

CLIMATE CHANGE, ENERGY AND  
ENVIRONMENT

# KEY WATER CHALLENGES IN THE EASTERN MEDITERRANEAN: A CALL FOR REGIONAL COOPERATION

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Currently, the Mediterranean basin ranks as one of the world's most contaminated seas, confronting immediate dangers from climate change and the deterioration of ecosystems. The combination of climate change with demographic and socio-economic changes leads to reduced surface water flow and groundwater recharge, as well as increased risks of excessive water use.



Around 30 million people, mainly in the southern and eastern Mediterranean, struggle to access safe drinking water. The elements that contribute to increasing water vulnerability, including conflicts and health hazards, might intensify in the future, presenting new obstacles in managing water resources.



Although water sources in the region have been a point of contention among countries, they are not the primary cause of conflicts. However, water plays a significant role in the Arab-Israeli dispute and in the disagreements over the Tigris-Euphrates and Nile basins.



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# INTRODUCTION

Water is vital for sustaining life, and a profound dependence on water regulates all aspects of our lives. The Eastern Mediterranean countries face a variety of water-related challenges; for example, water resources are inadequate, threatened, have limited availability, and are unevenly distributed. And while the majority of water resources are concentrated in the northern Mediterranean region, close to three-quarters of the water demand is concentrated in the south and east.<sup>1</sup> Consequently, the approximately 180 million individuals residing in the southern and eastern Mediterranean countries<sup>2</sup> endure the repercussions of water scarcity, with their water availability falling below 1,000 cubic meters per capita per year.<sup>3</sup>

Agriculture is the primary sector for water consumption, especially in the southern and eastern parts of the region. Currently, approximately one-fourth of all cultivated land in the region relies on irrigation--a proportion that is expected to rise in view of predicted increasingly arid climate conditions.<sup>4</sup> In the summer months the demand for water peaks, due to the concurrent needs of tourism and agriculture, and this could potentially contribute to heightened tensions and conflicts in upcoming years. Regional demographic shifts and migration patterns are also likely to worsen the situation, particularly in the southern regions where municipal water supplies already face notable constraints. The northern Mediterranean countries, where population growth and urban settlements continue to expand, are also susceptible, particularly in areas prone to flooding. This policy brief aims to present the area's key water challenges and explore how water management can serve to motivate regional cooperation.

<sup>1</sup> Fader, M., C. Giupponi, S. Burak, H. Dakhlaoui, A. Koutroulis, M.A. Lange, M.C. Llasat, D. Pulido-Velazquez and A. Sanz-Cobeña (2020). Water. In W. Cramer, J. Guiot & K. Marini (Ed.), *Climate and Environmental Change in the Mediterranean Basin – Current Situation and Risks for the Future. First Mediterranean Assessment Report*. Union for the Mediterranean, Plan Bleu, UNEP/MAP, Marseille, France, pp. 181-236, doi:10.5281/zenodo.7101074. p.181.

<sup>2</sup> It is important to note that the classification of northern, southern and eastern Mediterranean countries will vary according to different perspectives and definitions. The data and statistics presented in this report are primarily drawn from the "Climate and Environmental Change in the Mediterranean Basin – Current Situation and Risks for the Future. First Mediterranean Assessment Report," edited by Cramer, W., Guiot, J., and Marini, K., and published by the Union for the Mediterranean, Plan Bleu, UNEP/MAP in Marseille, France. The report is accessible at [https://www.medecc.org/wp-content/uploads/2021/05/MedECC\\_MAR1\\_complete.pdf](https://www.medecc.org/wp-content/uploads/2021/05/MedECC_MAR1_complete.pdf). As a result, the information regarding the classification of northern, southern, and eastern Mediterranean countries in this policy brief is largely based on this source, making it a key point of reference.

<sup>3</sup> Union for the Mediterranean (UfM). (n.d.). UfM Water Agenda. Retrieved October 21, 2023 from <https://ufmsecretariat.org/water-agenda/#:~:text=The%20UfM%20Water%20Agenda%20is,Nexus-%20WASH%20response%20to%20COVID19>

<sup>4</sup> Fader et al. (2020). p.181.

