15

Integrating Biodiversity into Environmental Impact Assessments

Lessons from the EIA Process in the Tigris and Euphrates Basin

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15.1 INTRODUCTION

This chapter examines the important role of environmental impact assessments (EIAs) as tools for biodiversity and nature conservation in the Middle East and North Africa (MENA) region. Drawing on lessons from three major projects, concerns have been heightened about their biodiversity risks to the Tigris and Euphrates river basin, namely the Güneydoğu Anadolu Projesi (GAP) project in Turkey,[1] the Tropical Water Projects in Iran,[2] and drainage projects in Iraq.[3] The chapter discusses how project developers and planners can maximize the full value of EIAs to better anticipate and manage such biodiversity risks.

In practice, an EIA can be used to identify and minimize potential significant harm caused by water resource projects and industrial developments in relation to water quantity and quality measures. Conducting a transboundary EIA for water projects across borders is therefore a recognized procedural obligation of international customary law.[4] EIAs provide a framework for project planners and regulators to effectively anticipate and prevent transboundary harm associated with large-scale dams and other water projects. As discussed in Chapter 3, failure to address the adverse

[1] Republic of Turkey, Ministry of Industry and Technology, "Southeastern Anatolia Project" www.gap.gov.tr/en/what-s-gap-page-1.html accessed January 29, 2024.

[2] Tehran Times, "Rouhani Opens Tropical Water Project in Kermanshah" (May 3, 2019) www.tehrantimes.com/news/435382/Rouhani-opens-tropical-water-project-in-Kermanshah accessed January 30, 2024.

[3] C. J. Richardson and N. A. Hussain, "Restoring the Garden of Eden: An Ecological Assessment of the Marshes of Iraq" (2006) 56 *BioScience* 477.

[4] The EIA is the process of identifying, predicting, evaluating, and managing the biophysical, social, health, and other relevant impacts of development proposals prior of taking any major decision and commitments. The EIA process includes consideration of all significant impacts, namely direct, indirect, and cumulative impacts. See: B. Sadler et al., *Environmental and Social Impact Assessment for Large Scale Dams* (World Commission on Dams Secretariat 2000).

impact of development projects on water security could worsen biodiversity loss and the extinction of plants and animals that depend on wetlands and other natural habitats. Understanding the relationship between the EIA and protecting biodiversity, and when it becomes significant, is therefore determinative in defining the impacts one assesses when conducting EIAs.

Across the MENA region, all infrastructure development projects are legally required to undergo some form of EIA to receive governmental approval or regulatory permit.[5] However, as demonstrated in this chapter, the terms and scope of an EIA are largely open to interpretation. This ambiguity is compounded by uncertainty in reconciling the damage which could result from projects and the legal concept of harm to diversity, which proponents must guard against. Concerns have been raised relating to the reduction of water levels in the Tigris and Euphrates rivers as a result of large-scale dam projects undertaken since 1950, permanent changes to the wetland ecology of the region, and a lack of widespread engagement from stakeholders impacted by such projects, all of which raise the need for a more comprehensive implementation of EIA norms in the MENA region.[6] Furthermore, the implementation of EIA processes will need to be better monitored across the MENA region before and after the approvals of development activities, in order to ensure that approved activities are being implemented in accordance with approved environmental quality standards and technologies.[7] This is not exceptional, even in new mega-projects such as the Grand Ethiopian Renaissance Dam, which may cause floods in the Nile Delta in both Egypt and Sudan,[8] or in the GAP in Turkey, which has led to biodiversity loss, as discussed in Section 15.3.

While several studies have examined the importance of EIAs as an important anticipatory tool for halting biodiversity loss, the challenges hindering its effective implementation to address biodiversity risks in the MENA region has yet to be exhaustively analyzed. This chapter fills a gap in this regard. It draws salient lessons from how the lack of comprehensive EIAs in water projects on the Tigris and Euphrates river basin has had diverse and adverse consequences on the environment and biodiversity of the basin. It discusses how the EIA could be enhanced in current and future developments in the basin by improving legal frameworks at the national level, increasing institutional capability, and integrating technological advancement into the fabric of EIAs.

5 Damilola Olawuyi, *Environmental Law in Arab States* (Oxford University Press 2022) 115–118.

6 Ibid. See also Katalyn A. Voss, James S. Famiglietti, MinHui Lo, Caroline de Linage, Matthew Rodell, and Sean C. Swenson, "Groundwater Depletion in the Middle East from GRACE with Implications for Transboundary Water Management in the Tigris–Euphrates–Western Iran Region" (2013) 49 *Water Resources Research* 904.

7 Olawuyi (n 5) 115–119.

8 Mohamed Mostafa Mohamed and Samy Ismail Elmahdy, "Remote Sensing of the Grand Ethiopian Renaissance Dam: A Hazard and Environmental Impacts Assessment" (2017) 8 *Geomatics, Natural Hazards and Risk* 2, 1225.

The chapter proceeds in five sections, this introduction being the first. Section 15.2 maps the interdependent relationship between EIAs and biodiversity protection, drawing from key international law instruments, including the Convention on Biological Diversity (CBD), the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo) and International Court of Justice (ICJ) cases. This section demonstrates how the legal scope of the EIA is changing, based on a gradual evolution in international environmental law (IEL), particularly pertaining to biodiversity, to embrace a more comprehensive vision of biodiversity protection. Despite this positive change, biodiversity protection is still not sufficient in many countries in the MENA region. Section 15.3 examines the negative impacts of ignoring EIAs in the case of dams and projects on the Tigris and Euphrates river basins. The lack of a comprehensive EIA process has contributed to the considerable loss of biodiversity, as well as cultural and heritage values, in the wetlands south of Iraq. Section 15.4 discusses how gaps such as the lack of clear recognition of biodiversity in EIA legislation, inadequate stakeholder engagement, weak integration of human rights standards in assessments and planning processes, the lack of institutional coordination between water and environmental institutions, and resource and capacity constraints all weaken the EIA process for these projects. To address these gaps in EIA implementation in current development projects and other future development projects across the MENA region, Section 15.5 discusses the need for human rights impact assessments as part of a comprehensive planning process. Section 15.6 is the concluding section.

