

[Short Communication]

Environmental geopolitics of the Caspian basin energy interactions

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ABSTRACT

Following the collapse of the Soviet Union and the discovery of gas and oil in Central Asia and Caucasia, it faced complex interests in the international political economy. These problems were mainly rooted in developing plans of the countries for increasing their influence in the area and also in Russia's connections with the Iranian and Turkish governments in the region. This paper investigates the Caspian Sea oil resources and the related systems of oil transmission through a descriptive-analytical method. Moreover, it studies the role of these factors in regional interactions of the Caspian coastal states. Finally, it analyzes the environmental geopolitics of the Caspian Sea, in association with the oil pollutants and the policies of Islamic Republic of Iran. The results revealed that the new routes of oil transmission and interactional active role of all coastal states in environment conservation may have a key role in the regional constructive interactions among the Caspian coastal states.

Key words: Caspian Sea, Oil resources, Regional interactions, Oil transmission routes, Environment geopolitics.

INTRODUCTION

The Caspian Sea basin is considered as a strategic energy source, concerning its vast gas and oil resources (calculated and non-calculated). In addition to the importance of the resources in the area, the position and energy transmission systems increase the area's geopolitical and geo-economic characters. The Islamic republic of Iran alongside of other states in Caspian basin as a main key player in the Caspian Sea has faced water border and water sovereignty changes, following the former Soviet Union collapse and formation of the newly independent countries. A great deal of changes are related to the "area's" underwater resources (Ganjdoost 2014).

Each newly independent country around the Sea has specific plan for oil and gas extraction and transmission through pipeline, which are opposed by the neighboring countries and their retaliating plans.

On the other hand, the Western powers and specifically the United States' intervention and their strategic and ideological threats for the regional countries such as Iran and Russia have increased the area's fears and hopes (Korsis 2011). At the eve of 20th century oil led to many wars at the world, but the current political utilities of the pipeline or transmission routes may hurt the governments' economic systems. However, existing hydrocarbon resources can enhance the regional convergence and lead to coalitions or unifier economic structures in the region.

MATERIALS AND METHODS

This study has been conducted using descriptive-analytical method and final subject of the article has been codified and supplied according to the content databases available in libraries and Internet.

RESULTS AND DISCUSSION

Theoretical bases

Position and energy resources of the Caspian Sea

The Caspian Sea is surrounded by five geological basins including southern, Northern, North Ustrust, Mangyshake and Amu-Darya basins; however Iranian political borders does not follow the pattern. The basins represent historical eras and diversity of the hydrocarbon reservoirs (Beloplosky & Taiwani 2002). In this regard, the southern basin which covers Iran, Azerbaijan and the Southwest of Turkmenistan is of great importance.

The 25km sediment accumulated on the Ocean-basin-rocks like of the Sea, specifically in the southern part which are in conformity with the present roughness of the sea basin is a reason for good hydrocarbon potential of the Caspian Sea (Dehqan 2005). Presence of the certain gas and oil resources in various points of the Sea, specifically Southern shores, Azerbaijan shores and the undiscovered Iran's territory reveal the potential energy capabilities in the regional countries' present and future political and economic structures. Thus, one of the greatest reasons for lack of a comprehensive legal regime among the Caspian Sea coastal states is the problem of dividing the basin and its underground resources. Each country seeks the best portion of the resources in order to meet their own national interests. Ultimately such a legal regime would determine each country's share in the Sea resources as a basis for investment plan for gas and oil extraction. So, the energy resources lead to a dial policy in the region.

Regional agreements of discovering and extracting oil may cause convergent backgrounds, in one hand and competition and foreign intervention may cause tension in the region.

Geopolitics of oil in the Caspian Sea

After the Soviet Union fragmentation, the Caspian basin, containing considerable

resources specially oil and gas reserves enjoys more geopolitical importance (Zeynolabedin *et al.* 2011).

