

## Water Scarcity and Biodiversity in the MENA Region

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### 3.1 INTRODUCTION

This chapter examines the opportunities and challenges for the integrated management of biodiversity in desert and water-scarce regions. It examines the effects of water scarcity – although ever-present but now exacerbated by climate change – on the rich biodiversity of various subregions of the Middle East and North Africa (MENA) region. It explores the need for a more integrated management of water and biodiversity in the MENA region and how the current international, regional, and national legal framework of biodiversity management can advance such an integrated governance approach, as well as the gaps in integrative governance in the MENA region and how those gaps can be better addressed.

The entire MENA region is rich in nature and biodiversity resources.<sup>1</sup> The Mediterranean Basin region of the MENA is replete with various ecosystems and biodiversity hotspots, with the highest rate of endemism globally at 20–30 percent.<sup>2</sup> Specifically, 43 percent of plants, 26 percent of mammals, 3 percent of birds, 48 percent of reptiles, 62 percent of amphibians, and 63 percent of freshwater fish are endemic to the Mediterranean hotspots.<sup>3</sup> The areas of greatest plant diversity in North Africa and the Levant are the High and Middle Atlas Mountains in North Africa, coastal strips of Morocco and Algeria, southern Turkey, Lebanon, and Cyrenaica in Libya.<sup>4</sup> Areas rich in reptile species are in southern Turkey, Lebanon, southwestern Syria, the Palestinian territories, northern Egypt, coastal portions of Morocco and Algeria, and the Atlas and Taurus Mountains.<sup>5</sup> In a similar fashion,

<sup>1</sup> Damilola Olawuyi, *Environmental Law in Arab States* (Oxford University Press 2022) 245–274.

<sup>2</sup> “Biological Diversity in the Mediterranean” (UNEP) [www.une.org/uneppmap/resources/factsheets/biological-diversity](http://www.une.org/uneppmap/resources/factsheets/biological-diversity) accessed January 3, 2023.

<sup>3</sup> Doga Dernegi, “Mediterranean Basin Biodiversity Hotspot” (*BirdLife International*, July 27, 2010) 8 [www.cepf.net/sites/default/files/resources/Donor%20Council/DC\\_Draft\\_Mediterranean\\_EP\\_Rev\\_27\\_July.pdf#:~:text=The%20Mediterranean%20Basin%20biodiversity%20hotspot,northern%20Italy%20to%20Cape%20Verde](http://www.cepf.net/sites/default/files/resources/Donor%20Council/DC_Draft_Mediterranean_EP_Rev_27_July.pdf#:~:text=The%20Mediterranean%20Basin%20biodiversity%20hotspot,northern%20Italy%20to%20Cape%20Verde) accessed January 2, 2023.

<sup>4</sup> *Ibid.*, 8–9.

<sup>5</sup> *Ibid.*

areas of high precipitation seem to have a high diversity of endemic freshwater fish, such as the mountains of Turkey and North Africa.<sup>6</sup> There are two major factors that have resulted in these high levels of biodiversity in the region. First, the location of North Africa and the Levant is at an intersection of the Eurasian and African landmasses, thereby bringing in rich diversity from both landmasses; and second, the region contains diverse topographical and altitudinal variations, resulting in varied climatic conditions.<sup>7</sup> Hence, the region is brimming with both endemic as well as nonendemic flora and fauna in need of protection.

However, when compared to other similar-sized regions of the world, the MENA region has very few freshwater resources.<sup>8</sup> The entire North African portion of the MENA region is a semi-arid desert, and so is the inhospitable Arabian Peninsula, with a UN agency confirming that the MENA region is “the most water-stressed region on Earth.”<sup>9</sup> With the absence of long-flowing rivers and an extremely low level of precipitation, this region is quite hostile to the propagation of many life-forms and is popularly known as the “empty quarter.” However, in terms of biodiversity, despite the scarcity of water, the MENA region is home to various endemic species of flora and fauna, as well as numerous concentrations of biodiversity hotspots.<sup>10</sup> The region consists of various biodiversity hotspots concentrated along the Red Sea coastline as well as the Arabian Sea coastline, especially the “Dhofar region of Oman, the wadis of the central Yemeni mountain ranges, south-west Saudi Arabia and the Socotra archipelago.”<sup>11</sup>

Even through the MENA region is the most water-stressed region in the world, it has surprisingly diverse terrestrial, freshwater, and marine ecosystems and

<sup>6</sup> Ibid.

<sup>7</sup> Ibid.

<sup>8</sup> UNESCWA, *Water Supply and Sanitation in the Arab Region: Looking beyond 2015* (UNESCWA 2015) 6–7. By 2025, all the Arab states will be under the water poverty line, see the *Arab Strategy for Water Security in the Arab Region – Meeting the Future Challenges and Needs of Sustainable Development* (2010–2030) (UNESCWA 2014). See also International Center for Agricultural Research in the Dry Areas (ICARDA), “Middle East and North Africa (MENA) Is the Most Water-Stressed Region on Earth” [www.icarda.org/media/news/middle-east-and-north-africa-mena-most-water-stressed-region-earth](http://www.icarda.org/media/news/middle-east-and-north-africa-mena-most-water-stressed-region-earth) accessed January 23, 2024.

<sup>9</sup> See ICARDA (n 8).