15.2 THE EIA AS A TOOL FOR BIODIVERSITY PROTECTION AND NATURE CONSERVATION

The need for EIAs arose out of growing global environmental awareness in the 1950s and 1960s, and the recognition that industrial and other development projects were producing undesirable consequences on the environment.[9] In 1989, the United Nations Environment Program (UNEP) called for the necessity of concluding an international agreement on biological diversity. Work began by a specialized team in 1989 to prepare the agreement. This team continued its work and was called the Intergovernmental Negotiating Committee. It announced its adoption of the text of the international agreement in 1989, at the Nairobi Conference, and it was later concluded.[10] The agreement was announced to be open for signature at the Earth Summit in Rio de Janeiro on June 1992, and it entered into force on December 1993. One hundred ninety-three parties joined it. The goal of the agreement was "[p]romoting practices that lead to a sustainable future."[11]

[9] Ibid.

[10] C. Y. Keong, *Global Environmental Sustainability Case Studies and Analysis of the United Nations' Journey toward Sustainable Development* (Elsevier, 2021) 63–202.

[11] Convention on Biological Diversity, 1760 UNTS 79, 31 ILM 818 (1992) (Date of Adoption, May 22, 1992; Place of Adoption, Rio de Janeiro).

In its preamble, the convention expressed its awareness of the fundamental value of biological diversity and ecological values, expressed its concern about the serious discrepancy in biological diversity due to human activities, and stressed at the same time that the basic condition for the conservation of biological diversity is the maintenance of ecosystems and habitats. The general objectives of the agreement, as stated in Article (1), is to ensure the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.[12]

For worldwide biodiversity, the most significant overall initiative is the CBD from 1992; the arrangement and the convention period put the focus on what biodiversity is, what it means to mankind, and what the globe will resemble for our children if we fail in safeguarding biodiversity at all its levels.[13] Here, the importance of the EIA is raised as a critical tool for the careful decision-making for the sustainable management of our resources, for considering best practices for protecting biodiversity in the long term, and for the care for the wider range of biodiversity beyond national borders. Article 14 of the CBD requires parties to mandate EIAs for their proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures.[14] It also requires parties to introduce appropriate arrangements to ensure that the environmental consequences of programs, activities, and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account.

Conducting a transparent EIA in accordance with the CBD is a preeminent issue for international rivers or transboundary rivers because water projects and changing water flows from upper-stream countries to downstream countries will have an impact on the biodiversity of river basins. The CBD confirmed countries have permanent sovereignty over natural resources inside their boundaries, but they are responsible for not causing damage to the environment beyond their territories.[15] This is known as the do-no-harm principle in the IEL, which directly relates to the EIA and protecting biodiversity.

15.2.1 *The Do-No-Harm Principle and the EIA: Protecting Biodiversity*

The do-no-harm principle – avoiding or minimizing environmental harm – has been expressed differently, but the meaning is the same. We use do-no-harm as the abbreviation for all the earlier terms. It is considered one of the most significant

[12] Ibid.
[13] L. S. Anderson, C. E. Davies, and D. Moss, "The UN Convention on Biological Diversity" (1997) 5.
[14] Convention on Biological Diversity (June 5, 1992) 1760 UNTS 79, 143; 31 ILM 818 (1992), Article 14.
[15] Ibid., Article 3.

principles for the international IEL.[16] It is one of the four essential principles of IEL with regard to the management of transboundary rivers.[17] According to the do-no-harm principle, states in transboundary river basins have a right to utilize the rivers. Still, they have a responsibility not to damage the environment of other states. It is usually linked to an equitable and reasonable allocation of transboundary rivers.[18] However, the overallocation of the rivers, in many cases, leads to damage to the environment of other states and biodiversity loss.

The do-no-harm principle has had a strong position since the twentieth century and at the early stages of the evolution of the IEL. The Madrid Declaration in 1911 insisted that changing the course of water, which leads to harm or putting waste into the water, is forbidden, as mentioned in Article 2.[19] In the *Corfu channel* case, the ICJ mentioned that states are responsible for damages to other states due to activities inside their territory.[20] Thus, the do-no-harm principle developed in customary international law until the UN Convention on the Law of the Non-navigational Uses of International Watercourses (Watercourses Convention) was formally recognized in 1997. Article 7 of the Watercourses Convention mentions that states are responsible for taking all necessary measures to avoid damage to other states during all stages of utilizing international watercourses.[21]

According to the Watercourses Convention, the EIA is one of the most significant measures and tools for avoiding harm to other states. Article 12 of the Watercourses Convention clearly identified the EIA as a precautionary measure to prevent harm to transboundary rivers as the article refers to notifying other states and sharing information prior to planning projects, "including the results of any environmental impact assessment, in order to enable the notified States to evaluate the possible effects of the planned measures."[22] This means states should conduct the EIA at the early stages of planning and designing projects, then share the results of the EIA with riparians to avoid harm, or take precautions, which is an effective method for communication and communication.

Similar requirements were raised in the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), but with

[16] Owen McIntyre, "The Current State of Development of the No Significant Harm Principle: How Far Have We Come?" (2020) 20 *International Environmental Agreements: Politics, Law and Economics* 601.

[17] Stephen C. McCaffrey, Christina Leb, and Riley T. Denoon, *Research Handbook on International Water Law* (Edward Elgar Publishing 2019) 83.

[18] Charles Harper, Charles L. Harper, and Monica Snowden, *Environment and Society: Human Perspectives on Environmental Issues* (Routledge 2017) 52–53.

[19] Madrid Declaration of the Institute for International Law on International Regulations regarding the Use of International Watercourses for Purposes Other than Navigation (1911).

[20] Corfu Channel Case (*United Kingdom v Albania*) (Merits and Judgment) (1949) ICJ Rep 22.

[21] United Nations Convention on the Law of the Non-navigational Uses of International Watercourses (May 21, 1997) 36 ILM 700 (International Watercourses Convention).