The Caspian Sea and its surrounding countries have been faced to strategic axis of some preventive Powers with various capacities. Some of the Powers utilize the non-oil resources as an economic opportunity and others, specifically the newly independent countries (Azerbaijan, Kazakhstan and Turkmenistan) consider the Caspian Sea as a precious water resource of food and the related products.

Therefore, achieving a certain and optimum share of the Sea is one of their crucial national goals. Actually end of the Cold War and collapse of the former Soviet Union paved the way for achieving a new energy resource of the Caspian Sea (Bahjat 2004). Some studies estimated that the probable oil reservoirs of the Caspian Sea is about 70 - 200 billion barrel which is equal to those of North Sea or at most of Iraqi resources (Rend 2003). However, with regard to lack of precise studies on the Caspian basin's gas and oil resources, the amount has not been calculated yet. Apparently, geological assessments on the probable oil reservoirs are not reliable, and the estimates should be viewed doubtfully. The most reliable estimates have announced the reservoirs as 50 - 160 billion barrels (Rend 2003) which reveals the importance of this natural heritage.

The Sea had been possessed by Iran and the former Soviet Union before collapse, but after the collapse the newly independent countries claimed possessing the Sea. In fact, the geographical possession integrates the developing energy of the Caspian Sea. The Sea was controlled by Iran and the former Soviet Union until 1991, but the Caspian legal situation has not been defined since collapse of the former Soviet Union. All the five Caspian coastal states face great political and economic barriers which limit their energy export capabilities (Camp & Hakavi 2004).

Table 1. Discovered oil reservoirs of the Caspian Sea basin (billion barrels); (Sources: Jalali 2005)

Scores Countries	Gas and Oil Magazine (2001)	B. P. Amu Co. (2000)	British Petroleum (1998)
Azerbaijan	1.2	7	7
Iran	89.7	—	—
Kazakhstan	5.4	8	8
Russia	48.6	—	—
Turkmenistan	0.5	0.5	—
Uzbekistan	—	0.6	—

The newly independent countries had weak economy; therefore, they attempted to extract Caspian oil using the West's technical knowledge. Azerbaijan and Turkmenistan changed into petty role players in geopolitics of energy in the region through European companies' investment. These companies invested in Caspian basin for the following reasons (Jafari 2010): Recession of products in great oil centers of the North Alaska and the North Sea. The Caspian embraces some huge under-developed gas and oil regions. Saudi Arabia and Kuwait seriously oppose foreign investments in their countries. Iran, Iraq and Kuwait have been faced the UN multilateral economic sanctions as well as the US unilateral sanctions. Baku, Astana, and Ashgabat had a weak economy. The only way of encountering the recession was utilizing their hydrocarbon resources. However, they lacked financial sources to explore gas and oil fields. Their leaders contracted foreign inverters as a vital step for their economic growth. In fact, the international Energy Agency has estimated that the required investment for the Caspian Sea is about 200 billion dollars which would lead to comprehensive development and application of the gas and oil resources (Mottaghi 2015).

Perspective for geopolitics of energy in the Caspian Sea

There are three efficient geopolitics factors on the Caspian Sea energy problem which

produce deep concerns about the resources ownership; the amount of existing hydrocarbon for extraction, production and distribution; as well as direct and environmental expenses (Camp & Hakawi 2004).

Resources ownership: Many oil-rich points of the Caspian Sea have not yet been explored; because there is no generally accepted dividing system for the Sea, or because utility of the resources is faced by the neighboring countries' reaction.

If the negotiations lead to specifying the sea borders and determining the basin and beneath the basin resources, we may hope that the related countries provide their economic plans for oil extraction (Zajtsev & Pavlova 2005).

Hydrocarbon for extraction:

This factor depends on the situation of the resources ownership. Most of assessments in the Caspian Sea basin are estimation and many points have not yet been explored.

However, the estimations may pave the way for utilization and investments (Mottaghi 2015).

Environmental expenditures:

Since the Caspian Sea is currently a closed lake, any oil pollution provides the environment with a serious crisis; therefore, the environmental challenge of oil extraction from the Caspian Sea has put shadow on the geopolitics of environment and as a result, the way of practice, exploration, drilling and extraction affect the problem.

Table 2. Oil resources in the Caspian region; (Source: Ehteshami 2004).

Countries	Discovered Resources (Minimum-Maximum) (billion barrels)	Oil potential resources (billion barrels)
Azerbaijan	7-12.5	32
Iran	0.1	15
Kazakhstan	9-17.6	92
Russia	0.3	7
Turkmenistan	0.5-1.7	38

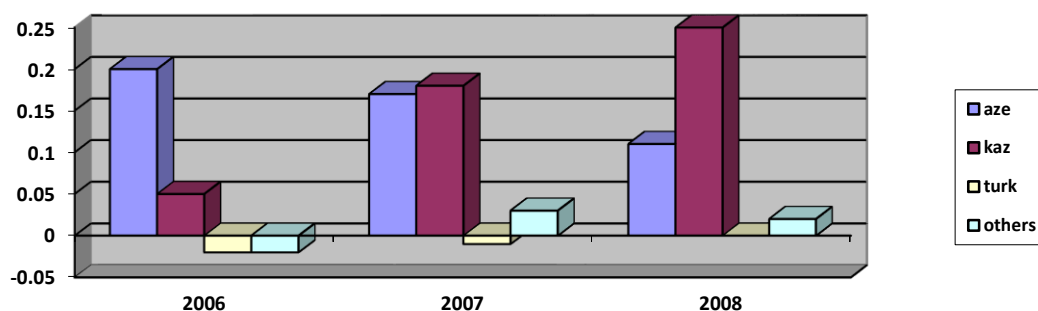


Fig 1. Oil production growth in the Caspian Sea; (Source: EIA 2007)

Utilizing the Caspian Sea's energy is rooted in two political and economic problems which may affect directly or indirectly the development of the activities related to the economy of energy in the Caspian Sea basin. The political subjects related to the development of the Caspian Sea oil are as follows (Zajtsev & Pavlova 2005):

- 1- Definition of the Russia's role in the world after collapse of the former Soviet Union;
- 2- The new balance of the regional powers;
- 3- Reappearance of the regional powers;
- 4- National awakening of the former Soviet people and appearance of the oil-based economic nationalism. The economic subjects include (Naderi Beni *et al.* 2013):

- 1- Competition of the great multinational companies for participation in utilizing the existing reservoirs;
- 2- Development of oil industries, in order to reduce dependence on the Persian Gulf exports as well as sustaining the oil price;
- 3- The western countries tendency to access the energy supply sources aiming at competition for the Southeast Asian economy;
- 4- Widespread attempts of all parties interested in controlling the huge pipeline networks which are used to transmit gas and oil to the world markets (Spatharou 2001).

However, these subjects in geographic and political domains require cooperation of some countries including Russia, Georgia, Turkey, Iran, Armenia and Azerbaijan, as well as oil producers of the Central Asia, Pakistan, Afghanistan, India and china. Although the region countries are to develop the oil

production, extract and export from the basin, the problem will be accompanied by challenges and threats including conflicts and wars. The main factors in this regard are as follows (Ozyavas *et al.* 2010):

- The effect of the international oil market and the Asian hydrocarbon consumers such as China, India, Japan and South Korea;
- Exploring the new hydrocarbon resources in the Caspian Sea basin;
- Oil export oscillation from the Persian Gulf;
- Increase of the Caspian Sea's resources exploitation in order to encounter the Persian Gulf oil producers' dominance;
- Tension between OPEC and Caspian Sea surrounding countries provided that the latter can affect the OPEC production (Ehteshami 2004); In addition to the above mentioned factors, the regional factors may also affect the geopolitics of energy in the basin. They consist of Caucasian political and ethnical riots and political competition among the Caspian coastal states.