<sup>10</sup> David Mallon, “Global Hotspots in the Arabian Peninsula” (2011) 54 *Zoology in the Middle East* 13; Friedhelm Krupp, Masaa Al-Jumaily, Michael Bariche, Maroof Khalaf, Masoumeh Malek, and Bruno Streit, “The Middle Eastern Biodiversity Network: Generating and Sharing Knowledge for Ecosystem Management and Conservation” (*ZooKeys*, December 28, 2009) [www.tandfonline.com/doi/abs/10.1080/09397140.2011.10648896](http://www.tandfonline.com/doi/abs/10.1080/09397140.2011.10648896) accessed January 2, 2023; Doga Dernegi, “Mediterranean Basin Biodiversity Hotspot” (*BirdLife International*, July 27, 2010). [www.cepf.net/sites/default/files/resources/Donor%20Council/DC\\_Draft\\_Mediterranean\\_EP\\_Rev\\_27\\_July.pdf#:~:text=The%20Mediterranean%20Basin%20biodiversity%20hotspot,northern%20Italy%20to%20Cape%20Verde](http://www.cepf.net/sites/default/files/resources/Donor%20Council/DC_Draft_Mediterranean_EP_Rev_27_July.pdf#:~:text=The%20Mediterranean%20Basin%20biodiversity%20hotspot,northern%20Italy%20to%20Cape%20Verde) accessed January 2, 2023.

<sup>11</sup> N. García, I. Harrison, N. Cox, and M. F. Tognelli (compilers), “The Status and Distribution of Freshwater Biodiversity in the Arabian Peninsula” (IUCN 2015), 91 <https://portals.iucn.org/library/sites/library/files/documents/RL-53-003.pdf> accessed January 23, 2024.

biodiversity hotspots, including “deserts, steppes, mountains, broadleaf and coniferous forest, wetlands, coral reefs and mangroves.”<sup>12</sup> The already scarce water resources support very fragile ecosystems. When compounded with climate change-induced water shortages, these ecosystems are on the brink of collapse. Rampant industrialization and development, rapid population growth, inadequate protection policies, and climate change-related water shortages have put considerable pressure on the biodiversity.<sup>13</sup> The MENA region has long been projected to become the first region to essentially run out of water.<sup>14</sup> Other major factors contributing to the loss of terrestrial biodiversity are “habitat destruction for development, deforestation, hunting, overgrazing and degradation of rangelands.”<sup>15</sup> These numerous factors work in tandem, bringing ecosystems to a brink of collapse, and thereby reducing biodiversity. The loss of biodiversity would result in a loss of “services rendered by ecosystems: protection against soil erosion, water purification, flood and drought mitigation, food supply, pollination, carbon storage, and cultural and recreational services.”<sup>16</sup> Water scarcity and declining water resources are one of the major reasons for the decline in biodiversity of the region. Hence it is imperative to put a stop to the loss of habitats and biodiversity in the MENA region.

In order to tackle the rapid decline in biodiversity, various nations of the region have individually and collectively formulated certain national, regional, and international regulations. This chapter examines the integration of the regulations on biodiversity and water preservation at the national and regional levels. This approach reveals the extent to which the integrated governance of water and biodiversity has taken place in the region, as well as the gaps in the integration, and provides suggestions for addressing the said gaps.

This chapter proceeds in five sections, this introduction being the first. Section 3.2 examines the need for the integrated management of water and biodiversity resources to effectively address the cross-cutting impacts of climate change and other ecological pressures on biodiversity. It examines the meaning, nature, and elements of integrated water and biodiversity governance and the implications for the MENA

<sup>12</sup> Kira Walker, “MENA’s Biodiversity Shrinking under Pressure of Climate Change” (*Nature-Middle East*, December 13, 2022) [www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2022.79](http://www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2022.79) accessed January 3, 2023.

<sup>13</sup> David Mallon, “Global Hotspots in the Arabian Peninsula” (2011) 54 *Zoology in the Middle East* 13; Friedhelm Krupp, Masaa Al-Jumaily, Michael Bariche, Maroof Khalaf, Masoumeh Malek, and Bruno Streit, “The Middle Eastern Biodiversity Network: Generating and Sharing Knowledge for Ecosystem Management and Conservation” (*ZooKeys*, December 28, 2009); Doga Dernegi, “Mediterranean Basin Biodiversity Hotspot” (*BirdLife International*, July 27, 2010).

<sup>14</sup> Tony Allan, *The Middle East Water Question: Hydropolitics* (I. B. Tauris 2001); Jonatha Chenoweth et al., “Impact of Climate Change on the Water Resources of the Eastern Mediterranean and Middle East Region: Modeled 21st Century Changes and Implications” (2011) 47 *Water Resources Research* <https://doi.org/10.1029/2010WR010269> accessed January 23, 2024.

<sup>15</sup> Krupp et al. (n 13).

<sup>16</sup> UNEP, “Biological Diversity in the Mediterranean” [www.unep.org/unepmap/resources/factsheets/biological-diversity](http://www.unep.org/unepmap/resources/factsheets/biological-diversity) accessed January 3, 2023.

region. Section 3.3 evaluates the wide array of cross-subregional and cross-national initiatives that have been developed to advance the integrated management of biodiversity in the desert and water-scarce countries of the MENA region. It evaluates the gaps that hinder their effective and coherent implementation. Section 3.4 provides recommendations on how these gaps can be addressed. Section 3.5 is the concluding section.

### 3.2 INTEGRATED GOVERNANCE OF WATER AND BIODIVERSITY IN THE MENA REGION

The integrated governance of biodiversity and water preservation, particularly in the context of the MENA region, refers to a holistic, coordinated, and strategic approach to the policymaking, implementation, and management of both biodiversity conservation and water resource management. It means aligning objectives, strategies, and actions in both domains to ensure the sustainable use and protection of natural resources.

As demonstrated in this chapter, the integrated governance of water and biodiversity in the MENA region is essential due to the interdependence of the biodiversity and water resources, the shared challenges these resources face, and the significant benefits of a coordinated approach. The most significant reason for integration is that water scarcity directly affects biodiversity. As discussed earlier, the MENA region is one of the most water-scarce regions in the world. This has been compounded by the synergistic adverse effects of climate change (including changes in water resources) to species of fauna in regions of the world.<sup>17</sup> It would follow that synergistic solutions could help to adapt the land, flora, and fauna to the adverse effects of climate change. By addressing water and biodiversity issues in tandem through robust integrated governance, the region can bolster its resilience against climate change, desertification, and other environmental challenges.

Reduced water availability can lead to habitat degradation, loss of wetlands, and adverse impacts on freshwater ecosystems. Conversely, biodiverse ecosystems, such as wetlands, play a crucial role in water purification, groundwater recharge, and flood control.<sup>18</sup> The degradation of these ecosystems can lead to decreased water quality and quantity. Further, many major water resources in the MENA region,

<sup>17</sup> Matthew G. Betts, Javier G. Illán, Zhiqiang Yang, Susan M. Shirley, and Chris D. Thomas, “Synergistic Effects of Climate and Land-Cover Change on Long-Term Bird Population Trends of the Western USA: A Test of Modeled Predictions” (2019) 7 *Frontiers in Ecology and Evolution: Population, Community, and Ecosystem Dynamics* (May 29, 2019) <https://doi.org/10.3389/fevo.2019.00186> accessed January 23, 2024.

<sup>18</sup> Wetlands International, “Collaboration for a Water-Wise World” (August 21, 2023) [www.wetlands.org/blog/collaboration-for-a-water-wise-world/#:~:text=Wetlands%20are%20a%20vital%20nature,filtering%20pollutants%20like%20heavy%20metals](http://www.wetlands.org/blog/collaboration-for-a-water-wise-world/#:~:text=Wetlands%20are%20a%20vital%20nature,filtering%20pollutants%20like%20heavy%20metals) accessed January 23, 2024.

such as the Nile, Tigris, and Euphrates rivers, are shared among multiple countries.<sup>19</sup> These shared resources require cooperative management to ensure equitable distribution and avoid potential conflicts.<sup>20</sup> Further, many species, including birds, migrate across national boundaries in the MENA region.<sup>21</sup> Protecting their habitats requires a coordinated approach across countries, as well as the proper integration of regulations that protect biodiversity and water resources.

Finally, integrated governance can lead to the pooling of resources, knowledge sharing, and the formulation of joint strategies, which can be more cost-effective than managing these resources separately.<sup>22</sup> This approach also allows for consideration of the entire ecosystem, enabling comprehensive solutions. This can prevent narrowly focused decisions that may benefit one aspect of the environment but harm another.

### 3.2.1 *Elements of Integrated Water and Biodiversity Governance*

As discussed, the integrated governance of biodiversity and water preservation in the MENA region is essential, given the unique environmental, social, and political challenges the area faces. To be effective, such governance must be built on certain core elements, and achieving these requires a mix of strategies.

Ensuring proper policy coherence is paramount. Policy coherence refers to the systematic promotion of mutually reinforcing policy actions across government departments and agencies to achieve agreed objectives.<sup>23</sup> In the context of integrated governance for biodiversity and water preservation in the MENA region, policy coherence implies that regulations, strategies, and actions related to these

<sup>19</sup> National Geographic, “Fertile Crescent” <https://education.nationalgeographic.org/resource/fertile-crescent/> accessed January 23, 2024.

<sup>20</sup> Achref Chibani, “Water Politics in the Tigris-Euphrates Basin” (Arab Center, Washington, DC, May 30, 2023) <https://arabcenterdc.org/resource/water-politics-in-the-tigris-euphrates-basin/> accessed January 24, 2024.

<sup>21</sup> UNEP, Convention on the Conservation of Migratory Species of Wild Animals, “Fact Sheet” (September 2019) [www.cms.int/sites/default/files/publication/abu\\_dhabi\\_fact\\_sheet\\_o.pdf](http://www.cms.int/sites/default/files/publication/abu_dhabi_fact_sheet_o.pdf) accessed January 24, 2024; J. A. Lindsell, G. Serra, L. Peške et al., “Satellite Tracking Reveals the Migration Route and Wintering Area of the Middle East Population of Critically Endangered Northern Bald Ibis *Geronticus eremita*” (July 14, 2009) 43 *Oryx* 3, 329–335 [www.cambridge.org/core/journals/oryx/article/satellite-tracking-reveals-the-migration-route-and-wintering-area-of-the-middle-east-population-of-critically-endangered-northern-bald-ibis-geronticus-eremita/097533C867806B80E8D0933113AB6128](http://www.cambridge.org/core/journals/oryx/article/satellite-tracking-reveals-the-migration-route-and-wintering-area-of-the-middle-east-population-of-critically-endangered-northern-bald-ibis-geronticus-eremita/097533C867806B80E8D0933113AB6128) accessed January 24, 2024; Arabia Weather, “100 Million Migratory Birds Cross the Skies of Saudi Arabia Every Year” (May 14, 2023) [www.arabiaweather.com/en/content/100-million-migratory-birds-cross-the-skies-of-saudi-arabia-every-year](http://www.arabiaweather.com/en/content/100-million-migratory-birds-cross-the-skies-of-saudi-arabia-every-year) accessed January 24, 2024.

