Journal of Research in Biology
An International Scientific Research Journal
ISSN No: Print: 2231 –6280; Online: 2231- 6299

Review

Geopolitical and environmental study of artificial islands in the Persian Gulf (from the perspective of international law)

Authors:
Sona Ghasemi[1], Seyed Abbas Poorhashemi[1], Ali Zare[2], Parvin Farshchi[3] and Hermidas Bavand[2]

Institution:
1. Department of Environmental Law, Faculty of Environment and Energy, Science and Research Branch, Islamic Azad University, Tehran, Iran.

2. Department of law and politic science, Faculty of Environment and Energy, Science and Research Branch, Islamic Azad University, Tehran, Iran.

3. Department of Environmental pollution, Faculty of Environment and Energy, Science and Research Branch, Islamic Azad University, Tehran, Iran.

Corresponding author:
Seyed Abbas Poorhashemi

Email Id:
abbas.poorhashemi@chmail.ir

ABSTRACT:
According to the Convention on the Law of the Sea 1982, constructing artificial island is permitted and countries can construct artificial islands in their own territory. Constructing artificial islands in the Persian Gulf area makes the countries in the region, especially Iran, to pursue the issue with more sensitivity. According to data dissemination principle of International Environmental Law, the countries that construct artificial islands should notify other states regarding construction and properties of their own artificial islands. Today, artificial island construction is being increased and this has caused many environmental crises including increase of water darkness and pollution and transport of coastal sediments. In this study, the destructive results of constructing artificial islands in the Persian Gulf environment, the effect of development of new land space from geopolitical view, and also constructing artificial islands from the viewpoint of International Law of the seas have been reviewed. Moreover, according to the fact that the notion of governance in modern International Law have been modified regarding the use of environment and sustainable development, the states will have limited right to construct artificial islands.

Keywords:
Persian gulf, Artificial islands, Environmental impacts, Geopolitical, International environmental law.

Article Citation:
Sona Ghasemi, Seyed Abbas Poorhashemi, Ali Zare, Parvin Farshchi and Hermidas Bavand
Geopolitical and environmental study of artificial islands in the Persian Gulf (from the perspective of international law)
Journal of Research in Biology (2017) 7(3): 2248-2265

Dates:
Received: 26 Feb 2017 **Accepted:** 04 April 2017 **Published:** 14 May 2017

INTRODUCTION

The Persian Gulf is one of the most important seas in the region with political, geographical, military, strategic, economic and environmental importance. The body of water in southern Iran, from Arvand river Mouth to Strait of Hormuz, has been named the Pars Sea, the Persian Gulf, or Al-'Ajam Gulf. The Greeks are the first nation who had called this sea as "Pers" and Iran territory as "Parseh", "Persay" and "Persepolis", meaning the country of the Persians. The Persian Gulf is a semi-closed sea with warm water in the South of Iran and North of the Arabian Peninsula, in South West of Asia and the end of northwest of Indian Ocean. It connects to the Oman Gulf through the Hormuz Strait with the width of 56 km and divides the peninsula of southwestern Asia. The latitude of this gulf is 23-30° and its longitude is 48-56°. Its width varies between 185 to 233 km (100 to 180 nautical miles) and its coastline length is 1375 km from Al-Faw Peninsula to Bandar-e Abbas. The average width of the Persian Gulf is 240 km and its length is about 990 km, and with a depth of 36 m, its water volume is about 8630 km^2. This gulf is 226 thousand km^2 and covers 0.062% of the earth water. The trough line of syncline of the Persian Gulf is near Iran's coastline which, after passing through the "Tonb" and "Faw" islands in the Hormuz Strait area, is extended into the coastline of "Al-Musandam" peninsula. The salt concentration in the Persian Gulf is between 37-70 parts per thousand and in the shallow depth areas, is 60-200 parts per thousand. At summer, the temperature is 32 to 34°C and, in winter, is 15°C in north and 21°C in Hormuz Strait, and the water temperature at 20-40 meters of depth is 21°C. Dust storm blows from the northwest to the center of the Gulf and it lasts for 16 to 35 days. The Persian Gulf is very important from three aspects of "gas and oil resources", "shipping and sea trade" and "sea animals". The depth of the Persian Gulf in eastern parts is about 50 to 80 M and in western parts is about 10 to 30 M. The deepest part of the Gulf is a hole of 93 m depth in southern Greater Tunb Island. Near all coastlines, in all direction, the depth is shallow. The normal depth in coastal zone is 18 to 20 m which is a sign of flat coast. Petroleum extraction and export, and ongoing increase of economic activities in the Persian Gulf states (especially from the begging of 1960s) have made the region one of the most important international channels. Considering these general physical properties of the Persian Gulf, the great amount of industrial pollution in the areas far from the coast which is brought by the permanent and seasonal moving waters, can be a great danger for bio-resources of this see in long term and normal conditions (Christopher and Hopkins, 2009). Many centuries ago, the French famous theorist, James Boudwin, had written that foreign policy of a state is defined by its geographical situation (Fowler, 1993). The Persian Gulf's special geographical situation has formed foreign policy of many states in the region and outside of it, and undoubtedly, the states of this region would have had another destiny if they had located in another region. The Persian Gulf has been always at the peak of important regions in the world and has been considered by the foreign and regional powers. This region is a homogenous environment covering nations which are different from some cultural aspects but have the same political, strategic and economic concerns (Zadeh, 2001). It is said that the Persian Gulf with the area of 500000 km^2, geographically is known as an inland sea (gulf). It can be said that although this gulf is located at the edge of Iranian plateau and Arabian Peninsula, it is a central region for states in this peninsula and is a root of geopolitical evolutions of the region. Various opinions have been raised regarding the reason of its special situation. For long times, the commercial importance and the existence of India as an eastern basis of one of the great emperors of the world (Britannia) are considered to be the reason. After World War II and independence of India in 1948, the theory of keeping the Persian Gulf as a gate of India lost its importance totally (Vosoughi,

