events

| Date (start - end) | Name | Description |
|----------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| November, 1922 | Colorado River Compact | The States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, having resolved to enter into a compact under the Act of the Congress of the United States of America; signed a compact to allocate water rights and promote cooperative management of the Colorado River, addressing water scarcity issues in the American Southwest. |
| 1930s | Dust Bowl | Severe drought and poor land management practices resulted in the Dust Bowl in the United States, highlighting the need for soil conservation and sustainable water management practices. |
| July, 1-22th, 1944 | Bretton Woods Conference | During this conference, the International Monetary Fund (IMF) and the World Bank were established. These organizations later funded global water management initiatives and still play an important role in promoting water projects. |
| August 12-24th, 1956 | United Nations Water Conference | The conference marked the first major international effort to address global water issues and emphasized the need for integrated water resource management. |

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|---------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| June, 5-16th, 1972 | Stockholm Conference on the Human Environment | The conference discussed environmental issues, including water management, and contributed to the establishment of the United Nations Environment Programme (UNEP) and the recognition of the importance of sustainable development. |
| June, 3-14th, 1992 | Rio Earth Summit (UNCED) | The summit led to the establishment of the United Nations Development Program (UNDP) and water resource management strategies, recognizing the importance of sustainable development. Furthermore, the concept of IWRM was the object of extensive discussions. |
| August 26th-September 4th, 2002 | World Summit on Sustainable Development (WSSD) | 10 years after the Rio Earth Summit, WSSD highlighted the importance of water resource management, especially focusing on the context of poverty reduction. |
| March, 19-23th, 2003 | World Water Forum | 3rd World Water Forum, resulted in the establishment of various networks and partnerships for information sharing after the agreement of the Secretariat of the 3rd World Water Forum, the World Water Council and the Global Water Partnership. This marked the history as a platform providing collaboration on water-related issues. |
| July, 28th, 2010 | United Nations General Assembly Resolution on the Human Right to Water and Sanitation | The resolution recognized access to clean water and sanitation as a fundamental human right, influencing policies and strategies worldwide. |
| September, 25th, 2015 | Sustainable Development Goals (SDG) | Importance of IWM for sustainable development was demonstrated by setting the goal of clean water and sanitation as one of the SDGs, notably SDG 6. |
| 2017-2018 | Cape Town Water Crisis | The crisis affected the city of Cape Town, South Africa and lasted about two years. However, it gained importance as it started to be taken as an |

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|-------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| | | example of how cities could manage water scarcity when facing climate change and population growth. |
| March, 2018 | United Nations Water Action Decade (2018-2028) | Adopted unanimously by the United Nations General Assembly, this resolution aims to accelerate efforts towards sustainable water management. |

Relevant UN Treaties and Events

- Implementation of Agenda 21, the Programme for the Further Implementation of Agenda 21 and the outcomes of the World Summit on Sustainable Development : resolution / adopted by the General Assembly, 18 Feb. 2009, **(A/RES/63/212)**
- Sendai Framework for Disaster Risk Reduction 2015-2030, September 2016
- 2/24. Combating desertification, land degradation and drought and promoting sustainable pastoralism and rangelands : resolution / adopted by the United Nations Environment Assembly, 3 Aug. 2016, **(UNEP/EA.2/RES.24)**
- International Decade for Action, "Water for Sustainable Development", 2018–2028 **(A/RES/71/222)**
- Drought Resilience, Adaptation and Management Policy (DRAMP) Framework, September 2019
- Implementation of the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa : resolution / adopted by the General Assembly, 21 Dec. 2022 **(A/RES/77/166)**

Previous Attempts to solve the Issue

UN

The United Nations have been relentlessly working to build drought resilience and implement sustainable water conservation around the world by holding conventions, preparing resolutions and frameworks, and collaborating with nations, stakeholders and international organizations. Some of these resolutions and conventions have already been mentioned previously in this report however some that stand out are the United Nations Convention to Combat Desertification (UNCCD), World Summit on Sustainable Development (WSSD) - Johannesburg Plan of Implementation, the Sendai Framework for Disaster Risk Reduction (2015-2030) and High-Level Panel on Water (HLPW). All these practices made great strides in addressing issues related to the drought nevertheless absence of strict enforcement mechanisms

for Member states and lack of universal solutions are among the reasons why these efforts remain insufficient.