<sup>22</sup> See Chapter 18. See also Olawuyi (n 1).

<sup>23</sup> Mans Nilsson, Tony Zamparutti, Jan-Erik Petersen, and Björn Nykvist, “Understanding Policy Coherence: Analytical Framework and Examples of Sector–Environment Policy Interactions in the EU” (2012) 22 *Environmental Policy and Governance* 395 [www.researchgate.net/publication/260357612\\_Understanding\\_Policy\\_Coherence\\_Analytical\\_Framework\\_and\\_Examples\\_of\\_Sector-Environment\\_Policy\\_Interactions\\_in\\_the\\_EU](http://www.researchgate.net/publication/260357612_Understanding_Policy_Coherence_Analytical_Framework_and_Examples_of_Sector-Environment_Policy_Interactions_in_the_EU) accessed January 24, 2024.

two domains complement, rather than contradict, each other. This policy coherence will allow for better coordination where the combined impact of separate policies is greater than the sum of their individual effects.<sup>24</sup> Further, without coherence, there is a risk of one policy undermining the objectives of another. The initial costs of the coordination required to ensure harmony between the ends and means of different environmental policies and projects would be trivial in comparison to the resources saved by avoiding redundant or conflicting projects and the value gained by preserving biodiversity. For instance, a water resource management strategy that focuses solely on maximizing extraction might endanger biodiversity in aquatic ecosystems.

Policy coherence can be best achieved through inter-agency collaboration, especially through fostering communication and collaboration between different government departments or agencies responsible for biodiversity and water management. Additionally, agencies can establish shared platforms or databases where data related to biodiversity and water resources are accessible to all relevant stakeholders. This ensures that policy decisions are made based on comprehensive, up-to-date information. Lastly, proper policy coherence may also require periodic reviews of policies to identify any potential overlaps, gaps, or conflicts. This can be complemented by impact assessments to evaluate the effectiveness of current policies.

While there are many elements of integrated governance, this chapter focuses on a more pivotal component – that of transboundary collaboration. Transboundary collaboration is of utmost importance in a region such as the MENA,<sup>25</sup> in terms of shared ecosystems, water bodies, and common environmental challenges which necessitate cooperative action.

Achieving integrated governance in the MENA region requires a holistic approach combined with immense political will. Given the pressing nature of the challenges facing biodiversity and water in the region, such efforts are not only beneficial but essential for the region's long-term sustainability and stability. Water scarcity and the loss of biodiversity have immediate and long-term destabilizing effects, with consequences that ripple across economic, social, and political spheres.

Water scarcity, exacerbated by climate change, can lead to reduced agricultural yields, impacting food security and leading to potential economic downturns.<sup>26</sup>

<sup>24</sup> Asa Persson, "Environmental Policy Integration: An Introduction," Policy Integration for Sustainability Background Paper (Stockholm Environment Institute, June 2004) <https://mediamanager.sei.org/documents/Publications/Policy-institutions/EPI.pdf> accessed January 24, 2024; also: Nilsson et al. (n 23).

<sup>25</sup> UNECE, *Convention on the Protection and Use of Transboundary Watercourses and International Lakes* (Helsinki 1992).

<sup>26</sup> World Bank, "High and Dry: Climate Change, Water, and the Economy" (May 2, 2016) [www.worldbank.org/en/topic/water/publication/high-and-dry-climate-change-water-and-the-economy](http://www.worldbank.org/en/topic/water/publication/high-and-dry-climate-change-water-and-the-economy) accessed January 24, 2024.

Coupled with the loss of biodiversity, this diminishes the ecological resilience of various habitats, further compromising the livelihoods of many, especially those dependent on natural resources.<sup>27</sup> More directly, scarcity of clean water and increasing temperatures can result in health challenges, such as dehydration, heat stress, and associated fatalities.<sup>28</sup>

Further, experts are already raising alarms about the onset of a massive climate refugee crisis.<sup>29</sup> Many regions are becoming uninhabitable due to a combination of drought, famine, floods, and extreme heat.<sup>30</sup> The current global refugee situation, which is already destabilizing many climate-stressed regions and destination countries, offers just a glimpse of what may be to come.<sup>31</sup> Future environmental catastrophes could lead to an exponentially larger and more severe refugee crisis, putting even greater strains on global resources and geopolitical stability. Therefore, addressing the intertwined challenges of biodiversity loss and water scarcity is not just an environmental imperative but a crucial step in averting broader regional and global crises.

### 3.3 REGIONAL AND NATIONAL INITIATIVES IN THE MENA REGION FOR INTEGRATED GOVERNANCE OF REGULATIONS FOR THE PROTECTION OF BIODIVERSITY AND WATER RESOURCES

#### 3.3.1 *The North African Mediterranean Region and the Levant*

##### 3.3.1.1 Biodiversity

Egypt, as the most populous country in the Arab world,<sup>32</sup> has long grappled with challenges related to water scarcity and biodiversity conservation. Given its heavy

<sup>27</sup> Elsa E. Cleland, "Biodiversity and Ecosystem Stability" (2011) 3 *Nature Education Knowledge* 10, 14 [www.nature.com/scitable/knowledge/library/biodiversity-and-ecosystem-stability-17059965/#:~:text=Diversity%2DStability%20Theory&text=Biologically%20diverse%20communities%20are%20also,adapt%20to%20a%20changing%20environment](http://www.nature.com/scitable/knowledge/library/biodiversity-and-ecosystem-stability-17059965/#:~:text=Diversity%2DStability%20Theory&text=Biologically%20diverse%20communities%20are%20also,adapt%20to%20a%20changing%20environment) accessed January 24, 2024.

