



The Journal of Sustainable Development Law and Policy



ISSN: 2467-8406 (Print) 2467-8392 (Online) Journal homepage: <https://www.ajol.info/index.php/jsdlp>

Advancing Sustainable Seawater Desalination in the Persian Gulf: Opportunities and Challenges under the Kuwait Convention 1978

Mahnaz Rashidi

To cite this article: Mahnaz Rashidi (2024). Advancing Sustainable Seawater Desalination in the Persian Gulf: Opportunities and Challenges under the Kuwait Convention 1978. *The Journal of Sustainable Development, Law and Policy*. Vol. 15:2. 141-161. DOI:10.4314/jsdlp.v15i2.6

To link this article: DOI:10.4314/jsdlp.v15i2.6



Received: 05 March, 2024

Final Version Received: 15 May, 2024

Published online: 30 August, 2024

Full Terms & Conditions of access and use can be found at
<https://www.ajol.info/index.php/jsdlp>

ADVANCING SUSTAINABLE SEAWATER DESALINATION IN THE PERSIAN GULF: OPPORTUNITIES AND CHALLENGES UNDER THE KUWAIT CONVENTION 1978

Mahnaz Rashidi* 

ABSTRACT

Seawater desalination has emerged as a viable solution, notably utilized by many Persian Gulf littoral countries facing severe water shortages and aiming to achieve the targets of the sustainable development goal 6 regarding ensuring availability and sustainable management of water and sanitation for all. However, desalination comes with costs and can adversely impact marine ecosystems. Conserving and sustainably using oceans, seas, and marine resources is one of the sustainable development goals (Goal 14), and unmanaged use of desalination plants in the Persian Gulf Coasts can threaten this goal. Therefore, moving towards a sustainable process of seawater desalination in this region requires the promotion of cooperation, including through the effective implementation of existing multilateral environmental agreements (MEAs). Based on this, the main question of this paper is: what are the opportunities and challenges of the Kuwait Convention (1978) in advancing sustainable seawater desalination in Persian Gulf? The results of descriptive and analytical studies based on library resources in this research indicate that the provisions concerning the prevention, control and combating of land-based pollution, as well as requirements for environmental impact assessments, are the most significant opportunities provided by this instrument. However, the lack of direct obligations regarding the management of seawater desalination and non-existence of effective compliance mechanisms are the challenges of this convention. To address these challenges, adopting a seawater desalination management guideline under ROPME, promoting international cooperation, sharing experiences and knowledge related to innovative technologies and empowering compliance mechanisms under this convention are the essential recommendations for the effective implementation of the Kuwait Convention towards sustainable seawater desalination in the region.

Keywords: Water Stress, Seawater desalination, Sustainable development Goals, Kuwait Regional Convention

1. INTRODUCTION

Although water covers three-quarters of the world's surface, freshwater remains a scarce resource.¹ Approximately 97.5 % of earth's water is saline, found in oceans, while only 2.5% exists as freshwater in groundwater, lakes, rivers and glaciers.² Unequal distribution of freshwater resources, coupled with population growth, industrialization, urbanization and climate variations has led to water scarcity, particularly in regions like the Middle East and North Africa (MENA).³

In pursuit of cleaner and more accessible freshwater resources, countries have adopted new water extraction technologies, such as seawater desalination, atmospheric water generation, and cloud seeding. The utilization of these methods, particularly seawater desalination, has increased significantly in Persian Gulf countries. In this region __an extremely arid area with an average rainfall of less than 100 mm per year and very high evaporation rates exceeding 3000 mm per year__ the countries face severe water shortage problems. Consequently, the development of desalination lies at the core of plans for combating water scarcity in the vast majority of countries.⁴

Desalination refers to the process of producing purified drinking water from saline water by removing salts and minerals. It can be utilized for both seawater and brackish water.⁵ Presently, 45% of global freshwater desalination production is concentrated in the Persian Gulf, housing the

* Assistant Professor, Law Department, Faculty of Human Science, Shahed University, Tehran, Iran Email: mahnazrashidi88@gmail.com; ma.rashidi@shahed.ac.ir.

¹ Juha Uitto, 'Global Freshwater Resources' (2001) in Matti Palo, Jussi Uusivuori and Gerardo Mery (eds), *World Forests, Markets and Policies* (Kluwer Academic Publisher) 68.

² Mahmoud Shatat and Saffa B. Riffat, 'Water Desalination Technologies Utilizing Conventional and Renewable Energy Sources' (2014) 9 *Int. J. Low-Carbon Technol* 1, 1.

³ Wondimu Music and Girma Gonfa, 'Fresh Water Resource, Scarcity, Water Salinity Challenges and Possible Remedies: A Review' (2023) 9 *Heliyon* 1, 6.

⁴ Marc-Antoine Eyl-Mazzega and Élise Cassignol, 'The Geopolitics of Seawater Desalination' (2022) *Études de l'Ifri*, Ifri 1, 13.