## 1.

# AN OVERVIEW OF THE WATER RESOURCES

The Mediterranean basin countries possess an estimated total of renewable freshwater resources that range between 1,212 km<sup>3</sup> and 1,452 km<sup>3</sup> per year, with uneven distribution across the region.<sup>5</sup> Approximately 72% to 74% of the freshwater resources in the Mediterranean are concentrated in the northern countries, while the remaining 26 to 28% is shared among the eastern and southern countries.<sup>6</sup> Moreover, the distribution of surface water and groundwater also varies significantly. In the northern countries, surface water accounts for approximately 96% of their renewable water resources, with 25% of this surface water contributing to river discharges.<sup>7</sup> Renewable groundwater resources in the southern Mediterranean region constitute merely 11% of the overall renewable freshwater available, and in eastern Mediterranean countries, 20%.<sup>8</sup> Particularly in the southern and eastern Mediterranean countries, non-renewable fossil groundwater resources make up nearly 66% of the total groundwater reserves.<sup>9</sup> The river basins that flow into the Mediterranean Sea comprise an expansive area exceeding 5 million km<sup>2</sup>, encompassing the entirety of the Nile River basin.<sup>10</sup> The northern part of the Mediterranean contributes approximately 71% of the total mean annual discharge into the sea, while the eastern countries contribute 12%, and the southern countries contribute 17%.<sup>11</sup>

Many Mediterranean countries, such as Libya, Palestine, and Israel, primarily rely on groundwater resources for their water supply; here the abstracted water totals 60,000 km<sup>3</sup> per year.<sup>12</sup> Accessibility of groundwater resources is subject to various factors, including the type of aquifer and the recharge of groundwater, which exhibits spatial variability. On average, northern Mediterranean countries abstract approximately 31% of their renewable groundwater, while eastern Mediterranean countries abstract around 92%.<sup>13</sup> For instance, Palestine and Jordan exhibit overexploitation of renewable water resources, which leads to severe aquifer depletion.<sup>14</sup> These are some of the factors that must be carefully considered to gain a comprehensive understanding of the regional water landscape.

<sup>5</sup> Ferragina E., (2010). The Water Issue in the Mediterranean. European Institute of the Mediterranean (IEMed), European Union Institute for Security Studies (ISS). Retrieved October 21, 2023 from [https://www.researchgate.net/publication/265012608\\_The\\_Water\\_Issue\\_in\\_the\\_Mediterranean\\_in\\_Environmental\\_and\\_Sustainable\\_Development\\_in\\_the\\_Mediterranean#fullTextFileContent](https://www.researchgate.net/publication/265012608_The_Water_Issue_in_the_Mediterranean_in_Environmental_and_Sustainable_Development_in_the_Mediterranean#fullTextFileContent), p.54; Food and Agriculture Organization of the United Nations (FAO). (2016). AQUASTAT Main Database. Retrieved October 21, 2023 from <https://data.apps.fao.org/aquastat/?lang=en>.

<sup>6</sup> Ferragina. (2010). p.54; FAO. (2016).

<sup>7</sup> Fader et al. (2020). p.184.

<sup>8</sup> FAO. (2016).

<sup>9</sup> Lezzaik, K. and A. Milewski. (2018). A Quantitative Assessment of Groundwater Resources in the Middle East and North Africa Region. *Hydrogeol. J.* 26, 251–266. doi: 10.1007/s10040-017-1646-5.

<sup>10</sup> Fader et al. (2020). p.184.

<sup>11</sup> Struglia, M.V., A. Mariotti, and A. Filogrosso. (2004). River Discharge into the Mediterranean Sea: Climatology and Aspects of the Observed Variability. *Journal of Climate*, 17, 4740–4751.

<sup>12</sup> Fader et al. (2020). p.184.

<sup>13</sup> Aureli, A., J. Ganoulis & J. Margat. (2008). Water in the Mediterranean. Groundwater Resources in the Mediterranean region: Importance, uses and sharing. In *IEMed Yearbook 2008* (pp. 96–105), Retrieved October 21, 2023 from <https://www.iemed.org/med-yearbook/iemed-mediterranean-yearbook-2008/>.

<sup>14</sup> Saghier, J., M. Schiffler & M. Woldu. (2000). *Urban Water and Sanitation in the Middle East and North Africa Region: The Way Forward*. World Bank, Middle East and North Africa Region, Infrastructure Development Group.

## 2.

## EXPLORING CRITICAL WATER ISSUES

In the socio-economically and politically diverse Mediterranean, water is intricately intertwined with economic growth, conflict, migration, employment, and human rights, all of which are influenced by the management and accessibility of water resources. Because water serves as the common thread linking all these matters, it is imperative to develop a deeper understanding of the challenges relating to water.

### THE CHALLENGE OF CLIMATE CHANGE

At present, the Mediterranean basin is one of the most polluted seas globally, facing imminent threats from climate change and ecosystem degradation. Climate change, especially when coupled with other factors such as demographic and socio-economic developments, results in adverse effects on the regional water cycle, e.g., diminished surface water flow and replenishment of groundwater, and augmented risks of over-exploitation, among others.<sup>15</sup> Notably, the magnitude of these impacts is projected to be significantly greater if global warming exceeds 2°C.

Climate projections for specific areas within the region foresee the likelihood of increased average seasonality, which will consequently impact hydrological patterns due to shortened wet periods and accelerated snowmelts.<sup>16</sup> Particularly in the drier parts of the region, the predominant factor influencing water availability responses is the rising temperature.<sup>17</sup> Moreover, an intensified freshwater demand is anticipated due to population growth and improved living standards. In the southern and eastern Mediterranean countries, desertification poses a significant threat, and would result in greater soil aridity and depletion of water resources.<sup>18</sup> Conversely, on the

northern shores of the Mediterranean, the absence of effective soil management policies leaves these regions susceptible to more frequent floods and landslides, resulting in potential damage to infrastructure.<sup>19</sup>

Climate changes impact not only the terrestrial environment but also the marine ecosystem. For example, an anticipated rise in sea level will alter numerous coastal areas across the region such that, among the most significant effects, we can expect the submersion of lands in delta regions and coastal zones.<sup>20</sup> This will impact certain countries in the region in particularly challenging ways: Türkiye and Syria, for example, may encounter difficulties due to reduced runoff projections and significant agricultural activity. Similarly, Iraq's downstream location could pose challenges, and Jordan might encounter difficulties due to limited per capita water resources and constrained desalination options.<sup>21</sup>

### THE CHALLENGE OF WATER STRESS

Water stress occurs when there is an imbalance between the need for water and the amount available, either at a particular time or due to limitations in water quality.<sup>22</sup> Water stress causes a decline in freshwater resources, affecting both their quantity, which can be seen in the overuse of aquifers and the drying up of rivers, and their quality, which presents problems such as eutrophication<sup>23</sup>, pollution from organic matter, and the intrusion of saline water.

Approximately 30 million individuals living in the Mediterranean region, primarily concentrated in the south and east,

<sup>15</sup> United Nations (UN) Water. *Water and Climate Change*. Retrieved October 21, 2023, from <https://www.unwater.org/water-facts/water-and-climate-change>; UNICEF. (March 2, 2023). *Water and the Global Climate Crisis: 10 Things you Should Know*. Retrieved October 21, 2023 from <https://www.unicef.org/stories/water-and-climate-change-10-things-you-should-know>.

<sup>16</sup> Zittis, G., M. Almazroui, P. Alpert, P. Ciais, W. Cramer, Y. Dahdal et al. (2022). Climate change and weather extremes in the Eastern Mediterranean and Middle East. *Reviews of Geophysics*, 60, e2021RG000762. <https://doi.org/10.1029/2021RG000762>.

<sup>17</sup> Zittis et al. (2022).

<sup>18</sup> Kibaroglu, A. (2017). *Water Challenges in the Mediterranean*. Mediterranean Yearbook. Retrieved October 21, 2023 from <https://www.iemed.org/publication/water-challenges-in-the-mediterranean/#:~:text=Almost%20every%20factor%20linked%20with,and%20burgeoning%20uncertainties%20coupled%20with,p.275>.

<sup>19</sup> Kibaroglu. (2017). p.275.

<sup>20</sup> Kibaroglu. (2017). p.275.

<sup>21</sup> Zittis et al. (2022). p.28.

<sup>22</sup> European Environment Agency. *Water Stress*. Retrieved October 21, 2023 from <https://www.eea.europa.eu/help/glossary/eea-glossary/water-stress#:~:text=Water%20stress%20occurs%20when%20the,%2C%20dry%20rivers%2C%20etc>.