<sup>28</sup> UNICEF, "Water and the Global Climate Crisis: 10 Things You Should Know the World Needs to Get Water Smart. Everyone has a Role to Play, and We Cannot Afford to Wait" (March 2, 2023) [www.unicef.org/stories/water-and-climate-change-10-things-you-should-know#:~:text=When%20disasters%20hit%2C%20they%20can,dangerous%20for%20people%20to%20drink](http://www.unicef.org/stories/water-and-climate-change-10-things-you-should-know#:~:text=When%20disasters%20hit%2C%20they%20can,dangerous%20for%20people%20to%20drink) accessed January 24, 2024.

<sup>29</sup> John Podesta, "The Climate Crisis, Migration and Refugees" (July 25, 2019) [www.brookings.edu/articles/the-climate-crisis-migration-and-refugees/](http://www.brookings.edu/articles/the-climate-crisis-migration-and-refugees/) accessed January 24, 2024.

<sup>30</sup> Ibid.; Yossi Mekelberg and Kate Fanning, "The Coming Climate Migration Crisis in the Middle East and North Africa" (New Lines Institute, December 8, 2021) <https://newlinesinstitute.org/displacement-and-migration/climate-migration/the-coming-climate-migration-crisis-in-the-middle-east-and-north-africa/> accessed January 24, 2024.

<sup>31</sup> Ibid.

<sup>32</sup> CIA Factbook, "Egypt: Demographic Profile" [www.cia.gov/the-world-factbook/countries/egypt/#:~:text=Egypt%20is%20the%20most%20populous,5%25%20of%20Egypt's%20land%20area](http://www.cia.gov/the-world-factbook/countries/egypt/#:~:text=Egypt%20is%20the%20most%20populous,5%25%20of%20Egypt's%20land%20area) accessed January 24, 2024.

reliance on the Nile River for fresh water and its rich biodiversity, particularly in areas such as the Red Sea and Sinai, Egypt has developed comprehensive strategies to address these issues. Egypt's strategies, such as the National Water Resources Plan (NWRP)<sup>33</sup> and the Biodiversity Strategy and Action Plan,<sup>34</sup> while distinct, both concern the protection of biodiversity and water resources. For instance, the Biodiversity Strategy may highlight the importance of freshwater ecosystems,<sup>35</sup> and the NWRP might emphasize the ecological importance of maintaining water quality for habitats.<sup>36</sup>

Tunisia has made efforts to align its environmental strategies with global standards, particularly in line with the Sustainable Development Goals.<sup>37</sup> Wetland conservation, such as the Tunisian government's preservation and desalination efforts in Ichkeul National Park, represents an area where water and biodiversity issues naturally intersect.<sup>38</sup> While there are specific initiatives addressing water and biodiversity issues, respectively, explicit integrated strategies that bridge both domains at the national policy level remain elusive.

Jordan's vulnerability to water scarcity has led it to be very proactive in its water governance. Similar to Tunisia, the Azraq Wetland Reserve is a notable example where water management and biodiversity conservation intersect.<sup>39</sup> The reserve, once a significant stopover for migratory birds,<sup>40</sup> had faced ecological challenges due to the overextraction of groundwater. Restoration efforts have aimed at reviving the wetland and, in the process, preserving its biodiversity. This example indicates some level of integrated strategy, although it may not be systematically applied at a national policy level.

Lebanon has faced myriad environmental and political challenges, which may have impacted its ability to systematically integrate water and biodiversity governance. The country has, however, made strides in designating and conserving its

<sup>33</sup> Arab Republic of Egypt, "Water for the Future: National Water Resources Plan 2017" (Ministry of Water Resources and Irrigation, January 2005) <https://faolex.fao.org/docs/pdf/egy147082.pdf> accessed October 10, 2023.

<sup>34</sup> Arab Republic of Egypt, "Egyptian Biodiversity Strategy and Action Plan (2015–2030)" (Ministry of Environment, January 2016) [www.cbd.int/doc/world/eg/eg-nbsap-v2-en.pdf](http://www.cbd.int/doc/world/eg/eg-nbsap-v2-en.pdf) accessed October 10, 2023.

<sup>35</sup> *Ibid.*, 16, 18, 42, 43, 48, 49, 50, 51, 52.

<sup>36</sup> Arab Republic of Egypt (n 33) 1–6.

<sup>37</sup> Republic of Tunisia, "Voluntary National Review: Sustainable Development Goals Progress Report at the High Level Political Forum" (July 2019) <https://digitallibrary.un.org/record/3866743?ln=en> accessed October 5, 2023.

<sup>38</sup> UNESCO World Heritage Convention, "Ichkeul National Park" <https://whc.unesco.org/en/list/8> accessed October 5, 2023; UNESCO World Heritage Convention, "Ichkeul National Park: Tunisia" <https://whc.unesco.org/en/soc/482> accessed October 5, 2023. We can see the progression of conservation efforts from 1985 to 2010.