⁵ Buzaina Moossa and others, 'Desalination in the GCC Countries- A Review' (2022) 357 *J. Clean. Prod* <www.sciencedirect.com/science/article/abs/pii/S0959652622013300?via%3Dihub> accessed 25 November 2023.

largest desalination plant complexes worldwide.⁶The first desalination plants on the Persian Gulf coast were established in Kuwait and Qatar in 1953, with a combined output of 5000 m³ per day.⁷ Nowadays, the production of drinking water in the majority of Persian Gulf countries depends on desalination of seawater: in the United Arab Emirates (UAE), 42% of drinking water comes from desalination plants producing more than 7 million m³ per day; in Kuwait, it is 90%; in Oman, 86%; and in Saudi Arabia 70%.⁸ Iran also has plans to build desalination plants, with an estimated capacity of 634,000 m³ per day.⁹ Studies indicate that the current production capacity of seawater desalination plants drawing water from Persian Gulf countries is over 20 million m³ per day, which may rise to 80 million m³ per day by 2050.¹⁰

Ensuring the availability and sustainable management of water and sanitation for all is a key Sustainable development goal (SDG) outlined in the General Assembly Resolution 70/1 (2015).¹¹ Seawater desalination is seen as a means to achieve this goal; however, concerns exist regarding its adverse effects on the marine environment. Despite its benefits, Seawater desalination poses environmental challenges. The discharge of brine into the Persian Gulf waters from seawater desalination raises concerns about its impact on marine ecosystems. Studies conducted by Lattemann and Höpner (2008) highlight issues such as increased salinity and temperature, altered nutrient balance, and the potential harm to marine organisms due to brine discharge. Additionally, desalination is energy-extensive, leaving a significant carbon footprint. The energy required for desalination constitutes a substantial portion of total energy consumption in Gulf countries, contributing significantly to greenhouse gas emissions.¹² Given that SDG 14 aims to conserve and

⁶ Francesco Paparella, Daniele D'Agostino and John A. Burt, 'Long-term, Basin-scale Salinity Impacts from Desalination in the Arabian/Persian Gulf' (2022) 12 *Scientific Rep* 1, 1.

⁷ W.J.F. Le Quesne and others, 'Is the Development of Desalination Compatible with Sustainable Development of the Arabian Gulf?' 173 (112940) *Mar. Pollut. Bull* 1, 2.

⁸ Eyl-Mazzega and Cassignol (n 4) 3.

⁹ '75 Water Desalination Plants Operating Across Iran', (Teheran Times, 2 August 2022) <www.tehrantimes.com/news/475292/75-water-desalination-plants-operating-across-iran> accessed 24 November 2023.

¹⁰ Eyl-Mazzega and Cassignol (n 4) 1.

¹¹ UNGA, 'Transforming Our World: the 2030 Agenda for Sustainable Development' UN GOAR 70th Session UN Doc A/Res/70/1 (2015), Goal 6.

¹² Shayma Al Bannay and Satoshi Takizawa, 'Decoupling of Water Production and Electricity Generation from GDP and Population in the Gulf Cooperation Council (GCC) Countries' (2022) 14(5386) *Sustainability* 1, 3.

sustainably utilize oceans, seas and marine resources, and considering the Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution (1978) (Kuwait Convention) as the main multilateral environmental agreement (MEA) on conservation and protection of Persian Gulf marine environment, a pertinent question arises: “What are the opportunities and challenges of Kuwait Convention 1978 in advancing sustainable seawater desalination in the Persian Gulf region?”

As a premise, the Kuwait Convention plays an important role in preventing, controlling and combating marine pollution, especially pollution from seawater desalination plants. However, empowering effective implementation of this instrument and establishing compliance mechanisms for this convention is necessary in advancing sustainable seawater desalination processes.

For the mentioned aim, this article is structured into five parts:

After this introduction, in the second part, by describing the necessity of sustainable desalination of seawater in the region, the meaning, nature and scope of effective MEA implementation will be explained. In the third Part, the opportunities and challenges of effective implementation of the Kuwait Convention as a tool for promoting sustainable seawater desalination will be evaluated. Then, after presenting the practical recommendations, the conclusion will be expressed.

2. TOWARDS SUSTAINABLE SEAWATER DESALINATION IN THE PERSIAN GULF BY EFFECTIVE IMPLEMENTATION OF MEAs

2.1 Necessity of Sustainable Seawater Desalinations in the Persian Gulf

In the 1970s, factors such as the increasing intensity of environmental degradation, destruction of natural resources, poverty, and others led states to understand the effects of human activities on the environment. As a result, the idea of sustainable development was introduced in international law to achieve human development.¹³ This concept was first publicized in a report

¹³ Christina Voigt, *Legal Aspects of Sustainable Development: Sustainable Development as a Principle of International Law*, Vol. 2 (Martinus Nijhoff Publishers, 2009) 13.

entitled “Our Common Future”¹⁴ submitted by Gro Harlem Brundtland, Norway's then-prime minister, to the UN General Assembly in 1987. This report advocated for sustainable development as the basis for any human economic activity, focusing on serious concerns regarding the environment and its connection with efforts to improve the level of life for the poor worldwide.¹⁵ The introduction of Sustainable development to global environmental management occurred when the UN General Assembly called for a conference on the environment and development. This conference was eventually held in Rio De Janeiro in 1992, marking the 20th anniversary of 1972 Stockholm Conference. It resulted in the reexamination of and emphasis on the concept of sustainable development in the field of international law.

Currently, there are numerous definitions for sustainable development. However, the most prevalent definition is implicitly mentioned in the Brundtland's Report. According to this report, “humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs”.¹⁶ Consequently, sustainable development seeks not only to achieve the highest level of socio-economic well-being for the present generation, but also aims to ensure suitable conditions for subsequent generations by preserving the environment. Thus, the reasonable use is the cornerstone of sustainable development.

Sustainable development, introduced with the goal of coordinating economic activities, social development and environmental preservation, comprises three fundamental dimensions: social, economic and environmental. The social dimension focuses on enhancing individuals' well-being through securing access to health, educational services and eradication of poverty. The economic dimension is related to economic variables including the optimal use of natural resources and the fair distribution of resulting benefits. Last but not least, the environmental dimension addresses the preservation and promotion of physical, biological and ecosystem resources.¹⁷

¹⁴ UNGA ‘Report of the World Commission on Environment and Development’ UN GAOR 42th Session UN Doc A/42/427 (1987).

¹⁵ Farhad Dabiri, Yalda Khal'atbari and Sahar Zare'ei, ‘Access to Sustainable Development from the Perspective of International Environmental Law’ (2018) 16 *Journal of Human and the Environment* 63, 64. [In Persian]

¹⁶ UNGA (n 14) 27.

¹⁷ Dabiri and others (n 15) 65.

Therefore, the relationship between water and sustainable development is fundamental and multifaceted. Water is a principal component of sustainable development and serves as a vital tool for socio-economic development, a healthy environment, and the survival of human life.¹⁸ Sustainable development encompasses two main elements: one involves directing the development process towards meeting the basic needs of human beings, and the other involves limiting development in a manner that takes into account the needs of future generations.¹⁹ Water, due to its multifaceted nature, holds various interests. Apart from its role in drinking and human survival, all activities including food production, agriculture, energy creation, resources exploitation, industrial development, ecosystem maintenance depend on it.

Consequently, ensuring sustainable development— meaning socio-economic development along with the preservation of the environment for future generations— is impossible without adequate quantities of clean water. Accessibility to reliable water resources in the short, medium and long terms is crucial.²⁰

Water is essential for energy production and economic development, and access to adequate quantities of clean water is indispensable for maintaining health, improving literacy levels, eradicating poverty, and combating contagious diseases, contributing social development. Recognizing this significant mutual relationship, the international community has highlighted solutions to water problems and the establishment of water security as strategies for achieving sustainable development in instruments such as the United Nations Millennium Declaration (2000)²¹ and Sustainable Development Goals (2015).²²

¹⁸ United Nations Department of Economic and Social Affairs (UNDESA), 'Water for Life Decade: Water and Sustainable Development' (n. d) <www.un.org/waterforlifedecade/water_and_sustainable_development.shtml> accessed 15 November 2022.

¹⁹ Mohammadreza Jahanipour and Ahmadreza Touhidi, 'Position of "Sustainable Development" in International Law with Emphasis on States Practice' (2021) 51 PLSQ 641, 645. [In Persian]

²⁰ Asit K Biswas and Cecilia Tortajada, *Water Security, Climate Change and Sustainable Development*, (Springer, 2016) 2.

²¹ UNGA 'United Nations Millennium Declaration' UN GAOR 55th Session UN Doc A/55/L.2 (2000), 19, 23.

²² UNGA (n 11) Goal 6.

Based on this understanding, Goal 6 of the SDGs is dedicated to ensure access to water and sanitation for all. One of the targets for this goal stipulates ensuring sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity (Target 6.4). According to this Goal and recognition of the inseparable relationship between the right to water, the right to an adequate standard of living and also the right to the highest attainable standard of health,²³ States have an obligation to respect, protect and fulfill the right to water. This means that States should refrain from directly or indirectly interfering with the enjoyment of the right to water; prevent third parties from interfering in any way with this right, and facilitate, promote and provide sufficient clean water.²⁴

In pursuit of implementation these obligations, states have resorted to various methods to supply the required water. Seawater desalination is an increasingly popular solution to combat water scarcity, as it can provide fresh water in areas with limited access to clean water.²⁵ For instance, faced with water stress forecasts, MENA States are committing to long-term action plans to increase their capacity for resilience in the face of water stress.

As noted by UNEP, unconventional water resources, such as desalination water play a key role in supporting the SDGs, particularly Goal 6. Seawater desalination can extend water supplies beyond what is available from the hydrological cycle, but innovation in brine management and disposal is required.²⁶

However, there are concerns about the adverse impacts of desalination on other SDGs. Notably, Goal 14 aims to address the need for the sustainable use and conservation of life below water: “Conserve and sustainably use the oceans, seas and marine resources for sustainable development”. To achieve this goal, the General Assembly has set various targets, including Target 14.1 which aims to “[b]y 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris

²³ UN Committee on Economic, Social and Cultural Rights (CESCR), General Comment No. 15: The Right to Water (Arts. 11 and 12 of the Covenant), 20 January 2003, E/C.12/2002/11, para. 3

²⁴ Ibid 20-29.