Findings Environmental structures of the Caspian Sea

The Caspian Sea forms over 40% of the world's lake areas and is by itself larger than total Oman and the Persian Gulf. The Sea has been considered seriously by the world energy market. When the experts announced that the world's oil resources are perishing and considered the problem as a crisis, the industrial countries concentrated on the Caspian coastal nations which had the highest income of 3500 dollars annually and contracted

for exploitation, extraction and transmission of this vital material. The related activities proceed the oil pollution process in the Caspian Sea (Mostaqimi 2005). Based on estimates, we may conclude that the Caspian Sea environment is increasingly polluted; and faces a gradual-growing threat. This pollution is mostly rooted in oil exploitation in Azerbaijan and Kazakhstan republics' basins. However, these operations have influenced the Iranian shores. The Caspian Sea has been of great value concerning the sea foods viewpoint; however this value is vanishing because of drilling and oil exploitation process. Although a little amount of the oil pollution in the Volga delta is out of the Strachan industries, the oil pollution is not a serious problem in the North Caspian. On the other hand the eastern shores sediments are oil-polluted. The Tangiz oil field in Kazakhstan is close to the coast and storm pushes oil pollution to the Sea. There are offshore gas and oil reservoirs in the south half of the Caspian Sea. Azerbaijan seashore is a basic oil facilities position with numerous oil wells inside the Sea which are accompanied by refineries and petrochemical factories in the land. The developments have led to serious oil pollutions. In the mid-60s, it was estimated that each year one million tons of oil, oil pollutions and oil products yet way to the Sea as a results of accidental gush, leakage, pipeline damages, shipping, industrial water waste and refinery sewage. During 70s and 80s oil pollution has been reported in most of the southern Caspian's west coast as well as in eastern coast near to Abshuran peninsula and even in the east coast. Also, in some areas highly hydrocarbon-polluted sediments have been seen (Mostaqimi 2005).

Azerbaijan National Committee for Environment and Ecology believe that thousands tons of the oil materials enter the Caspian Sea through Azerbaijan oil tankers and dock annually. Moreover, the country's traveling, fishing and oil ships do not consider the environmental cautions.

The published report of the Caspian symposium in September 1990 states that the

oil pollution of Baku has destroyed the Sea life in the Baku Gulf, where the basin has been covered by 1 - 1.5m thick oil remnants including azote (Amir Ahmadian 2014). It is believed that oil exploration process in the recent years has been the main reason for the Caspian pollution, especially in Azerbaijan and Kazakhstan. The other natural and environmental threat for the Caspian Sea is that it is considered as an earthquake area. The problem must be considered in oil exploitation plans and proposes for establishing pipelines, while it is usually ignored. Concerning the oil pollution consequences, we must point to pH changes, reduction of water lucidity, sea basin pollution, formation of gas complexes, direct destruction of water life or its botulism and weakness. Also, oil pollution reduces birds' reproduction and egg laying, fetus death inside the egg and prevention of glands activities (Mottaghi 2015).

Convolutd hydrocarbons may be lethal in densities of 1-100 in million for adult animals and in densities of 0.1 - 1 in million for larval stage. Also, vibrating and explosion operations in oil explorations are out of the fish tolerance range (7000 Hz) and explosion kill planktons and fish to tens meters from the center and change fish migration pathways (Mostaqimi 2005).