<sup>39</sup> European Commission, "Conservation: Azraq Wetland Reserve (Jordan)" (1978) <https://econservation.jrc.ec.europa.eu/site/11856> accessed January 24, 2024.

<sup>40</sup> UNESCO World Heritage Convention, "Azraq: Description" <https://whc.unesco.org/en/tentativelists/5156/> accessed January 24, 2024.



Important Plant Areas<sup>41</sup> and Important Bird Areas,<sup>42</sup> some of which are wetlands, indicating a recognition of the intersection between water and biodiversity. However, broader integrated strategies at the national level may still be in the nascent stages or facing implementation challenges due to other pressing issues in the country.

While these countries have demonstrated an understanding of the importance of both water governance and biodiversity conservation, explicit and comprehensive national strategies that integrate both domains may still be in development in the North African and Levant subregions of the MENA. Integrating these domains requires a multifaceted approach, considering socio-political, economic, and ecological factors, which can be complex in rapidly changing environments.

### 3.3.2 Arabian Peninsula

Oman, in the Arabian Peninsula, has been at the forefront in its efforts to combat the loss of biodiversity as well protect its natural resources – especially water. Law 114/2001 on the Conservation of the Environment and Prevention of Pollution was enacted to oversee environmental and biodiversity conservation projects and initiatives in Oman.<sup>43</sup> Its role is instrumental in ensuring the protection and preservation of Oman's diverse ecosystems, flora, and fauna, in the context of protection of the environment of the state in general. Law 114/2001 also has provisions for the protection of water resources – both fresh water and salt water. This law is one of the examples of integration of biodiversity and water protection regulations. The law recognizes the need to protect water resources in order to protect biodiversity.

Saudi Arabia has taken significant steps to protect its unique biodiversity and vital water resources. Over the years, it has enacted a series of laws and regulations to safeguard its environmental heritage and ensure sustainable water management. Notably, the Saudi National Transformation Program 2020<sup>44</sup> and Vision 2030<sup>45</sup> emphasize the importance of environmental sustainability and water conservation, highlighting the nation's commitment to these issues. While both domains of biodiversity and water protection may be addressed in the broader context of environmental and sustainable development strategies, it is not clear to what extent there

<sup>41</sup> Magda Bou Dagher-Kharrat, Hicham El Zein, and Germinal Rouhan, "Setting Conservation Priorities for Lebanese Flora – Identification of Important Plant Areas" (June 2018) 43 *Journal for Nature Conservation* 85–94 [www.researchgate.net/publication/321224250\\_Setting\\_conservation\\_priorities\\_for\\_Lebanese\\_flora-Identification\\_of\\_important\\_plant\\_areas](http://www.researchgate.net/publication/321224250_Setting_conservation_priorities_for_Lebanese_flora-Identification_of_important_plant_areas) accessed January 24, 2024.

<sup>42</sup> SPNL Homat al Hima, "Important Bird Areas – IBAs" (April 21, 2009) [www.spnl.org/ibas-kbas/](http://www.spnl.org/ibas-kbas/) accessed January 24, 2024.

<sup>43</sup> The Sultanate of Oman, Royal Decree No 114/2001 issuing the Law on Conservation of Environment and Prevention of Pollution (November 14, 2001) [www.fao.org/faolex/results/details/en/c/LEX-FAO098254/](http://www.fao.org/faolex/results/details/en/c/LEX-FAO098254/) accessed January 24, 2024.

<sup>44</sup> Kingdom of Saudi Arabia, "Vision 2030: National Transformation Program" [www.vision2030.gov.sa/en/vision-2030/vrp/national-transformation-program/](http://www.vision2030.gov.sa/en/vision-2030/vrp/national-transformation-program/) accessed January 24, 2024.

<sup>45</sup> Kingdom of Saudi Arabia, "Leadership Message: Saudi Vision 2030" [www.vision2030.gov.sa/en/](http://www.vision2030.gov.sa/en/) accessed January 24, 2024.

is direct integration between specific laws on biodiversity and water protection. The nation's approach to sustainable development, environmental protection, and resource management is informed by its Vision 2030 strategy, which emphasizes environmental sustainability among its goals.

### 3.3.3 *Regional Frameworks for Integrated Water and Biodiversity Governance*

The integration of biodiversity protection and water conservation regulations within the MENA region is gaining increasing momentum in regional strategies and instruments. For example, the Arab Water Strategy is an example of subtle integration.<sup>46</sup> While the primary focus is on water management and addressing water scarcity, the strategy also underscores the need for sustainable management practices that do not harm ecosystems. By emphasizing sustainable use and ecosystem conservation, it implicitly promotes the protection of biodiversity.<sup>47</sup> Similarly, one of the most successful examples of integrated governance is the Mediterranean Wetlands Initiative (MedWet).<sup>48</sup> Wetlands are zones of high biodiversity, and their conservation not only ensures water storage and purification but also protects numerous species. MedWet's initiatives directly target the conservation of these ecosystems, acknowledging the dual importance of water management and biodiversity. MedWet has established a network of scientific and technical experts to share knowledge, data, and best practices on wetland conservation, biodiversity, and water management.<sup>49</sup> This network plays a critical role in bridging the gap between biodiversity conservation and water resource management. Further, MedWet's strategic frameworks emphasize the interconnectedness of water management and biodiversity conservation.<sup>50</sup> This integrated approach acknowledges that protecting biodiversity is instrumental in ensuring water quality and quantity in Mediterranean wetlands.