<sup>23</sup> Eutrophication is a pollution process that ensues when a lake or stream becomes excessively enriched with plant nutrients. For further information see European Environment Agency. *Eutrophication*. Available at <https://www.eea.europa.eu/archived/archived-content-water-topic/wise-help-centre/glossary-definitions/eutrophication>.

face challenges in accessing clean drinking water.<sup>24</sup> The total population of Mediterranean countries is on an upward trajectory and is projected to reach 580 million inhabitants by the year 2050.<sup>25</sup> A closer examination reveals that the northern part accommodates 36% of the population but possesses 72% to 74% of the renewable freshwater.<sup>26</sup> In contrast, the eastern Mediterranean accounts for 24% of the population and possesses 19.5% to 21% of the renewable freshwater,<sup>27</sup> while the southern Mediterranean region houses 40% of the population but has access to only 5% to 8.5% of the renewable freshwater.<sup>28</sup> These figures underscore the precarious state of water supply, particularly in the southern Mediterranean countries.

In addition to quantitative pressures, there are also qualitative water challenges affecting the Mediterranean region. Numerous aquifers, specifically in the north, contain excessive levels of pesticides or nitrates.<sup>29</sup> Moreover, the region's rivers suffer chronic pollution due to the discharge of untreated domestic and industrial waste.

## THE CHALLENGE OF INTEGRATED WATER MANAGEMENT

To respond to the greater demand for water, national strategies usually focus on increasing the water supply and designing water infrastructure projects to improve resource management and mitigate risks arising from natural limitations. The supply-based approach is problematic, however, as the factors contributing to the growing water vulnerability-- such as conflicts, and sanitary risks-- may worsen in the future and lead to new challenges in water resource management.<sup>30</sup> These might include the excessive exploitation of underground water; and more cross-border resource transfers, which may lead to potential conflicts over shared resources like transboundary rivers and aquifers. Thus, reliance on supply-based policies is recognized as problematic in terms of physical, socio-economic, and environmental aspects, and this is largely seen in the southern and eastern parts of the region with the present state of dams. Many reservoirs are facing siltation issues, which have led to a significant reduction in their original capacity.<sup>31</sup> Related to that, geopolitical dimensions come into play as well, as exemplified by the infrastructure of the Turkey-Northern Cyprus water pipeline. Mason<sup>32</sup> identifies the project as an illustration of Turkish hy-

droterritorialization, which contrasts with the island-wide hydrosocial scaling undertaken by the Republic of Cyprus (RoC), within the politically intricate context of the Cyprus Problem.

It is evident that the task of managing water demand is of paramount importance and extends beyond mere physical supplies. It also entails optimizing the economic and social use of the mobilized water resources. In northern Mediterranean countries, where water resources are relatively abundant and demand is declining, there is a greater emphasis on maintaining or restoring ecosystems. This is because of the prevalence of good resource quality, which results in lower water supply costs. However, the southern and eastern Mediterranean countries face the dual challenge of coping with scarce water supplies and a swiftly growing need.<sup>33</sup> The only way to reverse these trends is by implementing policies that aim to enhance usage efficiency and reduce losses.

## THE CHALLENGE OF HYDRODIPLOMACY

Aquifers and rivers usually cross international borders, leading to freshwater resource interdependency among countries.<sup>34</sup> Hydrodiplomacy, in that context, can offer a strategic approach to integrated water resource management at both national and transboundary levels; by promoting a cooperative model that aims to foster peaceful relations among riparian countries.<sup>35</sup>

In the southern and eastern Mediterranean areas, more than 60% of the surface water crosses international borders, and all Middle Eastern and North African countries share at least one aquifer among themselves.<sup>36</sup> Based on the dependency ratio, which represents the percentage of renewable freshwater resources coming from other countries, the average dependency of northern Mediterranean countries is 22%, the eastern countries is 27%, and the southern countries is 18%.<sup>37</sup> The Nile River, for instance, traverses ten countries before it reaches Egypt, whose territorial share in the Nile

Turkey-Northern Cyprus water pipeline. *Political Geography*, Volume 76, 102086. ISSN 0962-6298. Retrieved October 23, 2023 from <https://doi.org/10.1016/j.polgeo.2019.102086>.

**33** Blue Plan Notes. (2006). p.4.

**34** Ganoulis, J. (2006). Water resources management and environmental security in Mediterranean transboundary river basins. In B. Morrel & I. Linkov (eds.), *Environmental Security and Environmental Management: The Role of Risk Assessment* (pp. 49-58). Springer Netherlands; Iglesias, A., L. Garrote, F. Flores, & M. Moneo (2007). Challenges to Manage the Risk of Water Scarcity and Climate Change in the Mediterranean. *Water Resources Management*, 21, 775-788; Iglesias, A., R. Mougou, M. Moneo, & S. Quiroga. (2011). Towards Adaptation of Agriculture to Climate Change in the Mediterranean. *Regional Environmental Change*, 11, 159-166.