2005). In twenty century, many researchers considered the oil as the reason for the Persian Gulf superiority. By creation of Israel state, new Islamic-Arabic disputes are raised against Israel and the combination of these issues adds to the previous reasons new aspects of the Persian Gulf importance. Referring to the special importance of the Persian Gulf, Brzezinski, the security advisor to Jimmy Carter, described it as a trembling string bow which is drawn to the end and is ready to shoot a fatal arrow into the world, and not only the region itself but the centers around it can also be instigated at any time and stimulate the two great powers (Glassner, 1993). If the Persian Gulf is being reviewed from this perspective, it will be have a universal importance on which the world security is depended. On the other hand, the Persian Gulf has a great importance for the states around it. In addition to the existing energy resources of the sea floor, the military control of the region and its numerous islands can have a great role in providing the security of its coastal states. As an instance, Hormuz, Hengam, Qeshm, Lark, Greater Tunb and Abu Musa islands are of the very important islands for Iran and Iran has always benefited from their strategic value. Although it has been for years that some pipelines have been built in Arabia to transport oil, the dependence of coastal states on the Persian Gulf is an evident issue. As to the research methodology, the study tries to answer the question on the geopolitical-environmental effects of artificial islands in the Persian Gulf. The study hypothesis is framed in such a way that it seems that constructing artificial islands will have geopolitical and environmental and as a result legal effects, the effects that, though not compatible with the status of the Persian Gulf environment, are in line with the geopolitics of the constructing states and help the development of their vital space. Of course, these effects will have special legal consequences as well. The main method of this study is analytical-descriptive and is based on libraries studies. Thus, library resources such as legal books were first gathered and then national and foreign articles on this issue were collected. After that, the resources were reviewed and the required data were extracted using slip writing method. Gathering and compiling of data, their analysis and conclusion are also the method of this study.

Theoretical framework of the study

Discovery, extraction and export of oil have changed the previously poor desert regions in the Arabian Peninsula to rich sheikhdoms with the highest per capita income in the world. With such wealth, the subsistence economy of the Arab Peninsula has changed into a profitable oil-based and tourist-based economy, and the oil incomes provide financial support for new projects on the health, education and other social grounds. Oil flourishing, economic development and increase of living standards had many consequences. Extensive population changes, fast urbanization, growth of land and sea constructions, increase of various pollutions, water scarcity, and wasteful and unbalanced use of natural resources are of these consequences (Dolatyar and Gray, 1999). The notion of territoriality is one of the important issues of political geography and reflects attempt of various states and groups to exercise their exclusive control and power over a defined space and location with political-economic, commercial, tourist and military motives. