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Caspian Sea environmental crisis: political or legal solution?

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Abstract:

Background and Theoretical Foundations: The environment problems have pervasive and lasting consequences for this generation and the next generation. The effects of environmental change on human life will soon appear. One of the most important environmental crises that Iran and the four littoral Caspian Sea countries bordering are facing is the environmental crisis of this sea. The Caspian Sea, the world's largest salt lake, has a sensitive ecosystem. Although salt lakes are very important for the environment, the most important example that has been recorded of the successful management of salt lakes is the case of the Great Lakes between the United States and Canada. Their solution can be used to protect the environment of these lakes in the Caspian Sea and its border countries.

Method: In this research, by using the descriptive-analytical method, it has been tried to study the ecosystem of the Caspian Sea and find the best solution for it as a salt lake.

Findings: As a matter of fact, although the Caspian Sea has a very rich resource but it has a very sensitive ecosystem and riparian states put it under pressure by over exploitation of its resource. It caused several problems,

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such as, degradation of water level, pollution of water and demise of caviar fish.

Conclusion: It is extremely important to accurately attribute the causes of such change to understand how best to manage this body of water. In my opinion, Iran must pay more attention to its water in the north unless we face fine dust and drying of wetlands as we have seen in the south that put in danger human security in different dimensions. It is undeniable that principles and obligations of international law such as paying polluters, common and differentiated responsibility, and non-harmful use of land… can't solve the problems all alone. It is true about politics, but alongside together, we can hope for sustainable management of the Caspian Sea. So the only way is the combination of international law and political will and using other states' experiences. So the proposal of this paper is building an institution with real decision-making. The design of the new institution is a step forward. For example, an institution can evaluate any problems with the Caspian Sea or rise by any coastline states and provide a solution for that establishing a formal arrangement with real decision-making authority and not leaving most decisions up to individual states without effective collective control. But in practice, states hardly show interest in institutions with mandatory power. So, instead, the Caspian Sea shoreline's states can establish a non-mandatory committee that we hope to execute its decision with political will as we have seen in the Great Lakes. Because above all of this, politics will stand. So political and international law together could solve this problem.

Key word: International Law, Politics, the Caspian Sea, Environment Crisis, Saline Lakes

1. Introduction:

The environmental problems have pervasive and lasting consequences for this generation and the next generations. The effects of environmental change on human life will be visible soon, and Iran will not be safe from disasters caused by environmental changes. The most important example is the Aral Sea. It is necessary to have vigilance and international cooperation in protecting the environment, especially the Caspian Sea. Although efforts have been made to revive the Aral Sea, including the United Nations Program to Save the Aral Sea, it has been to no avail.

These disasters resulted in harm to human security[1] in different dimensions. This experience shows when the environment is hurt, even if its revival isn't impossible but too difficult and expensive, so it's better to prevent it from happening with vigilance. It is much more important for Iran because environmental disasters including fine dust, desertification, deforestation, etc., have happened a lot because of mismanagement. So saline inland waters play an essential landscape role and provide multiple economic roles, such as mining and nesting sites for migrant water birds. On the other hand, it has fragile ecosystems that need to be considered, such

[1] The UN Commission on Human Security report, (2003)," The report defined human security in the following manner: human security means protecting the vital core of all human lives in ways that enhance human freedoms and human fulfillment. Human security means protecting people from critical (severe) and pervasive (widespread) threats and situations. It means using processes that build on people's strengths and aspirations. It means creating political, social, environmental, economic, military and cultural systems that together give people the building blocks of survival, livelihood and dignity."[online] Available at: https://www.un.org/humansecurity/what-is-human-security/ (july,2003)

as the Lake Urmia and the Caspian Sea despite such importance they have received less attention.

The Caspian Sea, as the largest saline lake in the world, has a sensitive ecosystem. Exploitation of the Caspian Sea without taking appropriate measures to preserve the environment and ecosystem of it could lead to environment disaster and hurt human security as a whole, especially environmental security. These types of harms can be compared to a gradual death, which in the near future, will lead to conflict between coastline states of the Caspian Sea and international law can't solve these problems all alone, but it can be concluded according to other states' experiences and getting help from political politicians. In this paper, we examine what is the best solution for the Caspian Sea crisis? Can international law solve this problem? So, we first examine saline lakes under international law and next study about the Caspian Sea and similar experience, especially the great lake, and at last, examine the best solution.