[22] Ibid.

fewer details and in weaker language compared to the Watercourses Convention in 1977. The Water Convention encourages parties to apply the EIA "as far as possible" to reduce the negative impacts on other states.[23] However, the CBD more comprehensively linked the do-no-harm principle and the EIA to protect biodiversity beyond the national border. In addition to the provisions of Article 14 of the CBD, which introduces the EIA as a requirement for all projects that may have a negative impact on biodiversity, public engagement is also recommended in the EIA process.[24]

As well as these important conventions, the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) provided sufficient details regarding the procedure and practice of an EIA to achieve a better level of sustainable management of our natural resources. The Espoo Convention's Article 1(vi) defined the EIA as a "means a national procedure for evaluating the likely impact of a proposed activity on the environment."[25] Under the Espoo Convention, parties are responsible for undertaking the EIA "prior to a decision to authorize or undertake a proposed activity."[26] This national procedure is a critical precautionary step for avoiding harm at the national and transboundary levels and protecting biodiversity. It would also result in the proper implementation of the do-no-harm principle. However, as Section 15.3 demonstrates, the lack of comprehensive implementation of the EIA process remains a key challenge in the MENA region. This is despite the fact that the countries of the MENA region are part of several regional environmental conventions that bind them to apply the EIA in designing their projects.

15.3 MEGA-PROJECTS WITHOUT COMPREHENSIVE EIAS ON THE TIGRIS AND EUPHRATES RIVERS

Despite the clear recognition of the importance of EIAs in regional and national instruments in the MENA region, the tendency of several development projects, especially large-scale dam projects with adverse impacts on biodiversity, to bypass the EIA process remains a key challenge.[27] This is evident in the Tigris and Euphrates basins. Turkey, Iran, Syria, and Iraq are the main riparian countries within the basin. Each of them continually works to guarantee that they have access to the

[23] United Nations Economic Commission for Europe (UNECE), Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 1992, UN Doc ECE/MP.WAT/41 (UNECE Water Convention).

[24] Convention on Biological Diversity, Article 14.

[25] UNECE, Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) (adopted February 1991, entered into force September 10, 1997) 1989 UNTS 309.

[26] Ibid., Article 2(3).

[27] Olawuyi (n 5) 124–125. See also Economic and Social Commission for Western Asia (ESCWA), "A Study on the Evaluation of Environmental Impact Assessment in Selected ESCWA Countries" (July 17, 2001) E/ ESCWA/ENR/2001/8;.

necessary water supplies to suit their household, agricultural, and industrial needs.[28] In the absence of inclusive agreements and collaboration for the equitable sharing of water resources, riparian countries took unilateral steps and implemented projects that caused the reduction of the water quality of the entire basin and worsened its local and agricultural benefits with an adverse impact on biodiversity.[29]

As dam construction permits exert control over large amounts of water, the riparian state can dictate flows and water availability in downstream countries. In the last fifty years, upstream countries on the Tigris and Euphrates have competed and built major dams on the two rivers and their tributaries without including EIAs and local people in the decision-making process.[30] Empirical studies have demonstrated that Turkey's and Iran's water projects have significantly reduced water quality and quantity in Iraq at surface and groundwater levels.[31] These projects are exacerbating climate change consequences for the two rivers.[32]

The main issue in the basin is that all countries, but mainly the upstream states, have constructed many dams, and large-scale irrigation and hydropower projects, without proper consultation and communication with each other.[33] These dams have been built without an assessment of their impact on the environment. Most significant is Turkey's extensive damming of the Euphrates, which has caused a drastic reduction of the water quality as a result of the decrease in the amount of water entering downstream territories. The water reduction due to these mega-dams contributed to biodiversity loss in Iraq; many species, including ferruginous duck, are under real threat.[34]

In addition, decision-makers in the GAP project failed to apply international standards in constructing these dams and managing them. They largely ignored the EIA, resulting in the destruction of the cultural heritage of the Kurdish people, and the disregard for their cultural and environmental values. The GAP's external credit companies claimed that they undertook the EIA but never shared it with the public.[35] Another crucial issue is that neither Turkey nor Iran have signed or ratified

[28] Nadhir Al-Ansari, "Hydro Geopolitics of the Tigris and Euphrates" in *Recent Researches in Earth and Environmental Sciences: 2nd International Conference on Advanced Science and Engineering 2019 (ICOASE2019) Zakho-Duhok, Kurdistan Region – Iraq* (Springer International Publishing 2019) 53.

[29] Ibid., 60.

[30] Katalyn A. Voss et al., "Groundwater Depletion in the Middle East from GRACE with Implications for Transboundary Water Management in the Tigris-Euphrates-Western Iran Region" (2013) 49 *Water Resources Research* 904.

[31] Ibid.

[32] Nadhir Al-Ansari et al., "Water Quality within the Tigris and Euphrates Catchments" (2018) 8 *Journal of Earth Sciences and Geotechnical Engineering* 95.

[33] Aysegül Kibaroglu, "State-of-the-Art Review of Transboundary Water Governance in the Euphrates–Tigris River Basin" (2019) 35 *International Journal of Water Resources Development* 4, 9.

[34] A. A. Al-Zubaidi, "The Importance of Geodiversity on the Animal Diversity in Huwaiza Marsh and the Adjacent Areas, Southeastern Iraq" (2017) 14 *Bulletin of the Iraq Natural History Museum* 235.