Oil transmission using tankers makes it necessary to prevent accidents and balancing water evacuation system; since they create a great deal of pollution during natural disasters or accidents. Such accidents make oil utility in the Caspian Sea a crisis. For instance, fire in one oil well in the Sea followed by huge pollution in 1971. Also, a group of the Iranian experts visited the Abshuran peninsula and found a vast oil stain in 1984 and also found that 47000 tons of crude oil entered the Sea from Azerbaijan oil fields in 1978. Oil leakage during exploration, extraction loading and transmission as well as during see accidents related to oil tankers and locks from the very beginning of crude oil dispersion on the water surface create tar mass which may endanger the Sea life directly or indirectly. Oil materials

cover the water surface and prevent the sunshine and gas exchange and food material formation. Some part of oil materials sedimentation gradually and cover the Sea basin and prevent exchanges between the basin and water. While the global economic slowdown in the late 2000s depressed demand and prices for energy, competition over energy reserves in the Caspian Basin will no doubt continue for many more years. Its dynamics depend upon a number of factors, including security issues, global energy demand, domestic politics within the region, and the strategies of external actors (Kubicek 2013). Anyhow, the problem is very important; and the usual destruction and pollution is critical event if we ignore the pollution and environmental deterioration as a result of gas and oil extraction and transmission. The pollutions are also serious from the viewpoint of economy and the costs imposed on the coastal states.

Environment pollution in the Caspian Sea

Since the Caspian Sea is surrounded by land, entrance of pollutions to the Sea leads to the biochemical changes which remain in the water for years. Water dilution is for the external buffer solution.

One reason for pollution of the Caspian Sea is entrance of pollutions through Volga and other main rivers which carry endless sediments.

Oil and gasoline are transmitted across the Sea using the oil tankers between the harbors which possess necessary facilities.

Leakage risk is not ignorable during transmission or storing.

The mercury accident happened in 2002 when the Actua tanker was carrying crude oil to Baku. Most of the tanker crews died when a large amount of the oil entered the Sea (EIA 2007).

Table 3 shows the amount and pollutions percent enter the Sea each year.

Table 3. Percent of pollutions enter the Caspian Sea in various ways during one year; (Source: Aliparast 2007).

Source	Oil share in one year (Ton)	Total oil share in one year (Ton)	Percent
Leakage and destruction	20000	10000-50000	12.5
Oil industry activities	8000	5000-13000	5.0
municipalities	21000	10000-40000	13.1
Other industries	35000	15000-50000	21.9
Rivers	75000	50000-260000	46.9
Space	1000	300-2000	0.6
Total	160000	90000-300000	100

Following division in the former Soviet Union, increased amount of the pollutants in the Caspian Sea reduced the agricultural and industrial activities in the four other countries. There is not enough information about pollutants observed in the Volga and Kura rivers basin. The region faces the threat of reservoirs flow in an accident or dam break. Some heavy metals are found at relatively high level in the Caspian Sea. However, regional pollutant dispersion including agricultural chemicals, specifically DDT and Endo-sulfate are the main reason for concerns about the Caspian Sea.

The prohibited materials including DDT prevent a great amount of productions in the Caspian Sea and lead to sedimentation. These

materials at relatively high amounts are some kind of venom for fishes and seals. They will affect the Caspian environment seriously and endanger its future.

Generally, pollution sources of the Caspian Sea can be divided into two sources of gas and oil exploitation and land sources.

Each year, 74 million tons of pollutants enter the Caspian Sea a great amount of which are from Great Russian Rivers.

The pollution sources include Volga (60 million Tons), Kura (1.5 million Tons), Turk (3 million Tons), Sulak (2.5 million Tons) and Samur (1.5 million Tons) rivers (Koriss 2011).

The reason is closeness of the industrial centers to the Caspian coast and the rivers carrying the pollutants to the Sea.

Therefore, all the coastline countries must cooperate and participate in securing the Caspian environment; otherwise it will be soon become mesotroph. Now we are going to

determine each country's share in pollution of the Caspian Sea (CEP 2004). Table 4 shows the amount of oil pollution resulted from oil production in the Caspian Sea.

Table 4. Oil pollution resulted from oil production in the Caspian Sea; (Source: Adl Tabatabai 2002).