²⁵ Haya Nasrullah and others, ‘Energy for Desalination: A State-of-the-art Review’(2020) 491(114569) *Desalination* 1, 2.

²⁶ ‘Five Things to Know about Desalination’ (UNEP, 11 January 2021) < www.unep.org/news-and-stories/story/five-things-know-about-desalination > accessed 23 November 2023.

and nutrient pollution”, Target 14.2 aiming to “[b]y 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration, to achieve healthy and productive oceans” , and Target 14.3, which seeks to “[m]inimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels”. Despite the various benefits of seawater desalination, concerns have been raised about its adverse impacts on marine ecosystems, particularly in the Persian Gulf.

The Persian Gulf, a shallow semi-enclosed basin, is characterized by extreme conditions due to its location, bathymetry, and restricted circulation. The average summer sea surface temperature is 33 °C, reaching maxima of over 36 °C in the southern basin, with salinities exceeding 43 ppt in parts of the Gulf. Despite these characteristics, the Persian Gulf is crucial for biodiversity conservation, including globally significant species and habitats such as coral reefs, seagrasses and mangroves. Furthermore, the Persian Gulf plays a vital role for littoral countries in terms of providing food, supporting a growing tourism industry, and offering locations for recreation and leisure.²⁷

Scientific studies have revealed that desalination activities are the key drivers of marine pollution, especially in the Persian Gulf. Sharifinia et al. (2019) have indicated that the rapid growth in the number of desalination plants in the Persian Gulf will cause ecological stress by increasing water temperatures and salinities throughout the region, reducing dissolved oxygen concentrations, and increasing heavy metal concentrations.²⁸ Additionally, research results have shown that increased brine discharge from desalination plants will reduce plankton biomass, species diversity, and richness in the Persian Gulf.²⁹ Most desalination plants use chlorine for water purification, which increases chlorine concentration in their effluents, leading to the formation of hypochlorite and primarily hypobromite in seawater.³⁰

²⁷ Quesne and others (n 7) 3.

²⁸ Moslem Sharifinia, Moslem Daliri and Ehsan Kamrani, ‘Estuaries and Coastal Zones in the Northern Persian Gulf (Iran)’ in Eric Wolanski and others (eds), *Coasts and Estuaries: The Future* (Elsevier Science, 2019) 64.

²⁹ Moslem Sharifinia and others, ‘Prevention Is Better than Cure: Persian Gulf Biodiversity Vulnerability to the Impacts of Desalination Plants’ (2019), 25(12) *Glob Chang Biol* 4022, 4022-4033.

³⁰ Mohamed A. Dawoud and Mohamed M. Al Mulla, ‘Environmental Impacts of Seawater Desalination: Arabian Gulf Case Study’ (2012) 1(3) *IJESD* 22, 29.

Moreover, seawater desalination is an energy-intensive process that can release significant amounts of greenhouse gases.³¹ Recent studies in the UAE have estimated that water desalination and energy production have raised the temperature of the Persian Gulf seawater by 7-8 °C, affecting dissolved oxygen content.³² While water desalination processes are highly energy-intensive and result in significant greenhouse gas emissions,³³ it can be contradicted by SDG 13, which concerns mitigation and adaptation to climate change. Currently, the negative effects of climate change on marine ecosystems have been proven.³⁴

In conclusion, while using seawater to produce freshwater is essential for achieving SDG 6, establishing seawater desalination plants without considering their environmental impacts may hinder the realization of SDG 14. Therefore, sustainable seawater desalination can be achieved by striking a balance between the requirements of these two SDGs in the utilization of desalination processes. In this way, international law by regulating state conduct can facilitate moving towards sustainable seawater desalination, and in this context, the effective implementation of MEAs plays an important role.

2.2 Meaning, Nature and Scope of Effective MEA Implementation

In global environmental governance, defined as “the sum of organizations, policy instruments, financing mechanisms, rules, procedures and norms that regulate the processes of global environmental protection”, MEAs play a prominent role.³⁵ The Food and Agriculture Organization of the United Nations (FAO) has described MEAs as “agreements between three or more states that assist with addressing specific environmental problems at national, regional and global levels”.³⁶

According to this definition, MEAs are legal instruments that have three basic features:

³¹ Eyl-Mazzega and Cassignol (n 4) 4.

³² Dawoud and Al Mulla (n 30) 28-29.

³³ Eyl-Mazzega and Cassignol (n 4) 19.

³⁴ See: Scott. C. Doney and others, ‘Climate Change Impacts on Marine Ecosystems’ (2012) 4 *Ann. Rev. Mar. Sci.* 11, 11-37; Stephanie, A. Henson and others ‘Rapid Emergence of Climate Change in Environmental Drivers of Marine Ecosystems’ (2017) 8(14682) *Nat. Commun.* 1, 1-9.

³⁵ Adil Najam, Mihaela Papa and Nadaa Taiyab, *Global Environmental Governance: A Reform Agenda* (International Institute for Sustainable Development, 2006) 3.

³⁶ FAO, ‘Building Capacity Related to Multilateral Environmental Agreements in African, Caribbean and Pacific Countries (ACP MEAs 3)’ (n.d) < <https://www.fao.org/in-action/building-capacity-environmental-agreements/overview/what-are-meas/en/> > accessed 23 March 2024.

First, they are an “agreement”. This term closely corresponds to the definition of “treaty” in the 1969 Vienna Convention on the Law of Treaties, i. e: “...an international agreement concluded between States in written form and governed by international law...”³⁷. Therefore, MEAs are legally binding. Intergovernmental soft law, such as action plans, agreed measures, codes of conduct, declarations, resolutions, and similar policies, are excluded from the scope of MEAs because they are not binding. Second, MEAs are intergovernmental, meaning they may involve three or more states. The last and most crucial feature of these documents is their “environmental” focus. In other words, the subject of MEAs is typically environmental. However, they also have effects on other areas such as economic, social and political.³⁸

After the entry into force of MEAs, the parties focus on their implementation. Although the implementation of these agreements is done through national legislation and administrative arrangements, some mechanisms in the MEA context can enhance their implementation. These empowering mechanisms include institutions for implementation, reporting, monitoring, and verification, national implementation plans and compliance mechanisms.³⁹

For further explanation, the establishment of a competent body within MEAs to make new decisions within the framework of the agreement and review its implementation is a good solution for effective MEA implementation. The Conference of Parties (COP) in some MEAs, such as the United Nations Framework Convention on Climate Change (UNFCCC), is an example of competent bodies in MEAs. COPs usually consist of representatives of all Parties and often establish “subsidiary bodies” to facilitate the progress of an MEA. For example, the Convention on Biological Diversity (CBD) has a Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA) to make recommendations to the CBD COP.⁴⁰

Some existing intergovernmental organizations play an institutional role in MEAs and provide policy and administrative support to the parties. For example, UNEP serves as the Secretariat for the Convention on International

³⁷ Vienna Convention on the Law of Treaties (adopted 23 May 1969, entered into force 27 January 1980), 1155 UNTS 331, Art. 2(1)(a).

³⁸ UNEP, Auditing the Implementation of Multilateral Environmental Agreements (MEAs): A Primer for Auditors, (UNON Publishing Services Section, 2004) 4-6

³⁹ Ibid 15-24.

⁴⁰ See: Convention on Biological Diversity, ‘Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA)’ (n.d) <www.cbd.int/sbstta> accessed 21 March 2024.

Trade in Endangered Species of Wild Fauna and Flora 1973 (CITES);⁴¹ and the Secretariat of the Ramsar Convention is assisted by the International Union for Conservation of Nature (IUCN).⁴² Another type of institution in MEAs is independent intergovernmental organizations consisting of state parties' representatives. This type of institution is better suited for regional environmental agreements.

Reporting, monitoring, and verification of implementation of MEAs are other mechanisms for increasing the implementation of commitments under MEAs. These efforts can assist state parties in tracking their implementation and compliance with MEA commitments. Reporting involves providing regular and timely reports by state parties on their efforts in conformity with their commitments. Monitoring is defined as gathering data in accordance with the provisions of an MEA to assess compliance with the agreement, and verification may involve acknowledging data and technical information to ascertain whether a Party is in compliance and, in the case of non-compliance, the degree, type and frequency of non-compliance.⁴³

Existence of obligations to provide national implementation plans in MEAs can increase the effectiveness of their implementation. Since national implementation plans seek to promote compliance in a deliberate and proactive manner, they can indicate how state parties strive to comply with MEA obligations and what challenges they face in compliance and implementation.⁴⁴

Inclusion of compliance mechanisms in MEAs is important for the efficiency of these agreements. Given to non-reciprocal nature of environmental obligations and the need to promote, facilitate, and secure compliance, non-compliance can be non-adversarial and non-punitive. Non-compliance in MEAs usually results from a lack of capacity rather than intentional disregard of obligations. For these reasons, the approach to non-compliance in MEAs

⁴¹ CITES, 'The CITES Secretariat' (n. d) <<https://cites.org/eng/disc/sec/index.php>> accessed 21 March 2024.

⁴² The Convention on Wetlands, 'The Secretariat' (n.d), < www.ramsar.org/about/bodies/secretariat> accessed 21 March 2024.

⁴³ UNEP, 'Guidelines on Compliance with and Enforcement of Multilateral Environmental Agreements' (2001) pt. 4, para. 14(c), <<https://wedocs.unep.org/bitstream/handle/20.500.11822/17018/UNEP-guidelines-compliance-MEA.pdf?sequence=1&isAllowed=y>> accessed 21 March 2024.

⁴⁴ UNEP Division of Environmental Conventions, Manual on Compliance with and Enforcement of Multilateral Environmental Agreements (UNEP, 2006) 140.

has generally involved the use of non-compliance means to bring parties into compliance.