[35] Itzchak E. Kornfeld, *Mega-Dams and Indigenous Human Rights* (Edward Elgar 2020) 126–127.

the Watercourses Convention.[36] This significant convention obliges states to share transboundary rivers equitably and avoid environmental damage to other states. The negative impacts of these dams are considerable on the lower part of the Tigris and Euphrates river basins or the marshlands and wetlands in the south of Iraq. The marshland is considered the birthplace of human civilization, with great environmental, cultural, and biodiversity values for Iraq and the world.[37]

15.3.1 *GAP: Development Projects or Destruction of Natural and Cultural Values*

In the 1970s, Turkey started the damming project GAP, which was announced in the 1980s as a program to intensify the irrigation and hydroelectric capabilities of Turkey's southeastern region. This project consists of a total of twenty-two dams (with a capacity of around 120 billion cubic meters). It contains nineteen hydroelectric electricity-generating stations across the Tigris–Euphrates basin, which were expected to be completed by 2010 but which has been extended to the end of this decade, approximately 73 percent of which have been finished, and several irrigation projects.[38]

Mesopotamia, the land between the two rivers, was known as the most ancient productive farming area in the history of humanity. The Tigris and Euphrates played a major role in creating and developing the Sumerian, Babylonian, and Assyrian civilizations.[39] The GAP project grants Turkey the hegemony to monopolize the water of the Tigris and Euphrates rivers. This hegemony has already had an impact on

[36] United Nations Convention on the Law of the Non-navigational Uses of International Watercourses (May 21, 1997) 36 ILM 700 (International Watercourses Convention), also Qaraman Hasan, A *Trans-national Analysis of Equitable Utilisation and Minimisation of Environmental Harm under Environmental Laws at International, Federal and National Levels* (University of Waikato 2023) 222–223.

[37] The marshlands of Iraq and the Relict Landscape of the Mesopotamian Cities is a mixed serial heritage property located in the southern region of the Republic of Iraq. The nominated property comprises seven components, four of which are natural with associated cultural value whereas the three other components are cultural. The natural components include the Huwaizah and the central, east, and west Hammar Marshes, while the cultural components comprise the archaeological cities of Uruk and Ur together with the Tell Eridu archaeological site. Republic of Iraq, "The Ahwar of Southern Iraq: Refuge of Biodiversity and the Relict Landscape of the Mesopotamian Cities" document prepared by the National Committee for the Environmental and Cultural Management of the Ahwar and their World Heritage Nomination (January 2014) 3.

[38] GAP-RDA (Southeastern Anatolia Project – Regional Development Administration), "History of GAP" (October 24, 2022) www.gap.gov.tr/en/ accessed January 31, 2024. The construction of dams and irrigation tunnels was originally set to be completed by 2010, but this has now been delayed by several years, due to the funding problems that are directly related to Turkey's dispute with Syria and Iraq over the rights to water resource, the World Bank has refused to provide loans because Turkey refused to comply with the international standards for such projects. See Joost Jongerden, "Dams and Politics in Turkey: Utilizing Water, Developing Conflict" (2010) 17 *Middle East Policy* 139.

[39] Mohammed Al-Najim, "Impact of Tigris and Euphirates Water Crisis on the Environmental Catastrophe of Iraqi Marshlands" (2005) 34–38 Iraqi Geological Journal 96.

agricultural production in the area and the livelihoods of millions of people who depend on it, whether for agriculture or as a primary source for everyday use for drinking and household needs.[40] The completed GAP projects have already made life difficult in the downstream countries, and if the damming continues according to the current trend, the adverse effects of diversity loss in the region will be grave.

Since the beginning of the GAP in 1989, the water salinity of the Euphrates has started to increase rapidly, which is predicted to increase drastically as the GAP approaches full development.[41] This constant decrease in the water quality in the downstream basins will make Iraq unable to reclaim its previous rich agricultural soils effectively.[42] Additionally, it would halt the naturally occurring discharge of salt and other contaminants from the Euphrates–Tigris system, whose soils are generally heavy and have drainage issues, making them unsuitable for agricultural use.[43] The daily functioning of the power plant will produce water surges downstream of the dam, which will harm the ecology below.

The downstream countries' human and animal health will be further complicated by these variables, which will severely degrade the river environment and make it difficult for many species to survive.[44] The Tigris basin is renowned for its vast biological diversity, despite the fact that many parts of it have never been subjected to biological surveys. Mesopotamia is also the birthplace of numerous plants and agriculture.[45] Its extensive, intact river environment, which is home to numerous endangered animal and plant species, a significant portion of the Tigris, and its tributaries will be impacted by the upstream GAP. Agriculture, fisheries, and aquaculture have all experienced significant decreases as a result of declining river flows and deteriorating water quality in the basin.[46]

15.3.2 *The Tropical Water Project in Iran*

Iranian development projects on the tributaries of the Tigris have negatively impacted the water quality and quantity of these tributaries since several of them rise in Iran, and as far as Shat Al-Arab is concerned, Iran and Iraq are the two primary riparian

[40] Ibid.

[41] Laith Al-Oubedi and Dicle Tuba Kilic, *Challenge C: Ecosystem Tigris-Euphrates River Ecosystem: A Status Report* (Mesopotamian Water Forum 2019), 13.

[42] According to the 2009 FAO report, there are approximately 6.5–7 million hectares of agricultural land in the Tigris–Euphrates basin that is being irrigated; the majority is Iraqi farmland, which covers about one-fifth of the country, and which is almost entirely dependent on irrigation from the Tigris and Euphrates Rivers. Only in the northeastern plains and mountain valleys is there rain-fed farming. Food and Agricultural Organization of the United Nations (FAO), *Irrigation in the Middle East Region in Figurs-Aquastat Survey 2008* (FAO 2009).

[43] Al-Najim (n 39) 96.

[44] Ibid.

[45] Ibid.

[46] Frederick Lorenz and Edward Erickson, *The Euphrates Triangle: Security Implications of the Southeast Anatolia Project* (National Defense University Press 1999) 47.

nations. Iran currently diverts the Tigris River's tributaries through the Tropical Water Project, which is made up of numerous dams and tunnels, before crossing the boundaries of Iraq.[47] According to a Food and Agriculture Organization assessment, Iran began construction of a sizable dam on the Tigris' tributaries in 2004.[48]

The construction of the Daryan dam on the Sirwan River and the Sardasht dam on the Lesser Zab River, both of which flow into the Kurdistan region of Iraq, are the two most recent examples of aggressive dam building along the tributaries of the Tigris River in western Iran. In Khuzestan province, on the Iraqi border farther south, Iran constructed a massive embankment dam, essentially dividing the Hawiza Marshes.[49] Major portions of these wetlands have been completely parched on the Iranian side as a result of the dam construction along the rivers flowing to the Hawiza Marshes, resulting in the dust.[50]

Similar to Turkey, Iran, as an upstream country, has started dam building without assessing its impact on the environment and has failed to apply international standards in constructing these dams and managing them by ignoring the EIA. Here, the negative impacts on Iraq are considerable on the marshlands that are home to rich biodiversity, most of which has been lost due to the drying up of the marshes.