2. Saline lake under international law:

Two sorts of salt water are found on the earth's surface, namely marine water (the ocean) and epicontinental (Inland Surface) Salt Lake (Williams, 2000, 2). Although the first one was noticed by international law and legalized as the law of the sea, but the last one didn't. The Saline lakes are notable for their unique species composition and are a critical aquatic resource where they occur. In addition, they provide many ecosystem services that benefit humans (Wilson, 2021). Saline inland water bodies play an important role in determining regional climate patterns, sustaining biotic productivity and diversity, maintaining environmental and human health, and providing recreational services, minerals, and other resources. But human activities affect saline lakes. Human impacts, including the climate crisis and resource exploitation, and the natural variability of saline

lakes. According to the CBD, biodiversity is essential for human health and well-being, economic prosperity, and food safety provided its use is sustainable. But because of mismanagement, the environment is in danger. In saline lakes, these problems are exacerbated by their shrinking due to climate change and water diversion. The ecological, sociological, and economic benefits of saline lakes are diverse. When saline lakes are severely desiccated, they become a source of fine dust that harms human health and agriculture (Wurtsbaugh and others, 2017,1)According to the World Health Organization(WHO, 2019), the environmental risk of air pollution is one of the leading universal public health issues and is responsible for about 9 million deaths per year. Impacts have been particularly well documented at Hawizeh Marshes and The Aral Sea.

As mentioned above, although saline lakes are very important for the environment, international law didn't pay attention as much as it did to fresh water. As codified international law did not pay much attention to saline lakes, it resulted in uncertain state obligations and a lack of a precise solution for that. But, still, some people can use environmental principles such as paying polluters, common and differentiated responsibility, non-harmful use of land, etc. could be useful for the Caspian Sea. Although these principles and obligations have been said by researchers and documents. But in all these years, it is demonstrated that those are not enough for the Caspian Sea. In this paper, the purpose is to find the best solution to find the best solution, let's find the ecological features of the Caspian Sea.

1.2 **Caspian Sea as saline lake:**

Saline lakes are widespread on all continents, especially in arid and semi-arid areas. The largest and deepest slain lake in the world is the Caspian Sea. The Caspian Sea is by far the largest saline lake in the world (accounting for 44% of global saline lake volume). The sea stretches 1,200 km (750 mi) from north to south and over 130 rivers provide inflow to the Caspian, the Volga River being the largest. The Northern Caspian only includes the Caspian shelf and is very shallow (about 5 m), but the Southern Caspian is the deepest. The water flow is from northwest to southeast (Effimof, 2000, 158).

The water inflow is so slow on Iran's coastline that it results in thick pollution in this area. Nevertheless, the water salinity is not uniform in different parts of the sea, but also in different seasons of the year.(Hosseini, 2020,1-2) The Caspian Sea is important for commercial, fishery, supplies water for agriculture, and provides recreation and work opportunities for people living nearby. Its waters are also home to several threatened species, including an estimated 90 percent of the planet's last remaining sturgeon. None of these values should be underestimated (Hoseini, 2020, 1-2). The Caspian Sea, as strategically, is important because of biodiversity, oil and gas mines, but it has such a fragile ecosystem because of a closed situation. In other words, as is shown, the Caspian Sea has no exit route, just evaporation.

Although, as said earlier, the Caspian Sea is important in different dimensions, it has no connection with the seas and, on the other hand, facing different problems puts it in danger. Let's see some problems that the Caspian Sea faces. The two most important problems are desiccation and pollution created by mining which we will examine.

1.2.1. Desiccation of water level:

The Caspian Sea is characterized by substantial fluctuations during its geological lifetime. It is believed that climate-induced changes are the main reason for the Caspian Sea Level. Fluctuations influence the hydrological budget of the sea (Naderi and others, 2013, 1401) the output is mainly controlled by evaporation over the sea and the watershed. This means that the sea-level oscillations are strongly dependent on climatic variation. According to the latest research, the water level of the Caspian Sea will decrease twice as much as the global estimate (Eurasianet, 2021). Drought is one of the most tangible impacts of climate change. It leads to global environmental challenges such as water scarcity, decreased food production, and the drying of large lakes (Bakhtiar, 2023, 3). Large lakes are significant freshwater sources that now face critical consequences due to climate change and associated phenomena (Sterner, 2020). Some noteworthy examples include Lake Urmia, Lake Chad, the Sea of Galilee, and Aral (Feizizadeh, 2022).