**35** See Comair F. (February 2, 2023). Hydrodiplomacy and the Food, Water and Energy Nexus: A Holistic Approach for Transboundary Cooperation and Peace. ELIAMEP, Mediterranean Programme Working Papers / Policy Papers. Retrieved October 21, 2023 from <https://www.eliamep.gr/en/publication/υδροδιπλωματία-και-το-πλέγμα-τροφίμων/>.

**36** Fader. et.al. (2020). pp.184-185.

**37** Fader. et.al. (2020). pp.184-185.

**24** Blue Plan Notes. (October 4, 2006). Facing water stress and shortage in the Mediterranean. *Environment and Development in the Mediterranean*. United Nations Environment Programme Mediterranean Action Plan. Plan Bleu – Regional Activity Centre. No.4. Retrieved October 21, 2023 from <https://planbleu.org/en/publications/facing-water-stress-and-shortage-in-the-mediterranean/>.

**25** Blue Plan Notes. (2006).

**26** FAO. (2016).

**27** FAO. (2016).

**28** FAO. (2016).

**29** Blue Plan Notes. (2006).

**30** Kibaroglu. (2017); Blue Plan Notes. (2006).

**31** Blue Plan Notes. (2006). p.3.

**32** Mason, M. (2020). Hydraulic patronage: A political ecology of the

River basin is just 9% of the total basin area.<sup>38</sup> The Jordan River is another significant transboundary river facing severe water scarcity.<sup>39</sup>

Despite the fact that several water sources have been subject to dispute among countries in the region, water is not the sole cause for any of the conflicts. Nonetheless, it holds substantial significance in the Arab-Israeli conflict and in disagreements concerning the Tigris-Euphrates and Nile basins. The dispute in the Jordan basin over water distribution is intertwined with a prolonged political Arab-Israeli conflict,<sup>40</sup> while the water-related crisis in the Nile basin is closely connected to joint sharing agreements that, in retrospect, are seen to be unfair.<sup>41</sup> And tensions have recently escalated due to the growing capability and motivation of upstream states, particularly Ethiopia, to confront Egypt's hydro-hegemony.<sup>42</sup> Similarly, in the Euphrates-Tigris basin, competing, uncoordinated, and unilateral water development projects among the riparian states have led to an escalation of tensions relating to water.<sup>43</sup>

In terms of shared aquifers, there are 274 known underground water fields,<sup>44</sup> and among these, the Nubian Sandstone Aquifer is one of the largest. Egypt holds nearly 37% of the water in this aquifer, while Libya possesses 34%, relying heavily on groundwater, which accounts for 90% of its water supply.<sup>45</sup> Given this backdrop, collaborative efforts across borders assume even greater significance at the regional level.

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<sup>38</sup> Fader et al. (2020). pp.184-185.

<sup>39</sup> See Yasuda, Y., J. Schillinger, P. Huntjens, C. Alocs, & R. De Man. (2017). *Transboundary Water Cooperation over the Lower Part of the Jordan River Basin: Legal Political Economy Analysis of Current and Future Potential Cooperation*. The Hague Institute for Global Justice. Retrieved October 21, 2023 from [https://climate-diplomacy.org/sites/default/files/2020-10/Water%20Diplomacy\\_Making%20Water%20Cooperation%20Work\\_Jordan%20River.pdf](https://climate-diplomacy.org/sites/default/files/2020-10/Water%20Diplomacy_Making%20Water%20Cooperation%20Work_Jordan%20River.pdf).

<sup>40</sup> Kibaroglu. (2017). p.276.

<sup>41</sup> Kibaroglu. (2017). p.276.

<sup>42</sup> Kibaroglu. (2017). p.276.

<sup>43</sup> Kibaroglu. (2017). p.276.

<sup>44</sup> Fader et al. (2020).p.187.

<sup>45</sup> Fader et al. (2020).p.187.