UN Agencies

Similar to the UN, numerous UN agencies have been trying to find solutions to the question of drought resilience and water management. Food and Agriculture Organization launched the Integrated Drought Management Program, UNDP has supported initiatives like Adaptation to Climate Change in Arid Zones, UNEP developed the Global Water Scarcity Atlas, and United Nations International Strategy for Disaster Reduction (UNISDR) developed and contributed to the implementation of Sendai Framework for Disaster Risk Reduction (2015-2030). Again, due to similar reasons with UN's work, these practices fail to mitigate the issue at its root.

Member States' Efforts

Several countries made efforts to solve the problem of drought in and outside their borders. Among these countries are China who pursued the South-to-North Water Diversion Project and Brazil who started the One Million Cisterns Program (P1MC). Such initiatives were successful at their scope but at an international level, they lacked the need for collaborative work.



With this press release UNCCD is “calling for urgent action to boost drought resilience.”

Possible Solutions

Since the issue of drought resilience has arisen, there have been many attempts to solve the issue mainly by the UN, UN agencies and Member States. Unfortunately such initiatives are not without challenges. To provide better solutions Member States must first of all understand the specific setbacks that any initiative on this issue may face. First of all, every region has its specific climate factors that influence the way solutions should be implemented. So, even though there is a need for international

cooperation and a global outlook to the issue, every region should be reviewed separately. The UN can provide the necessary solutions but without the incentive of Member States to put enforcement mechanisms, these solutions may not be necessarily enforced. Especially in poverty stricken areas and Less developed countries, implementing solutions can be more difficult, therefore resources should be allocated effectively. Furthermore, the slowness of bureaucracy may impede the initiatives by hindering proper international cooperation and without community involvement, the implemented decisions may once again lose their effectiveness.

Sub-topic 1: Using Innovative Technologies For Drought Resilience and Water Conservation

Some of the challenges of using innovative technologies are their high costs, the lack of specialized knowledge to implement such technologies in some areas, the need of significant amounts of energy, policy barriers and backlash from society. Therefore, Member States should focus on encouraging research to create alternative sustainable water conservation technologies and sharing such progress with others to promote international cooperation.

The amount of energy consumption may also be reduced by using energy-efficient technologies, eventually decreasing CO₂ emissions and improving water quality.

Water management and decreasing the overall water consumption is only possible if everyone takes part in such actions. To this extent, social practices may be incentivized to change or simply influenced through education by the Member States.

Sub-topic 2: Highlighting Community-based Water Management Initiatives For Drought Resilience and Water Conservation

Equity should be the main goal of community-based approaches and a system which monitors the specific needs of every community should be implemented to ensure the right distribution of water supplies, hindering water shortages that occur in specific regions.

Right individual practices that contribute to building water resilience should also be encouraged such as installing rainwater harvesting systems or encouraging the practice of water recycling and reuse in households.

Additionally, to facilitate the implementation of these two solutions, it is crucial to raise awareness by promoting educational campaigns and fostering a sense of collective responsibility through community engagement. Member States may choose to organize annual or monthly active outreach activities where an expert on the issue gives a lecture and the participants take part in workshops aimed

to gain knowledge on correct water management practices and to take responsibility for their actions.

Sub-topic 3: Combatting Exacerbating Effects of Climate Change on Drought Resilience and Water Conservation

Member States should focus on sustainable development, more specifically on implementing Ecosystem-based approach (EbA) as it is one of the management strategies that need to take its place in climate policies. However, there are other pre-existing goals prepared by the UN such as the United Nations Framework Convention on Climate Change (UNFCCC), the Aichi Targets of the Convention on Biological Diversity (CBD) and the Sustainable Development Goals (SDGs) as well. To tackle the effects of climate change and build water resilience, it is thus necessary to prepare an extensive framework integrating each one of the objectives. Moreover, EbA is a new concept and lacks scientific data and evidence, so it requires such information to be collected and used to develop guidelines and tools to form the basis of national and international policies.

Finally, It is important to note that there may be various solutions to achieve drought resilience and water conservation, however it is equally important to collaborate with the stakeholders and other Member States to reach an agreement and determine an international standard for the policies that would implement aforementioned solutions.

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