MedWet's collaborative approach, combined with its emphasis on integrating biodiversity and water resource management, has made it a flagship initiative in the

<sup>46</sup> Technical Secretariat of the Arab Ministerial Water Council, "Arab Strategy for Water Security in the Region to Meet the Challenges and Future Needs for Sustainable Development (2010–2030)" (2012) [www.susana.org/\\_resources/documents/default/3-3431-189-1539510564.pdf](http://www.susana.org/_resources/documents/default/3-3431-189-1539510564.pdf) accessed January 24, 2024.

<sup>47</sup> See also Tarek Abulhawa and Tricia Cummings, *Rapid Cultural Inventories of Wetlands in Arab States including Ramsar Sites and World Heritage Properties: Building Greater Understanding of Cultural Values and Practices as a Contribution to Conservation Success* (Wetland Link International 2020) [https://wli.wwt.org.uk/wp-content/uploads/2020/12/2017-06-28\\_arab\\_states\\_report\\_web.pdf](https://wli.wwt.org.uk/wp-content/uploads/2020/12/2017-06-28_arab_states_report_web.pdf) accessed January 24, 2024.

<sup>48</sup> The Mediterranean Wetlands Initiative (MedWet), Wetlands for a sustainable Mediterranean region <https://medwet.org/> accessed January 24, 2024.

<sup>49</sup> The Mediterranean Wetlands Initiative (MedWet), Wetlands for a sustainable Mediterranean region, "The Scientific and Technical Network" <https://medwet.org/the-scientific-and-technical-network/> accessed January 24, 2024.

<sup>50</sup> The Mediterranean Wetlands Initiative (MedWet), Wetlands for a sustainable Mediterranean region, "The Strategic Plan (2026–2020)" <https://medwet.org/observatory/strategic-plan/> accessed January 24, 2024.

Mediterranean region. The initiative recognizes that the health of wetland ecosystems, their biodiversity, and water resources are deeply interconnected and that an integrated approach is essential for the long-term sustainability of these vital habitats. Similarly, the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden has adopted a comprehensive Regional Master Plan for marine protected areas (MPAs) in the Red Sea and Gulf of Aden aimed at protecting the rich and delicate wetlands of the Red Sea and Gulf of Aden.<sup>51</sup> Focusing on twelve MPAs across the MENA region, the Regional Master Plan “is a regionally agreed framework for the planning and management of each of the MPAs in the Regional Network that will facilitate the achievement of regional objectives for sustainable resource usage, conservation of biodiversity and for economic development.”<sup>52</sup>

While these initiatives signify a move toward integrated governance, practical integration at the domestic level often varies. Challenges frequently arise in implementing policies cohesively across sectors. The mere existence of such initiatives does indicate a recognition of the intertwined nature of water resources and biodiversity, and it is a good indication of whether the nations recognize the importance of such integration.

### 3.4 ADDRESSING GAPS IN INTEGRATED MANAGEMENT OF BIODIVERSITY AND WATER RESOURCES

The MENA region has shown a growing awareness of the need for integrated governance of biodiversity and water preservation. Integrating biodiversity conservation and water resource management is essential for the region’s sustainable development. However, the presence and robustness of such integrated governance varies significantly across the region – nationally as well as regionally. These gaps pose considerable challenges to achieving holistic and effective resource management. The most common reason for presence of such lacunae in integrated governance is the diverse political landscape of the region. The MENA region comprises countries with varying political systems, governance structures, and priorities. While

<sup>51</sup> The Red Sea and Gulf of Aden (RSGA) is recognized for the rich biological diversity of its coastal and marine environments and the associated social, economic, and tourism value. See Olawuyi (n 1) 71–72; the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA), *The Red Sea and Gulf of Aden Regional Network of Marine Protected Areas: Regional Master Plan* (PERSGA 2002) <https://iwlearn.net/resolveuid/a76ab1cb7a5b8d749bed4551ec6abce0> accessed January 12, 2024. See also G. Bawazir, *Marine Biodiversity of Aden Wetlands Protected Areas* (Aden Wetlands Conservation Project, Wings Over Wetlands 2009).

<sup>52</sup> The twelve MPAs are: Iles des Sept Frères and Ras Siyan (Djibouti); Ras Mohammed National Park; Giftun Islands and Straits of Gubal (Egypt); Aqaba coral reefs (Jordan); Straits of Tiran; Wajh Bank, Sharm Habban and Sharm Munaybirah; Farasan Islands (Saudi Arabia); Aibat and Saad ad-Din Islands, Saba Wanak (Somalia); Sanganeb Marine National Park; Makkawar Island and Dungonab Bay (Sudan); Socotra Islands; Belhaf and Bir Ali area (Yemen). PERSGA (n 52).

some countries have made strides in environmental governance, progress has been slow in others due to challenges such as political instability, conflicts, or other pressing socio-economic issues.<sup>53</sup>

These countries also have varied economic realities on the ground. Historically, the economic emphasis in many MENA countries has been on oil and gas extraction. Although there is a growing recognition of the need to diversify economies and focus on sustainable development, the transition has been uneven across the region.<sup>54</sup> Uneven institutional capacities also play a significant role. While some countries, especially the wealthier Gulf states, have invested in building institutional capacity for environmental governance, others might lack the expertise, infrastructure, or resources to implement and oversee integrated regulations effectively.<sup>55</sup>

There is also an epidemic of policy silos in the MENA region. Institutions responsible for water resource management and biodiversity conservation operate in isolation in many countries of the region.<sup>56</sup> This siloed approach results in fragmented and sometimes conflicting policies and actions. Water policies rarely incorporate biodiversity considerations and vice versa.<sup>57</sup> Addressing the gaps in the integration of biodiversity and water protection regulations requires a multifaceted approach that combines technical, institutional, policy, and community-based strategies.