Compliance mechanisms in MEAs have various approaches. Some are based on self-reporting of non-compliance, while others use compliance bodies to recognize and assess instances of non-compliance. In some cases, particularly in cases of negligence or insufficient commitment by a party to its obligations, the results of compliance mechanisms may be publicized or considered by the COP to impose sanctions.⁴⁵

3. OPPORTUNITIES AND CHALLENGES OF KUWAIT CONVENTION FOR SUSTAINABLE SEAWATER DESALINATION IN THE PERSIAN GULF

The activities of the international community in establishing MEAs for the management of marine ecosystems can be categorized into two groups: the codification of international treaties and the creation of regional treaties.⁴⁶ Considering the unique conditions of each regional seas, entering into regional treaties stands out as the most effective solution for managing marine pollution. Based on this premise, the littoral countries bordering the Persian Gulf_ Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates_ recognized the necessity of preventing marine pollution in this region and consequently entered into a treaty known Kuwait Convention.⁴⁷ According to this convention, the Regional Organization for the Protection of the Marine Environment (ROPME) was established in 1979 as an intergovernmental organization encompassing all the Persian Gulf countries.

In management of seawater desalinations in the Persian Gulf, the Kuwait Convention has some opportunities and challenges. While this convention not explicitly obligate combatting pollution from seawater desalination, it implies such obligations through both general and specific provisions within its framework. The primary aim of the Kuwait Convention is to “protect the marine environment of the Region for the benefit of all concerned, including

⁴⁵ UNEP (n 38) 21-22.

⁴⁶ Morteza Najafi Asfad and Morteza Darabinia, ‘Performance of Kuwait Regional Convention on Persian Gulf Marine Environment’ (2012) 22(96) J Mazand Uni Med Sci 71, 72 [In Persian].

⁴⁷ Ibid, p. 72.

future generations”.⁴⁸ In pursuit of this objective, the state parties have certain obligations. As general obligations, the parties should, individually and/or jointly, take appropriate measures to prevent, abate, and combat pollution of the marine environment in the Sea Area. They are also expected to collaborate in formulating and adopting other protocols prescribing agreed-upon measures, procedures and standards for the implementation of the convention. Additionally, establishing national standards, laws and regulations as required for effective discharge of the primary obligation, harmonizing national policies, cooperating with competent international, regional, and subregional organizations, and ensuring that the implementation of the convention does not transform one type of pollution into a more detrimental form are among the obligations outlined.⁴⁹ According to this convention, “marine pollution” refers to the introduction by humans, directly or indirectly, of substances or energy into the marine environment that results or likely to result in deleterious effects such as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairment of seawater quality, and reduction of amenities.⁵⁰ This pollution is categorized based on its sources, including pollution from ships, pollution caused by dumping from ships and aircraft, pollution from land-based sources, pollution resulting from exploration and exploitation of the bed of the territorial sea and its subsoil and continental shelf, and pollution from other human activities.

The definition of “pollution from land-based sources” may encompass pollutants from seawater desalination. Article VI asserts: “The Contracting States shall take all appropriate measures to prevent, abate and combat pollution caused by discharges from land reaching the Sea Area whether water-borne, air-borne, or directly from the coast including outfalls and pipelines”. Since most seawater desalination plants are situated on the coasts of the Persian Gulf, the littoral countries where these plants are established within their territorial jurisdiction are responsible for taking appropriate measures to prevent and combat marine pollution caused by them. The term “appropriate measures” encompasses the utilization of the best available technology practiced in any of the Persian Gulf littoral States,⁵¹ the adoption

⁴⁸ Kuwait Regional Convention for Co-Operation on the Protection of the Marine Environment from Pollution (adopted 24 April 1978, entered into force 30 January 1979) preamble.

⁴⁹ Ibid Art. 3.

⁵⁰ Ibid Art. 1(a).

⁵¹ Farhad Nadim, Amvrossios C. Bagtzoglou and Jamshid Iranmahboob, ‘Coastal Management in the Persian Gulf Region within the Framework of the ROPME Programme of Action’ (2008) 51 *Ocean Coast. Manag.* 556, 560.

of required policies, regulations, guidelines, their effective implementation, and continuous monitoring.

Another significant obligation under this convention, which related to management of seawater desalinations, is “environmental assessment”.

Article XI stipulates: “(a) Each Contracting State shall endeavour to include an assessment of the potential environmental effects in any planning activity entailing projects within its territory, particularly in the coastal areas, which may cause significant risks of pollution in the Sea Area. (b)The Contracting States may, in consultation with the secretariat, develop procedures for dissemination of information on the assessment of the activities referred to in paragraph (a) above. (c)The Contracting States undertake to develop, individually or jointly, technical and other guidelines in accordance with standard scientific practice to assist the planning of their development projects in such a way as to minimize their harmful impact on the marine environment. In this regard international standards may be used where appropriate”

Therefore, each Contracting State of this convention, before establishing and using seawater desalination projects, must assess their potential environmental effects on the marine ecosystem of the region. Environmental impact assessment is a rule under general international law⁵² today and is essential for preventing significant transboundary environmental harms.

Scientific and technological cooperation (Article X) and technical and other assistance (Article XII) are other obligations in this convention to prevent, abate, and combat marine pollution in this region, particularly pollution from land-based resources such as desalination plants.

Moreover, four protocols have been added to the Kuwait Convention, including:

- Protocol concerning Regional Cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency (1978);
- Protocol concerning Marine Pollution resulting from Exploration and Exploitation of the Continental Shelf (1989);

⁵² Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua) and Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica) (Merits) [2015] ICJ Rep. 665, para. 104.