15.3.3 *Previous Iraqi Regimes and Drying up the Marshes*

As well as the negative impacts on dams and water projects in the upstream countries, the previous Iraqi regime deliberately dried up large areas of the marshes in the south of Iraq.[51] The marshlands of Iraq were considered one of the largest wetlands in the Middle East, and one of the ten most important environmental areas on earth, according to UNESCO.[52] The Ahwar supports several criteria related to biodiversity which qualify them to be wetlands of high global importance.[53] These marshes are fed by the branches of the Tigris and Euphrates rivers, in addition to rainfed waters during the winter season and its consequent flooding period.

A portion of the Iran–Iraq boundary passes across the wetlands, and both countries built causeways and drained marshy sections during the 1980s war to improve

[47] Dana Muhammad Faraj, Kawa Z. Abdulrahman, and Nadhir A. Al-Ansari, "The Impact of the Tropical Water Project on the Operation of Darbandikhan Dam" (2022) 36 *Journal of King Saud University-Engineering Sciences* 6, 385.

[48] FAO (n 42).

[49] Kamal Chomani and Tune Bijee, *The Impact of the Daryan Dam on the Kurdistan Region of Iraq* (Save the Tigris and Iraqi Marshes Campaign 2016.

[50] Ercan Ayboga, "Policy and Impacts of Dams in the Euphrates and Tigris Basin" paper for the Mesopotamia Water Forum (2019) Sulaymaniyah, Kurdistan Region of Iraq, 2.

[51] Andrew Lawler, *Reviving Iraq's Wetlands* (American Association for the Advancement of Science 2005).

[52] Al-Najim (n 39) 95.

[53] This recognition was initiated by the inclusion of the Huwaizah Marshes on the Ramsar List in 2006, under five criteria out of nine adopted for the agreement.

access to the front. The Iraqi government began draining the remaining marshes following the first Gulf War and the Shiite Muslim revolt in the south, both of which were unsuccessful, to replace the marsh culture of fishing and rice farming with dry agriculture in order to eliminate the potential of rebellion.[54] To accomplish this goal, the central government began implementing five significant drainage projects to prevent water from the Tigris and Euphrates rivers from reaching the marshes. The region had been heavily polluted by poison gas and army ammunition. As a result, less than 10 percent of the marshes received water supplies by 2000 compared to two-thirds in 1993. Thus, most marsh dwellers were forced to leave their homes, and certain species and flora were gone.[55] The government at the time conducted numerous agricultural projects in the marshlands' dried-out parts to alter the ecology.

Many villages and the plants and animals that lived there were burned when the project was finished. The water was poisoned to kill off all the fish and other aquatic life. The people's primary source of food and money, the rice fields, were also damaged. Due to this operation, 500,000 marshland residents moved to other Iraqi cities or sought asylum in other nations. As a result, the marshes have turned saline and are unusable for farming due to frequent sandstorms.[56] After the fall of the Saddam regime in 2003, the Iraqi government, with the help of other countries and international organizations, started restoring and rehabilitating the Iraqi marshes.[57] The Ahwar of southern Iraq are located in an arid climate; these wetlands are home to a variety of biologically significant ecosystems, including those that support vulnerable species with major conservation and research value. It is one of the most significant freshwater ecosystems in the world.[58]

Because they are major wetlands for the area and the world and our only remaining connection to the ancient Mesopotamian civilizations of the Sumerians, Babylonians, and Assyrians, the destruction of the Mesopotamian marshlands is one of the biggest humanitarian and environmental challenges facing Iraq.[59] It requires both an immediate and long-term planning response in order to restore the marshlands sustainably.[60] It should be regarded as the top environmental priority in Iraq, requiring a management strategy and significant assistance from international donor nations, international organizations, and nongovernmental organizations (NGOs).

[54] Lawler (n 51).
[55] Sam Kubba, *The Iraqi Marshlands and the Marsh Arabs: The Ma'dan, Their Culture and the Environment* (Trans Pacific Press 2011).
[56] Ibid.
[57] Nadhir Al-Ansari, "Management of Water Resources in Iraq: Perspectives and Prognoses" (2013) 5 *Engineering* 8, 667.
[58] Ibid.
[59] Ibid.
[60] Abdul Hameed M. Jawad Al Obaidy, "The Challenges of Water Sustainability in Iraq" (2013) 31 *Engineering and Technical Journal* 828.

15.3.4 *The Negative Impacts of Dam Building on a Downstream Country (Iraq)*

Dam building and operation have serious negative effects on the environment and society. In Syria and Iraq, people began to settle along the middle and downstream lengths of the Euphrates and Tigris around 6,000 years ago, which prompted the development of irrigation systems there. The two rivers originate in upper Mesopotamia, where there is abundant precipitation, then flow into central and lower Mesopotamia, where there is little precipitation and insufficient moisture for agriculture.[61] The Tigris and Euphrates rivers and their tributaries provide almost all of the water needed for domestic, industrial, and agricultural purposes.

Access to water in Iraq is significantly impacted by river diversions or flow decreases brought on by dam construction in Turkey and Iran.[62] People in Iraq and northeastern Syria suffer as a result of the GAP's construction, as back-water irrigation is directed into the main channel in its upstream reaches, resulting in a decrease in water quantity and quality.[63] As a result of damming, numerous archaeological sites have already been inundated, but the number of primarily threatened archaeological sites is still unknown because of insufficient assessments of the river valley.[64]

Another issue Iraq is dealing with is salinity. The upstream nations in the Euphrates and Tigris basin are seen to be the main contributors to Iraq's declining water quality by damming and implementing irrigation projects, which slowly raise the water's salinity while reducing its flow.[65] Farmers and fishermen have been adversely affected by salinity, particularly in southern Iraq, where many fish species cannot live due to the salinization of the water.[66] As a result of the farm and agricultural land reduction, intensive dust storms have taken place, climatic changes have been noticed, and higher temperatures are to be expected, and as a consequence regional environmental effects will appear.[67]

[61] Qaraman Hasan, Sarkawt Ghazi Salar, Durgeshree Raman, Sam Campbell, and Ibrahim Qasim Palani, "When the Law Is Unclear: Challenges and Opportunities for Data and Information Exchange in the Tigris–Euphrates and Indus River Basins" (2023) 8 *Water Policy* 25, 780.