## 3.

## WATER AS A SUBJECT OF BILATERAL AND REGIONAL COOPERATION

Amidst these challenges, strategies and policies related to water resources serve as vital tools for promoting regional cooperation. While, fundamentally, water is a local issue demanding context-specific approaches and remedies, the repercussions of water insecurity in interconnected and vulnerable supply chains are substantial at all levels.<sup>46</sup> Conflicts can easily erupt when water resources are selfishly co-opted by one country, and water resource strategies will be most effective when they are collectively agreed. Closer cooperation among southern and eastern Mediterranean countries can potentially bring mutual benefit. In fact, there are already a number of regional initiatives aimed at facilitating collaboration on water-related issues.<sup>47</sup> However, the considerable developmental disparities among Mediterranean countries have created distinct needs and priorities, which make any potential macro-regional strategy a challenge.

While recognizing the magnitude of the challenge, water can be framed as a focal point for cooperation via strengthening of:

- Strong water-sharing agreements that adopt an integrative approach, to ensure an equitable allocation of not only water resources but of the benefits derived from water resources.
  - Integrated water resource management practices at both bilateral and regional levels, to enable states across the region to cooperate on more sustainable water resource management strategies.
  - Joint infrastructure projects to enhance water availability and distribution at the regional level.
  - Systematic data sharing and information exchange to ensure a better understanding of water resources and problems and to enhance coordination strategies.
  - Joint research efforts to focus more on topics such as the impact of climate change and water quality management.
- Regional platforms and initiatives to target integrated water management strategies.
  - Joint capabilities to take adaptive measures in the face of climate change.

<sup>46</sup> See World Economic Forum. (May 2022). A Freshwater Future: Without Blue, There Is No Green Economy. Briefing Paper. Retrieved October 21, 2023, from [https://www3.weforum.org/docs/WEF\\_A\\_Freshwater\\_Future\\_2022.pdf](https://www3.weforum.org/docs/WEF_A_Freshwater_Future_2022.pdf), p.4.

<sup>47</sup> Some prominent initiatives include the adoption of A Mediterranean Charter for Water in Rome in 1992; the Barcelona Declaration of 1995; the establishment of the Euro-Mediterranean Water Expert Group under the Union for the Mediterranean (UfM); the EU Horizon2020 Initiative; and the EU Water Initiative (MED EUWI).



## CONCLUSION

Beyond the impact of climate change, the absence of coordinated efforts to manage water supply and demand has led to insufficiently integrated water policies across the Mediterranean. Furthermore, an unfavourable political environment hinders the peaceful governance of transboundary water resources, today often characterized by a zero-sum logic. Given the shared challenges across the region, the concept of creating a macro-regional integrated water management strategy for the Mediterranean region emerges as a credible solution. To effectively manage our water resources, it is crucial to establish measurable goals aligned with environmental and social considerations, redefine the roles of both public and private sectors, encourage decentralized management, incorporate stakeholders in decision-making processes, and employ a range of technical and economic tools. This will allow us to create and maintain a sustainable balance between water supply and demand while minimizing the impact on the environment. While these are all challenging aspects of water management in the region, it is the lack of consensus on the way forward that may ultimately prove to be the most formidable challenge of all.