- Protocol for the Protection of the Marine Environment against Pollution from Land-Based Sources (1990);
- Protocol on the Control of Marine Trans-Boundary Movements and Disposal of Hazardous Wastes and other Wastes (1998).

Among these protocols, “Protocol for the Protection of the Marine Environment against Pollution from Land-Based Sources (1990)” is most relevant to preventing and combatting the adverse effects of seawater desalination. Bahrain, Iran, Kuwait, Qatar, Oman, Saudi Arabia have ratified this protocol, while the United Arab Emirates has signed it. However, Iraq has not yet signed it.

The parties of this protocol, recognizing “the danger posed to the marine environment and to human health by pollution from land-based sources and the serious problems resulting therefrom in coastal waters of many Contracting States, principally due to the release of untreated, insufficiently treated and/or inadequately disposed of domestic or industrial discharges”⁵³ and by “noting that existing measures to prevent, abate and combat pollution caused by discharges from land-based sources need to be strengthened on a national and a regional basis”⁵⁴, have adopted this protocol with aim of strengthening the implementation of Article III, paragraph (b) and Article VI of the Convention.⁵⁵

According to Article 1(8) of this protocol, “Land-based Sources” encompass municipal, industrial, or agricultural sources, both fixed and mobile on land, discharges from which reach the Marine Environment, as outlined in Article III of this Protocol.⁵⁶ Thus, if pollutants from desalination plants in the territories of the contracting parties discharge into the sea, they are considered pollutions from land-based sources.⁵⁷

The obligations of the Contracting Parties to this protocol cover issues such as source control, joint or combined treatment of effluents, and regulations on the release of waste. These regulations apply to effluents resulting from the desalination of Persian Gulf water.⁵⁸

⁵³ Protocol for the Protection of the Marine Environment against Pollution from Land-Based Sources (adopted 21 February 1990, entered into force 1 February 1993), 2399 A-17898 UNTS 3, Preamble.

⁵⁴ Ibid.

⁵⁵ Ibid.

⁵⁶ Ibid Art. I(8).

⁵⁷ Ibid Art. III.

⁵⁸ Ibid Arts. IV, V and VI.

The obligation for environmental impact assessment enshrined in Article VIII of this protocol is crucial for preventing land-based pollution. Article VIII (1) states: “The Contracting States shall require, on a priority basis, an assessment of the potential environmental impacts during the planning and implementation stages of selected development projects within their territories, particularly in coastal areas, which may cause significant risks of pollution from land-based sources to the Protocol Area, in order to ensure that appropriate measures are taken to prevent or mitigate such risks.”⁵⁹

Moreover, prior written authorization from the Competent State Authorities, which fully considers the findings of the environmental impact assessment, is necessary for the implementation of selected projects. “The Contracting States shall cooperate with the Organization to develop procedures for the dissemination to all Contracting States of the reports on the results of such assessment with a view to enable the Contracting States, which may be affected by the environmental impacts of the development projects, to consult with the Contracting State concerned.”⁶⁰

Scientific and technological cooperation, along with scientific, technical, and other forms of assistance, constitute the primary obligations outlined in this protocol for preventing, reducing, and controlling pollution originating from land-based sources. These provisions hold potential effectiveness in addressing and combating pollution arising from the desalination processes in the Persian Gulf coastal states.

Additionally, Article XXIII of Kuwait Convention provides an obligation to submit reports to the secretariat on measures adopted in implementation of the provisions of the convention, and Article XXIV requires the contracting state shall cooperate in the development of procedures for the effective application of the Convention and its protocols, including detection of violations, using all appropriate and practical measures of detection and environmental monitoring, including adequate procedures for reporting and accumulation of evidence.⁶¹ In spite of these provisions, the compliance mechanism of this instrument is weak.

Consequently, although the Kuwait Convention does not directly regulate utilization of seawater desalination, it stipulates pertinent regulations aimed at preventing, mitigating, and combating land-based pollution, which could

⁵⁹ Ibid Art. VIII (1).

⁶⁰ Ibid Art. VIII (4).

⁶¹ Kuwait Convention (n 46) Arts. XXIII and XXIV.

potentially be extended to address pollutants generated by seawater desalination plants.

Moreover, one of the challenges of this convention is the weakness of cooperation between the state parties in technology transfer and financial assistance in protection of marine environment confronting pollutions caused by desalination. The lack of compliance mechanisms and ambiguity in mechanism of the ROPME Judicial Commission are other challenges of the Kuwait Convention.

4. RECOMMENDATIONS

On the basis of the special environmental, economic and social characteristics of each marine area, regional agreements for the protection and conservation of marine ecosystems are the best solutions to achieve sustainable development goals. The growing need for freshwater in the littoral countries of the Persian Gulf necessitates the exploitation of seawater desalination, despite its adverse impacts on the marine environment. Therefore, to strike a balance between Sustainable Development Goals 6 and 14 within desalination processes, effective implementation of the Kuwait Convention becomes imperative. Consequently, enhancing the efficiency of this convention entails addressing normative gaps and bolstering institutional frameworks.