Most crucially, there is a need for policy integration.<sup>58</sup> The nations need to develop frameworks that weave together biodiversity conservation and water management, ensuring that both issues are addressed in every relevant policy and initiative. Policymakers need to encourage a systems-thinking approach that recognizes the interconnectedness of water systems, ecosystems, and human communities and develop policies that account for the entirety of the water–biodiversity–human nexus rather than piecemeal solutions.

The region as a whole must also create or strengthen central bodies responsible for overseeing both biodiversity and water resources to ensure a unified approach, while promoting inter-agency coordination and taskforces that bring together experts from various domains. In order to have integrated policies that are robust, effective, and actionable, there needs to be enhanced monitoring of the efforts as well as in-depth, on-the-ground research on the requirements and effects of the policies. This should be coupled with facilitated data sharing between institutions and the development integrated databases that are easily accessible to policymakers. It is imperative that in

<sup>53</sup> Olawuyi (n 1).

<sup>54</sup> Ibid.

<sup>55</sup> Iyad Abumoghli and Adele Goncalves, “Environmental Challenges in the Mena Region” (UNEP) [https://wedocs.unep.org/bitstream/handle/20.500.11822/31645/EC\\_MENA.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/31645/EC_MENA.pdf?sequence=1&isAllowed=y) accessed January 24, 2024.

<sup>56</sup> Damilola Olawuyi, “Sustainable Development and the Water–Energy–Food Nexus: Legal Challenges and Emerging Solutions” (2020) 103 *Journal of Environmental Science & Policy* 1.

<sup>57</sup> Ibid.

<sup>58</sup> Nilsson et al. (n 23) 395.

a politically fractured region, such as the MENA, there is a mode of legal enforcement regionally. This can be carried out by strengthening the legal framework to ensure compliance with integrated regulations and establishing penalties for non-compliance along with mechanisms for conflict resolution.

The MENA region stands at a critical juncture where the integration of biodiversity conservation and water resource management can no longer be an afterthought. Addressing the highlighted gaps is crucial for the region's sustainable future, ensuring that its unique ecosystems thrive alongside its growing human population.

### 3.5 CONCLUSION

The MENA region, characterized by its rich biodiversity and precarious water situation, stands at a unique crossroads in the realm of environmental governance. The intricate linkage between biodiversity and water is evident not just ecologically but socio-economically, playing a pivotal role in the sustenance and livelihoods of its diverse communities. It becomes vitally important, then, to ensure that the governance structures in place address these connections holistically.

While countries in the MENA region have made strides toward recognizing the intrinsic relationship between biodiversity and water, comprehensive integration in the legal and policy frameworks remains a challenge – both nationally and regionally. Fragmented legislation and sectoral approaches often lead to gaps, redundancies, and sometimes contradictions in management practices. To truly foster sustainable development and resilience in the face of changing climatic conditions and growing anthropogenic pressures, there is an urgent need for a more cohesive, integrated approach.

The MENA region's path toward the integrated governance of biodiversity and water preservation is a journey marked by both promise and obstacles. While recognition of the need for harmony between these vital aspects of resource management is growing, significant gaps persist at both the national and regional levels.

The region's diverse political landscape stands out as a key challenge to integrated governance efforts. The region's particular vulnerability to destabilization and the impending climate refugee crisis is also notable. The climate refugee crisis is predicted to dwarf the current refugee crisis. Further, variations in political systems, governance structures, and priorities among MENA countries have led to disparities in environmental governance progress. Political instability, conflicts, and pressing socio-economic issues further compound these challenges. Economic disparities also play a pivotal role, with a historical emphasis on oil and gas extraction overshadowing efforts to diversify economies and promote sustainability. Uneven institutional capacities further hinder progress, with wealthier Gulf states having more resources for environmental governance. The prevalence of policy silos, where water resource management and biodiversity conservation operate independently,

leads to fragmented and sometimes conflicting policies and actions. This separation limits the effectiveness of integrated resource management.

To address these gaps effectively, a nexus and multifaceted approach is essential. Policy integration is paramount, requiring the development of frameworks that embed biodiversity conservation and water management in every relevant policy and initiative, adopting a systems-thinking perspective that recognizes their interconnectedness. Establishing or strengthening central bodies responsible for overseeing both biodiversity and water resources is crucial for a unified approach and improved inter-agency coordination. Effective monitoring and on-the-ground research, coupled with enhanced data sharing and accessible integrated databases, support evidence-based decision-making.

In a region marked by political fragmentation, regional legal enforcement mechanisms are imperative. Strengthening the legal framework, ensuring compliance with integrated regulations, and establishing penalties for noncompliance, along with conflict resolution mechanisms, can help create a unified approach to resource management. The MENA region stands at a critical juncture where addressing these gaps in the integration of biodiversity conservation and water resource management is not only necessary but also essential for its sustainable future. By confronting these challenges thoughtfully, the region can ensure that its unique ecosystems thrive alongside its growing human population, promoting resilience and prosperity for generations to come. It is crucially important to remember that true sustainability lies not just in the protection of individual components of our environment but in understanding and preserving the intricate web of relationships that bind them together.