The water level of the Caspian Sea is falling dramatically and this will intensify in the coming years. If left unaddressed, this problem will pose significant environmental, economic, and social problems for the Caspian region. Changing water levels can affect drinking water intake, commercial shipping, hydroelectric power generation, agriculture, shoreline property, recreation, fisheries, wildlife, wetlands, and other interests. It is predicted that the water level in the Caspian Sea will drop by 9 to 18 meters by the end of the 21st century (Caspian Policy Center, 2021, 3)and it will cause serious problems including fishing, food, energy, maritime borders and plans such as pipelines. According to the latest information, a decrease in

water levels resulted in problems with the harboring of ships on Iran's coastline in the Caspian Sea, this issue will be exacerbated by the shrinking due to climate change and water diversion (Shadrin, N., Anufriieva, E., & Gajardo, G., 2022, p. 22).

The major reason for the falling level of the Caspian Sea is the diversion of freshwater, precipitation, and evaporation. The most important activity impacting large permanent salt lakes is the diversion of freshwater. The case in point is the Aral Sea. On the other hand, evaporation (secondary salinization) leads to salinization too. (Williams, 2000, 158) There is a tendency to invoke "climate change "as the culprit for the decline of saline lakes without fully understanding the hydrological balance. Climate change will warmer temperatures, increased evaporation, and altered precipitation does indeed represent a pervasive long-term problem for saline lake sustainability (Wurtsbaugh and others, 2017, 4).

The sea level of the Caspian has fallen and risen, often rapidly, many times over the centuries. Ecosystems are suffering an accelerating process of degradation all around the world. Salt Lake includes a variety of aquatic areas. The Caspian Sea, Mono Lake, and Dead Sea, for example, never dry out, although their water levels may fluctuate considerably over a long period. Saline lakes are mostly located in regions categorized as arid and semi-arid climates. Mono Lake, the Caspian Sea, and the Dead Sea are some examples of that. Except for those few permanent salt lakes whose water level is monitored and managed (i.e., Mono Lake) and the few areas in areas with decreasing aridity that have occurred recently by 2025. Most permanent Salt Lake will become smaller and more saline. (Williams, 2000, 164) For the Caspian Sea, there is a Coordinating Committee on Hydrometeorology and Pollution Monitoring of the Caspian Sea (CASPCOM).

The lake elevation needed to sustain and the amount of inflow required to sustain those services and the amount of the inflow required to sustain that lake level. Importantly, the information must be provided with sufficient lead time so that a solution can be developed and implemented before saline lakes are desiccated.

However, the Caspian Sea coastline states should take action on the sea level of the Caspian Sea, but they didn't do that efficiently. Unfortunately, the fluctuations in water level weren't taken into consideration in the Aktau Convention (The Convention on the Legal Status of the Caspian Sea (Aktau Convention), 2018) and it must be regarded by coastline states in future negotiations.

1.1.2 Mining:

The Caspian Sea is an oil-rich natural resource on the border of five states. As a result of its geographical location, the Caspian Sea is at the center of many regional disputes. (Folger, 2002, 530)Various human activities physically disturb the beds of dry salt lakes and mining is the most significant danger, especially for particularly vulnerable lakes. One of the most important criteria for the Caspian Sea is the huge resources of oil and gas. The area has significant oil and natural gas reserves from offshore deposits in the Caspian Sea and onshore fields in the Caspian basin.

After the collapse of the Soviet Union and the formation of four independent governments (Kazakhstan, Azerbaijan, Russia, and, Turkmenistan), the newly independent governments found the Caspian Sea as a water source rich in hydrocarbon and food resources, through which they could compensate for their economic deficit (Zeinolabedin, 2009,

116). In addition, shifting legal and regulatory frameworks create uncertainty for foreign companies investing in natural resources. For example, the lack of agreed-upon maritime borders between Turkmenistan, Azerbaijan, and Iran has hampered geologic exploration in the southern Caspian basin. The more they push it for economic benefit, the more the Caspian Sea is polluted. Now, some areas of the Caspian Sea are contaminated with petroleum substances up to 11 times more than the limit for living organisms (Dehkordi, 2015, 20). The haste of some coastal states to exploit the sea economically resulted in the fact that some species of migratory birds and creatures are in danger of extinction in not near future and the sea will become a dead sea (Nejat, 2018, 97).