In the context of addressing normative gaps, as mentioned earlier, not referring to the pollutions from seawater desalinations directly is the most normative challenge of the Kuwait convention. To fill this gap, it should be mentioned that the Contracting States of Kuwait Convention, under Article XVI, established ROPME to coordinate the State's measures in protecting and preserving the regions' marine environment. This organization consists of three organs: the Council, the Secretariat, and the Judicial Commission. One of the Council's functions under Article XIV of the Protocol for the protection of the marine environment against pollution from land-based sources is to "adopt regional guidelines, standards or criteria in accordance with articles V and VI of this protocol".

Article VI of this protocol, with reference to Annex III, provides the obligation to "progressively develop and adopt, in cooperation with competent Regional and International Organizations as appropriate:

a) regional guidelines, standards or criteria, as appropriate, for the quality of sea-water used for specific purposes that is necessary for the protection of human health, living resources and ecosystems;

- b) regional regulations for the waste discharge and/or degree of treatment for all significant types of land-based sources;
- c) stricter local regulations for waste discharge and/or degree of treatment for specific sources based on local pollution problems and desirable water usage considerations.⁶²

Based on Annex III of this protocol, regional regulations along with the programs, measures, and the timetables required for implementation should be developed on a priority basis for specific types of wastes, including effluent and emissions from power and desalination plants.⁶³

Consequently, to strengthen the Kuwait Convention and its protocol capacities towards sustainable seawater desalination in normative dimension, the adoption of guidelines on the management of desalination facilities by the Council is suggested. It is necessary to mention that the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols adopted the “2003 Guidelines for the Environmental Sound Management of Seawater Desalination Plants in the Mediterranean” and amended it at their twentieth meeting in 2019. This instrument can serve as a good model for the adoption of such guidelines in the Persian Gulf. Ensuring the use of seawater desalination as a last solution for supplying freshwater, adopting criteria and standards for intake and brine discharge, regulating chemicals used in desalination, monitoring and conducting environmental impact assessments during and after the construction of desalination facilities, and identification of specially protected areas are the most important points that should be considered in such a guideline. Also, one of the objectives of the Kuwait Convention was the development of an integrated management approach to the use of the marine environment and coastal areas in a sustainable manner, allowing for the attainment of environmental and developmental goals in a harmonious way.⁶⁴ Considering the changes in environmental conditions and needs in the region, such as increasing water scarcity, new threats to marine ecosystems, intensification of climate change, and the use of new technologies, it may be necessary to adopt additional protocols and

⁶² Ibid Art. VI (1).

⁶³ Ibid Annex III, Art. 1(d)(ix).

⁶⁴ ROPME, ‘Kuwait Action Plan & Legal Documents’ (ROPME, n.d) <<https://ropme.org/about-ropme/action-plan-legal-documents>> accessed 27 December 2023.

amendments to the Convention under Article XIX in alignment with the sustainable development goals.

Concerning strengthening institutions under this convention, particularly ROPME, promoting the monitoring role of this institution and creating subsidiary bodies for compliance with the convention to support and assist the Contracting States in ensuring the implementation of obligations with a facilitative and non-punitive approach should be considered for amendment. The political competitions and non-cooperation were mentioned as other challenges of the efficiency of Kuwait convention. Therefore Promoting international cooperation and sharing experiences and knowledge related to innovative technologies in desalination aimed at reducing negative environmental impacts, such as reducing energy consumption, better waste and chemical management, and minimizing ecological side effects, can be helpful in the development of more efficient methods for desalination and reducing the adverse effects of seawater desalination methods.

By implementing these recommendations, the Kuwait Convention can be strengthened as a key instrument for promoting sustainable seawater desalination practices in the Persian Gulf region, thereby contributing to the achievement of broader environmental and developmental objectives.

5. CONCLUSION

Seawater desalination in arid and semi-arid countries in the coasts of the Persian Gulf is a means of ensuring water security and achieving sustainable development. However, concerns exist about its adverse effects on the marine environment. Given that one of the sustainable development goals focuses on conserving and sustainably using seas and their resources, the increasing use of seawater desalination plants, regardless of their benefits, can threaten this goal. The paper demonstrates that there is a conflict in the implementation between the requirements of SDG 6 and SDG 14 regarding the use of seawater desalination in the Persian Gulf region. To address this conflict, promotion of cooperation through implementing MEAs is essential. The Kuwait Convention, which is an MEA for the conservation and protection of the marine environment in the Persian Gulf, has some opportunities in regulating coastal states' conduct in the utilization of seawater desalination plants toward sustainable development. The provisions of this convention and one of its protocols concerning prevention, control and combating land-based pollution, as well as requirements about environmental impact assessments, are the most promising aspects of this instrument. The lack of direct obligations about regulating seawater desalination and the non-

existence of effective compliance mechanisms are the challenges of this convention.

To address these challenges, it is necessary for the littoral countries of the Persian Gulf to adopt a seawater desalination management guideline under ROPME. Promoting international cooperation and sharing experiences and knowledge related to innovative technologies in desalination aimed at reducing negative environmental impacts, and empowering compliance mechanisms under this convention are essential recommendations for effective implementation of the Kuwait Convention towards achieving sustainable development goals.