Sources	Percent
Deblasting load	70
Refineries, petrochemical complexes	7
Accident	4
Off shore productions	6
Other sources	13
Total	100

CONCLUSION AND PROPOSES

The effects of the environmental pollution on the Caspian Sea surrounding countries' economy are as follows:

- 1- Increase of the oil decontamination and pollution prevention costs;
- 2- Diminution of tourism industry;
- 3- Reduction of food, protein, sea food and industrial resources;
- 4- Pollution of cities, coasts, harbors and recreational center;
- 5- Diminution of snorkeling and fishing;
- 6- Diminution of fishing, boating, shipping, transportation and loading systems;
- 7- Wasting national capital as a result of oil dispersion in land, sea and air;
- 8- Changes in quality of saline and fresh waters as well as surface and under-surface waters;
- 9- Huge investments and application of equipment and experts for decontaminating water, land and air;
- 10- Investment for curing diseases, and compensation of damages and destruction of the Caspian Sea's flora, fauna and ecology as well as hurts to the human life and capital.

Calculation of the pollutions damages is very difficult; because it requires to determine the amount of polluters in land, air and sea and to explore the relation between pollution dispersion and environmental damages. It also requires considering the value of economic losses out of damages and destruction of environment as well as hurts to culture, history and communities. Despite of the problems, we have to prevent any encompass able losses.

The Caspian coastline countries' priorities must be to achieve sustainable development, preservation of the vital environment and prevention of ever increasing pollutions.

Of course, this idea is different among the countries.

Their top priority is exploration of gas and oil resources, while the oil is not important for Iran, but the environment is the country's priority. Although, Iran is interested in transmission of the Caspian Sea resources, the country emphasizes on environmental cares and preservation.

Prevention of the environment destruction is and inevitable must for the Caspian Sea sustainable development.

This requires concerted activities to encounter the potential and real threats.

The activities are as follows:

- 1- Individuals but consented activities of the countries to reduce pollutions;
- 2- Action in the frame works of international institutes; because cooperation's would be facilitated and enhanced in this way;
- 3- Cooperation's with NGOs and enhancing them; because they can play effective role both in domestic and international levels.

Also, there are a considerable number of NGOs who concern about the Caspian Sea environment;

- 4- Participation in extraction of resources in common basins as well as consultation for determining gas and oil pipelines, aiming at pollution reduction.

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ژئوپلیتیک زیست محیطی تبادلات انرژی در حوزه‌ی خزر

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چکیده

با فروپاشی اتحاد جماهیر شوروی و کشف گاز و نفت در آسیای مرکزی و قفقاز، دریای خزر با روابط و منافع پیچیده‌ی اقتصاد سیاسی بین‌الملل روبرو شد. این مشکلات عمدتاً ریشه در طرح‌های توسعه‌ی کشورها برای افزایش حوزه‌ی نفوذ خود در منطقه و روابط سنتی روسیه با کشورهای ایران و ترکیه دارد. مقاله‌ی حاضر با روش توصیفی-تحلیلی به بررسی منابع نفتی دریای خزر و مسیرهای انتقال نفت در این حوزه می‌پردازد. افزون بر این، مقاله‌ی پیش‌رو، نقش عامل‌های یاد شده در تعاملات بین‌المللی کشورهای خط ساحلی حوزه‌ی خزر را بررسی می‌کند. در نهایت، این مقاله مسائل ژئوپلیتیکی محیط زیست دریای خزر را با توجه به مواد آلاینده‌ی نفتی و سیاست‌های همه‌ی کشورهای حوزه‌ی خزر، تجزیه و تحلیل می‌کند. نتایج نشان می‌دهد که مسیرهای جدید انتقال انرژی و نقش فعالانه و تعامل همه کشورهای حوزه در پاسداشت محیط زیست، می‌تواند به عنوان خط‌مشی اصلی برای تعامل سازنده‌ی منطقه‌ای در میان کشورهای خط ساحلی خزر به‌شمار آید.