Drilling for oil beneath the Caspian Sea provides the most notable example. Mining may have an impact on salinization in the other way, particularly by adding pollution. Oil spills from mining rigs in the Caspian Sea, the discharge of mine wastewater, and the location of mine spoil dumps (from which pollutants leach) adjacent to Salt Lake provide examples (Williams, 2000, 159). But the most important dangers for the Caspian Sea are accidents for tankers and exploitation of oil basins.

In regards to pollution by mining in the Caspian Sea, the most important regional document is the Tehran Convention and its four protocols (The Protocol Concerning Regional Preparedness, Response and Co-operation in Combating Oil Pollution Incidents ("Aktau Protocol"), The Protocol for the Protection of the Caspian Sea against Pollution from Land-based Sources and Activities ("Moscow Protocol"), B The Protocol for the Conservation of Biological Diversity ("Ashgabat Protocol"), The Protocol on Environmental Impact Assessment in a Trans boundary Context), A fifth Protocol on Monitoring, Assessment and Information Exchange is currently under negotiation. The Tehran Convention serves as an umbrella legal instrument laying down general requirements and the institutional

mechanism for environmental protection in the Caspian Sea region. One of the most important actions that can help to protect the Caspian Sea from pollution is an Impact Assessment on the transboundary and cooperation to collect, release, and exchange data and information on the protection of the Sea's marine environment. But no progress is seen. Another problem with the Caspian Sea is illegal fishing.

1.1.3 Illegal, Unreported and unregulated fishing:

The Caspian Sea has huge biodiversity and more than 400 hundred types of unique fish, and the most famous one is caviar fish. For protecting those fishes, in addition to the Tehran convention, there is an agreement named "Agreement on the conservation and sustainable use of aquatic biological resources of the Caspian Sea" (2014). Under this agreement, aquatics of the Caspian Sea is a common heritage of humanity (Agreement on the conservation and sustainable use of aquatic biological resources of the Caspian Sea, 2014, Art.1). In my opinion, it was better to regard them as a common concern of humankind. Because the last word puts more responsibility on their shoulders as an obligation under international law.

Based on the approval of the 10th meeting of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (unfortunately, none of the coastline states of the Caspian Sea are party to it), since 1998, all caviar fish have been included under the aforementioned convention. Another document that considered this issue is the Aktau Convention. Despite these documents, according to the Tehran Convention Secretariat, illegal, unreported, and unregulated fishing is the most important reason (Interim Secretariat of the Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Tehran

Convention, 2019) that six types of aquatic are becoming extinct (Ermolin, 2018, 7). In addition, The International Commission on Aquatic Resources of the Caspian Sea was made in 2003.

Management activities performed during the historical management steps followed in the Caspian Sea as in many other saline lakes, initiatives are characterized by two outstanding features: the lack of a planned objective and the imposition of initiatives by outside agencies. The objective of different management activities performed during the last decades was to protect some physical components of the ecosystem (i.e., sturgeons, birds…) and was based on such a general legislative framework that it was very difficult to apply them efficiently.

The ecosystem services provided by saline lakes are real but less easily qualified and may have a consistency that is less well established in law, political, and social practice. As mentioned above, the coastline states have made agreements and established agencies regarding the Caspian Sea and its ecosystem but none of them were effective. So why weren't they efficient? What is the solution to oblige coastline states to make their obligation?

Answering those questions is important, especially for Iran, because it has a bad geographical situation in the Caspian Sea. So, the more pollution it earns, the less benefit from hydrocarbon deposits received.

Notwithstanding predictions, international law predicts some approaches for freshwater, such as IWRM (integrated water resource management) or IRBM (integrated river basin management), but there is one about saline water. There aren’t precise rules for saline lakes in international law, but we can use supplementary principles of international environmental law. Some international environment law and human rights

principles turn to customary international law, such as the right of public participation, the duty of states to cooperate, the principle of equitable utilization, the obligation to avoid boundary harm, the precautionary approach, and environmental assessment. These principles pertain not only to freshwater but also to the whole environment, including the saline water, especially the Caspian Sea. As said before, this paper is trying to find the best solution. So, what is it?