[62] Nadhir Al-Ansari and Sven Knutsson, "Toward Prudent Management of Water Resources in Iraq" (2011) 1 *Journal of Advanced Science and Engineering Research* 63.

[63] Ibid.

[64] Mesopotamia has a universally great cultural heritage and human history dating back 12,000 years when in the upper regions the first human settlements were established. Around 4000–3500 BC the first big civilizations were founded by the Sumerians.

[65] The FAO delegate in Iraq reported that the flow of the country's major rivers had decreased by about 40 percent. The "drop in water delivered downstream from dams constructed in the riparian state, Türkiye," according to the FAO, was cited as a contributing factor in the decreased flow. FAO Representation in Iraq, Drought Situation in Iraq, Submitted to the UN SC661 Committee (May 28, 2000).

[66] Al-Ansari et al. (n 31) 103.

[67] V. Sissakian, N. Al-Ansari, and S. Knutsson, "Sand and Dust Storm Events in Iraq" (2013) 5 *Journal of Natural Science* 10, 1084.

As well as surface water, groundwater suffers from serious issues. It is expected that groundwater levels will drop further due to the reduction of infiltrated water from the rivers. This will have tremendous effects on the electricity supply and will have severe consequences on irrigation and industrial projects.[68] Further, it is likely that the electricity demands will be covered by the use of oil-heated power plants, thus increasing the emission of greenhouse gases such as carbon dioxide.[69]

In addition, desertification is a major environmental and development problem in Iraq, which is caused by damming due to the decline of water flow of the Tigris and Euphrates rivers, the repeated frequency of drought, water quality degradation, and increasing soil salinity. As desertification leads to lower levels of organisms, it contributes to significant biodiversity loss compared to productive land. Large parts of Iraq have become deserts while it used to be productive farmland. Officials claim that in the last three decades, Iraq has lost most of its agricultural land, which has turned to desert.[70] The increase of desert areas caused frequent sand or dust storms, so the dusty days escalated from twenty-four days in the year between 1950 and 1990 to 200–220 days in a year in 2008–2009. This situation will deteriorate with the reduction of vegetation and palm trees due to the decrease of the Euphrates annual flow as a result of dam construction by Turkey.[71]

Furthermore, the annual individual share of freshwater is another substantial environmental challenge. Iraqi officials and researchers claim that for a decade between 2009 and 2018, the individual share of fresh water has decreased dramatically, mainly due to the dam building by Turkey.[72] The drying of wetlands is another negative impact of dam construction by the upstream countries; due to filling the dams of the GAP, some of the Iraqi marshlands have lost about 55 percent of their area since the construction of the GAP.[73]

In recent years, the Tigris and Euphrates rivers' flow has taken on a significant amount of importance. In order to prevent further tensions in the Middle East, the growing demands for water by riparian nations would likely result in significant

[68] For instance, research has shown that due to the WTP construction, about 48.4 percent of the power generation capacity of the Darbandikhan dam will be lost and the water surface elevation in the reservoir would be significantly affected. See Dana Mohammed Faraj et al., "The Impact of the Tropical Water Project on the Operation of Darbandikhan Dam" (2022)36 *Journal of King Saud University - Engineering Sciences* 6, 385.

[69] Al Ansari and Knutsson (n 62).

[70] Republic of Iraq, Ministry of Environment, "Sixth National Report to the Convention on Biodiversity" www.undp.org/iraq/publications/sixth-national-report-convention-biodiversity accessed January 31, 2024.

[71] Al Ansari and Knutsson (n 62) 62.

[72] Republic of Iraq, "Environmental Statistics for Iraq 2021" (Agricultural Indicators) A report by the Central Statical Organizations (CSO) (2022) https://cosit.gov.iq/ar/env-stat/envi-stat (in Arabic) accessed January 31, 2024.

[73] H. Salmabadi and M. Saeedi, "A Real Fluctuations Monitoring of Al-Azim/Al-Havizeh Wetland during the 1986–2017 Period Using Time-Series Landsat Data" The Second International Conference on Strategic Ideas for Architecture Urbanism Geography and Environment (2018) Mashhad Iran.

disputes in the near future so there is a need for more global attention.[74] These ecosystem services will continue to break down if the basin maintains its current pattern of poor management and in the absence of comprehensive agreements on resource sharing, which will result in enormous biodiversity losses to the region's economies and to the livelihoods of the citizenry living within the basin.[75]

15.4 INTEGRATING BIODIVERSITY INTO EIA: LEGAL GAPS AND RESPONSES

Although the majority of the papers and reports that are released by the United Nations water, environment, and agricultural organizations focus on the effects of drought, which is related to global climate change as a primary cause behind the catastrophic environmental problems and biodiversity loss in Iraq, it is not a coincidence that since the 1970s, the drought level has increased dramatically in Iraq, even without significant changes in the temperature and precipitation in the country. Overall, the upstream and downstream countries of the Euphrates and Tigris basins ignored and did not apply the EIA prior to building mega-dams on the two rivers, which is the main reason for the detrimental impact of water flow reduction and biodiversity loss. Many signs of biodiversity loss have been already observed in the basin, including loss of vegetation cover and agro-diversity, wildlife displacement, and ecological connectivity.[76] Long-standing environmental problems in the MENA region generally include (1) water shortage and quality, (2) land degradation and desertification, (3) coastline deterioration, and (4) urban and industrial pollution, which only vary in extent and severity between countries.[77]