## REFERENCES

- Aureli, A., J. Ganoulis & J. Margat. (2008). Water in the Mediterranean. Groundwater Resources in the Mediterranean region: Importance, uses and sharing. In *IEMed Yearbook 2008* (pp. 96–105), Retrieved October 21, 2023 from <https://www.iemed.org/med-yearbook/iemed-mediterranean-yearbook-2008/>.
- Blue Plan Notes. (October 4, 2006). United Nations Environment Programme Mediterranean Action Plan. Plan Bleu – Regional Activity Centre. No.4. Retrieved October 21, 2023 from <https://planbleu.org/en/publications/facing-water-stress-and-shortage-in-the-mediterranean/>.
- Comair, F. (February 2, 2023). ELIAMEP, Mediterranean Programme Working Papers / Policy Papers. Retrieved October 21, 2023 from <https://www.eliamep.gr/en/publication/υδροοιπλωματία-και-το-πλέγμα-τροφίμων/>.
- Fader, M., C. Giupponi, S. Burak, H. Dakhlou, A. Koutroulis, M.A Lange, M.C. Llasat, D. Pulido-Velazquez and A. Sanz-Cobena (2020). Water. In W. Cramer, J. Guiot & K. Marini (Ed.), . Union for the Mediterranean, Plan Bleu, UNEP/MAP, Marseille, France, pp. 181-236, doi:10.5281/zenodo.7101074.
- Ferragina E., (2010). European Institute of the Mediterranean (IEMed), European Union Institute for Security Studies (ISS). Retrieved October 21, 2023 from [https://www.researchgate.net/publication/265012608\\_The\\_Water\\_Issue\\_in\\_the\\_Mediterranean\\_in\\_Environmental\\_and\\_Sustainable\\_Development\\_in\\_the\\_Mediterranean#fullTextFileContent](https://www.researchgate.net/publication/265012608_The_Water_Issue_in_the_Mediterranean_in_Environmental_and_Sustainable_Development_in_the_Mediterranean#fullTextFileContent).
- Food and Agriculture Organization of the United Nations (FAO). (2016). . Retrieved October 21, 2023 from <https://data.apps.fao.org/aq-uastat/?lang=en>.
- Ganoulis, J. (2006). Water resources management and environmental security in Mediterranean transboundary river basins. In B. Morel & I. Linkov (eds.), (pp. 49-58). Springer Netherlands.
- Iglesias, A., L. Garrote, F. Flores, & M. Moneo (2007). Challenges to Manage the Risk of Water Scarcity and Climate Change in the Mediterranean. 21, 775–788.
- Iglesias, A., R. Mougou, M. Moneo, & S. Quiroga. (2011). Towards Adaptation of Agriculture to Climate Change in the Mediterranean, 11, 159–166.
- Kibaroglu, A. (2017). Water Challenges in the Mediterranean. . Retrieved October 21, 2023 from <https://www.iemed.org/publication/water-challenges-in-the-mediterranean/#:~:text=Almost%20every%20factor%20linked%20with,and%20burgeoning%20uncertainties%20coupled%20with>.
- Lezzaik, K. and A. Milewski. (2018). A Quantitative Assessment of Groundwater Resources in the Middle East and North Africa Region. 26, 251–266. doi: 10.1007/s10040-017-1646-5.
- Mason, M. (2020). Hydraulic patronage: A political ecology of the Turkey-Northern Cyprus water pipeline. , Volume , 102086. ISSN 0962-6298. Retrieved October 23, 2023 from <https://doi.org/10.1016/j.pol-geo.2019.102086>.
- Saghir, J., M. Schiffler & M. Woldu. (2000). World Bank, Middle East and North Africa Region, Infrastructure Development Group.
- Struglia, M.V., A. Mariotti, and A. Filograsso. (2004). River Discharge into the Mediterranean Sea: Climatology and Aspects of the Observed Variability., 17, 4740–4751.
- World Economic Forum. (May 2022). . Briefing Paper. Retrieved October 21, 2023, from [https://www3.weforum.org/docs/WEF\\_A\\_Freshwater\\_Future\\_2022.pdf](https://www3.weforum.org/docs/WEF_A_Freshwater_Future_2022.pdf).
- Yasuda, Y., J. Schillinger, P. Huntjens, C. Alocs, & R. De Man. (2017). The Hague Institute for Global Justice. Retrieved October 21, 2023 from [https://climate-diplomacy.org/sites/default/files/2020-10/Water%20Diplomacy\\_Making%20Water%20Cooperation%20Work\\_Jordan%20River.pdf](https://climate-diplomacy.org/sites/default/files/2020-10/Water%20Diplomacy_Making%20Water%20Cooperation%20Work_Jordan%20River.pdf).
- Zittis, G., M. Almazroui, P. Alpert, P. Ciais, W. Cramer, Y. Dabdall et al. (2022). Climate change and weather extremes in the Eastern Mediterranean and Middle East., e2021RG000762. <https://doi.org/10.1029/2021RG000762>.

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# KEY WATER CHALLENGES IN THE EASTERN MEDITERRANEAN: A CALL FOR REGIONAL COOPERATION

Water is essential for life, and our reliance on it shapes every aspect of our existence. Countries in the Eastern Mediterranean are grappling with numerous water-related issues. These include insufficient and threatened water supplies, limited access, and uneven distribution. Demographic changes and migration trends are likely to exacerbate these issues, especially in the southern

areas where city water supplies are already under significant pressure. The northern Mediterranean countries are not immune either, facing challenges in rapidly growing urban areas, particularly in flood-prone zones. This policy brief aims to highlight the major water challenges in the region and examine how effective water management could encourage regional collaboration.