2. International legal and political methods:

Regarding these problems, the best way is to pay attention to other states' experiences. One of the successful experiences was the cooperation between the US and Canada and building the joint commission for the Great Lake. So, let's see what it does, and how it works then we examine if this method will work for the Caspian Sea.

2.1 The Great lakes:

There are two types of great lakes; freshwater and saltwater. Freshwater attracts much more attention from states and governments because it can be used in household, industrial, and agricultural parts, but as mentioned above, salt lakes, especially the Caspian Sea ecosystems, and resources that are exclusive to economic, geopolitically, tourism, and aquatic resources. So, in my opinion, protecting the Caspian Sea is as important as freshwater, but for managing this exclusive body of water, we can use the best lake management patterns in the world, regardless of being freshwater or saltwater. Trying to find the best pattern for managing that.

2.1.1 The great freshwater lakes:

The Great Lakes, also called the Great Lakes of North America, are a series of large interconnected freshwater lakes in the mid-east region of North America. (Lake-wide Action and Management Plans for the Great Lakes, EPA, 2023) The International Joint Commission was guided by the Boundary Waters Treaty, signed by Canada and the United States in 1909. Canada and the United States created the International Joint Commission (hereinafter we mention IJC) because they recognized that each country is affected by the other's actions in lake and river systems along the border. The main reason for the establishment of the commission was the difference in the exploitation of the water of the lakes. In 2012, Canada and the United States amended the previous agreement to include more issues that threaten water quality. The two countries cooperate to manage these waters and to protect them for the benefit of today's citizens and future generations.

The IJC studies and recommends solutions to Transboundary issues when asked to do so by the national governments. When the IJC receives a government request, called a reference, it appoints a board with equal numbers of experts from each country. Board members are chosen for their professional abilities, not as representatives of a particular organization or region.

The IJC has two main responsibilities: approving projects that affect water levels and flows across the boundary investigating Tran's boundary issues and recommending solutions. The IJC's recommendations and decisions take into account the needs of a wide range of water uses, including drinking water, commercial shipping, hydroelectric power generation, agriculture, ecosystem health, industry, fishing, recreational boating, and shoreline property. The IJC has the authority to issue orders of

approval. These orders place conditions on the application and operation of projects, such as dams, diversions, or bridges that would affect the natural level of boundary waters. The IJC has different responsibilities, including, regulating shared water uses, Improving Water Quality, Improving Air Quality, Investigating issues, and recommending solutions (International Joint Commission, 2023).

References to the IJC have focused mostly on water and air quality and the development and use of shared water resources. Although IJC reference recommendations are not binding, they are usually accepted by the Canadian and United States governments.

Although this agency has an umbrella authority, one of the criticisms is that it lacks specific authority over pollution problems, and it hasn't a real decision-making authority (Dellapenna, 2007, 795).The Joint Commission has a website that puts all the information and action done on the Great Lakes. According to that information, job wise is going well.

2.1.2 The saline great lake:

Many saline lakes worldwide are in trouble. In their basins, lake areas decrease so that evaporative losses balance the decreasing inflows. In some cases, the decreased inflows are the result of climate change, such as the Caspian Sea, but in most cases, demands for water to support ever-increasing populations are the major factor impacting these terminal lakes, including the Aral Sea and the Urmia Lake. Many saline lakes throughout the world are shrinking due to over-exploitation of water in their drainage basins. Among them, one of the world's largest saline lakes is the U.S.A.'s Great Salt Lake (Wurtsbaugh, 2022, 1) (e.g. Great Salt Lake, Lake Abert,

Oregon Lake). There are similarities between Lake Urmia and the Great Salt Lake. But the management of the last one is iconic. The United States enacted an act for the management of saline lakes "saline lake ecosystems in the Great Basin States Assessment and Monitoring Program" enacted in 2022. According to this act a plan was made for the management of saline lakes.