15.4.1 *Legal Gaps: Legislation that was Never Fully Implemented*

Weak regulatory and enforcement frameworks exacerbate these issues, which have a significant negative economic impact and environmental harm. In accordance with some of these nations' existing environmental legislation, such as Article 2872 of the Republic of Turkey's Environmental Law of 1983, the EIA should be considered before any mega-dam development.[78] However, the law does not provide a clear guide for actually implementing the EIA and how the EIA process should be enacted and executed outside Turkey. Additionally, according to the Environmental Protection and Enhancement Law of 1974, which designates the Department of

[74] Al-Najm (n 39) 99.
[75] Al-Oubedi and Kilic (n 41) 13.
[76] Nasrat Adamo, Nadhir Al-Ansari, and Varoujan Sissakian, "How Dams Can Affect Freshwater Issues in the Euphrates–Tigris Basins" (2020) 10 *Journal of Earth Sciences and Geotechnical Engineering* 43.
[77] Karma el-Fadel Muatasem El-Fadel, "Comparative Assessment of the EIA in the MENA Countries Challenges and Prospects" (2004) 24 *Environmental Impact Assessment Review* 553.
[78] Environment Law, Law No. 2872 of 1983, published in: 18132 Official Gazette of the Republic of Türkiye (August 11, 2008).

Environment as the regulatory authority overseeing EIA, specific EIA requirements and procedures are established in Iran.[79] This law states that any action that could have a significant adverse effect on the environment may only be approved after an EIA has revealed its effects. It will look into the proposed measure's geophysical, social, and cultural repercussions as well as its effects on flora, fauna, and habitats; transboundary effects are not included.

An analysis of domestic law reveals that the Euphrates–Tigris riparian states, particularly Turkey and Iran, used EIA as a local regulatory tool without considering the diverse effects outside their borders. Nevertheless, only Syrian law expressly requires the consideration of transboundary consequences. Article 14 of Decree 225/2008 addresses potential transboundary effects.[80] The extent to which the proposed policy's transboundary effects must be considered by the competent authorities when determining whether or not it is environmentally acceptable and is still up for debate. How much the Syrian government takes into account transboundary implications while making decisions is unknown.

Federal Law 27/2009 is the main piece of environmental protection legislation in Iraq. Prior to the adoption of measures that are likely to have a major impact on the environment, an EIA must be undertaken, according to Article 10 of the legislation.[81] However, it does not mandate that transboundary effects be considered. Furthermore, Federal Law 27/2009's provisions are still quite ambiguous, and federal legislators have not yet approved any follow-up regulations that would clarify EIA obligations or procedures and it does not provide sufficient detail on the various steps and issues involved in conducting the EIA process. Also, there is a lack of legal provision for strategic environmental assessment.

Furthermore, the countries bordering the Euphrates–Tigris river system are not signatories to any international agreements that would oblige them to carry out transboundary EIAs before deciding on a course of action that might have a significant impact on the Euphrates–Tigris river system. Additionally, regional agreements only cover particular geographic regions.

Overall, the bulk of developing countries' failure to implement the EIA process successfully is attributed to a lack of competent implementation or political will, which is the primary cause of the EIA process failing in the MENA region, as it is in the majority of developing nations where there is still a wide gap between what is really done in practice and what is perceived to be true about EIAs despite significant improvements in law and policy. Although this is insufficient on its own to make the system functional, the fact that there are numerous regulations and an

[79] Environmental Protection and Enhancement Law of 1974, published in: 8592 Official Gazette (April 6, 1974).

[80] Decree No. 225 of 2008 on Executive Procedures for Environmental Impact Assessment in the Syrian Arab Republic (Decree 225/2008).

[81] Law for the Improvement and Protection of the Environment, Federal Law No. 27 of 2009, published in: 4142 Official Gazette of the Republic of Iraq (January 25, 2010).

administrative framework may be considered one asset of the EIA system in Iraq and the MENA region. There are a number of defects and problems with the EIA system in the MENA region that are typically commensurate with flaws in many developing nations.

Wide-ranging challenges are encountered when implementing EIA in the MENA region. First is the lack of meaningful public involvement at all levels of the EIA process as well as ongoing environmental ignorance. Developers make an effort to avoid public input. For instance, the GAP case reports have found that those still resident in the reservoir area and those already displaced by conflict do not appear to have been consulted about the dam.[82] The same concerns have been raised about theTropical Water Project (TWP) WTP dam construction in Iran.[83]

A second key challenge to implementing the EIA process effectively is the unavailability and inaccuracy of data defining environmental baseline conditions. Thus, decisions about effect evaluation are based more on personal judgment than on scientific research and prediction. As in the GAP dam construction reports found, due to security concerns in the area, it is doubtful that a comprehensive assessment of historic, cultural, or spiritual sites could occur in any of the reservoir regions.[84]

Third is the lack of a national policy culture that encourages EIA implementation and application and acknowledges the dedication, administrative infrastructure, and methodological resources at the necessary levels.[85] A lack of clear and comprehensive national strategies on evaluating biodiversity risks in mega-projects often result in inconsistency in evaluating biodiversity risks in EIA reports which could have an impact on programs, plans, and policies.[86] Furthermore, in practice, the EIA screening and scoping are typically focused on the possible effects of a single proposed project, ignoring the cumulative environmental effects of multiple projects in the same area on biodiversity and nature conservation.[87] There is a need for clear and comprehensive guidelines on the nature and extent of specific biodiversity-related scoping and screening that should be done to identify, address, and prevent biodiversity and nature risks in mega-projects.

Fourth is the inadequacy of regulatory fines and sanctions relating to EIA infractions in the MENA region generally. For example, the lack of clear and comprehensive EIAs in the case of dam construction of the Euphrates–Tigris basin are mostly

[82] Maggie Ronayane, *The Cultural and Environmental Impacts of Large Dams in Southeast Türkiye, Fact Finding Mission Report* (University of Ireland and Kurdish Human Rights Association February 2005) 5.

[83] Fatemeh Khosravi, Urmila Jha-Thakur, and Thomas B Fischer, "The Role of the Environmental Assessment EA in the Iranian Water Management" (Environmental Assessment and Management Research Centre, School of Environmental Science, University of Liverpool 2018) 9.