The management of Great Salt Lake is primarily controlled by state agencies, with the Utah Division of Forestry, Fire, and State Lands (FFSL) primarily responsible. However, the Utah Departments of Wildlife Resources, Department of Water Quality (DWQ), and Geological Survey provide most of the biological and chemical monitoring at many stations in the lake at bi-weekly or quarterly intervals. These agencies, however, do not monitor or control the amount of water flowing into the lake. Those respective responsibilities are given to the U.S. Geological Survey and the Utah Division of Water Resources (Wurtsbaugh, 2022, 22).

The Division of Forestry, Fire, and State Lands also oversees the Great Salt Lake Advisory Council, which is composed of representatives. This broad group of stakeholders often have competing objectives for managing the lake, but the Council provides a useful forum for working through complex management problems. A conservation group, Friends of Great Salt Lake, also convenes at a bi-annual conference where all the stakeholders can discuss issues (Wurtsbaugh, 2022, 11). Getting help from NGOs for managing the lakes is one of the reasons that this council works effectively.

Although there are agencies for the Great Salt Lake, but recent problems indicate their functions aren't satisfied, and they can't achieve their environmental goals. In 2021, the Great Salt Lake recorded low levels

(Milman, 2023) because water has been dedicated to agriculture and the industrial sector rather than to save the salt lake. But they shouldn't do that or the Great Salt Lake will become a dust hazard and soon negatively affect human health (Singh, 2023).

On the other hand, the mono lake is an example of the iconic management of Salt Lake. Its committee is called the Mono Lake Committee. Since 1978, the Mono Lake Committee has worked to protect Mono Lake, restore its tributary streams and surrounding lands, and educate the next generation about wise water use. (Mono Lake Committee, 2023) They bring the problems to the attention of the wider community. Above all of them, there was a legal system that judged the conflict and implemented the judicial determination. (Williams, 2000, 22) But for international lakes, it isn't so easy and needs international political pressure.

According to these experiences, as the Caspian Sea is an international saline lake, the management needs a combination of international law and political science and will. Without one of them, the future of this region would be like the Aral Sea for sure. So building a committee has ability in different dimensions and making decisions that coastline states perform by political will is the best solution. On the other hand, NGOs could have an important role by bringing the problems to this committee and in the community.

Conclusion:

Unfortunately, there is mismanagement of water in Iran in both sectors: freshwater and saline water. Water mismanagement in Iran is also a serious contributor to shortages and the economic sanctions have intensified it and

have had negative consequences for Iran's environment. Integrated management of the land and water resources in the area is required to preserve saline lake characteristics.

Iran's geographical situation in the Caspian Sea is inappropriate and the most benefit is commercial shipping and tourism. The Caspian Sea, as a saline lake, has a sensitive ecosystem, so degradation and pollution of the aquatic ecosystem of it, result in a disaster. It is extremely important to accurately attribute the causes of such change to understand how best to manage this body of water. In my opinion, Iran must pay more attention to its water in the north unless we face fine dust and drying of wetlands as we have seen in the south that put in danger human security in different dimensions.

It is undeniable that principles and obligations of international law such as paying polluters, common and differentiated responsibility, and non-harmful use of land… can't solve the problems all alone. It is true about politics, but alongside together, we can hope for sustainable management of the Caspian Sea. So the only way is the combination of international law and political will and using other states' experiences.

The first and most obvious step to be taken involves the need to raise the awareness of both community and governmental bodies at all levels of the values of salt lakes and the nature of threats to and impacts on salt lakes arising from human activities and access to information and NGOs could have a prominent role in it.

So the proposal of this paper is building an institution with real decision-making. The design of the new institution is a step forward. For example, an institution can evaluate any problems with the Caspian Sea or rise by any coastline states and provide a solution for that. Establishing a formal arrangement with real decision-making authority and not leaving

most decisions up to individual states without effective collective control. But in practice, states hardly show interest in institutions with mandatory power. So, instead, the Caspian Sea shoreline's states can establish a non-mandatory committee that we hope to execute its decision with political will as we have seen in the Great Lakes. Because above all of this, politics will stand. So political and international law together could solve this problem.

Besides, we need a financial fund for preserving the aquatic ecosystem of the Caspian Sea and the collaborative involvement of NGOs (there are a few NGOs about the Caspian Sea in Iran). The Iranian government neglected NGOs but they could have an effective role in the improvement of the Caspian Sea situation.

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