[84] Ronayane (n 82) 38.

[85] Ibid. Also Olawuyi (n 5).

[86] Ibid.

[87] Khosravi et al. (n 83) 10.

caused by a lack of harsh enough sanctions for noncompliance with EIA legislation and policies. Such inadequacy or nonenforcement of regulatory sanctions are often tied to political pressure, with research indicating the potential for governments in some countries to prioritize economic development over the environment.[88]

15.5 ENHANCING BIODIVERSITY THROUGH COMPREHENSIVE EIAS

Dam construction under the GAP Plan, Tropical Water Project in Iran, and other projects in both Iraq and Syria should not be continued without undertaking EIAs to avoid further environmental issues and biodiversity loss. If they continue, they would cause political turmoil and misery for millions with considerable biodiversity loss in Syria and Iraq. Baghdad now has little influence over its neighbors in the region and scant resources to repair its deteriorating water systems in the post-ISIS environment due to years of turmoil and internal conflict. A comprehensive plan to address the nation's environmental issues has not been developed due to weak IEL in the region. Currently, the Ministry of Water Resources is battling to reconcile the conflicting demands for water for irrigation, drinking, industry, and hydroelectricity while some of the nation's hydrological infrastructure is still damaged by fighting or militant activity.

However, biodiversity protection in the ancient basin should not be less prioritized among riparians and proper implementation of all stages of the EIA is the first and crucial step to achieving most of the environmental goals in the region. It is suggested that these nations get through the challenges they are facing when using EIA because a successful and efficient implementation of the tool could be the answer for the Euphrates and Tigris basin countries.

To maximize the full value of EIA as a tool for advancing biodiversity and nature conservation, there is a need for comprehensive legislation that mandates the transparent conduct of EIAs prior to the approval or commencement of any mega-project with a potential impact on biodiversity. All development plans, programs, initiatives, and projects must be based on comprehensive EIAs that address all potential environmental and social risks, including risks to water bodies. EIA legislation, like other environmental regulations, should be precise about how enforcement is to take place and should be unambiguous about what constitutes effective penalties.

Second and related to this is the need for a national policy environment that encourages the use of EIAs and acknowledges the commitment, administrative and methodological infrastructure, and resources at the necessary levels. Such policies would elaborate the need for effective public engagement during the EIA process, as any EIA process is unlikely to be successful without productive engagement with potentially affected stakeholders. In addition to conducting targeted vulnerability assessments to determine potential risks to marginalized and at-risk groups such as

[88] Khosravi et al. (n 83) 13.

women, youth, and indigenous groups, there is also a need to ensure that all pertinent points of view are taken into account throughout. The scoping and review phases of the EIA process need effective engagement with regulatory agencies, stakeholders, and the general public. Furthermore, NGOs, academic institutions, and organizations that are impacted must be adequately consulted and enabled to participate in EIA processes.

Third, after the necessary scoping on biodiversity risks, consideration of mitigation measures should be given to each impact individually and collectively. For example, in instances of heightened risks of biodiversity loss in marginalized communities and areas, there is a need for tailored programs to address such adverse impacts. Additionally, mitigation must take into account the role of technologies to gather data on biodiversity risks and to monitor the implementation of mitigation measures.[89] Digital technologies, "such as Environmental Systems Research Institute (ESRI) StoryMaps, purpose-built web-solutions and bespoke-built websites,"[90] can also ensure that EIA reports are produced and disseminated in a manner that is accessible to the general public, through the use of local languages and reporting approaches that aid public awareness and knowledge.

Fourth is the need for improving capacity building on the design and implementation of EIA programs. As awareness on environmental law increases across the MENA region, there is a need to ensure tailored education programs on biodiversity conservation and management with a focus on environmental planning through EIAs.[91] Critical to promoting awareness on EIAs is the need for MENA universities to ensure the teaching of environmental law-related courses as core courses in bachelors, masters, juris doctor and doctoral research programs. Furthermore, there is a need for executive certificates and courses on EIA design and implementation in order to promote practical knowledge and best practices on EIA reporting, EIA data collection and dissemination using digital technologies, and avoiding social exclusions in the design and implementation of EIAs. Such certificate programs can enhance continuous professional development and in-house training, thereby increasing the number of EIA professionals, as well as on promoting environmental awareness needed to avoid biodiversity risks in mega-projects.

15.6 CONCLUSION

Despite prevailing ambiguities and uncertainties in the legal enforcement mechanisms, EIAs remain important tools for averting and addressing biodiversity risks relating to mega-projects, especially infrastructure developments such as the GAP

[89] Laurel Northmore and Malcolm D. Hudson, "Digital Environmental Impact Assessment: An Exploration of Emerging Digital Approaches for Non-Technical Reports" (2022) 92 *Environmental Impact Assessment Review* 106689.

[90] Ibid.

[91] See Chapter 17.

project in Turkey, the Tropical Water Project in Iran, and drainage projects in Iraq that have adverse impacts on the biodiversity of river basins. The transboundary environmental issues raised by these projects have the potential to destabilize an already tense region further. Compliance with the requirements of international biodiversity law and policy with regard to EIAs and environmental planning can serve as a foundation for discussions, and policymakers should be aware of the ground rules well before the crisis develops further. An international agreement is urgently needed to handle the issue of distributing the Tigris and Euphrates rivers' water supplies among the riparian nations fairly and equitably to avoid other interconnected environmental issues such as biodiversity loss.

Additionally, none of the riverine nations, especially the upstream hegemons, should be permitted to continue freely constructing huge dams and using the water from the two rivers without EIAs and in defiance of earlier IEL. No riparian state along the Euphrates–Tigris has publicly stated their stance on the need for a transboundary EIA. All riparian states should hold bilateral and multilateral negotiations on dam activities and integrating an EIA. When new projects are being planned or implemented, international development and financing entities helping with water infrastructure projects in the Euphrates–Tigris basin should ensure that environmental and impact evaluations are undertaken prior to the commencement of such infrastructure development activities.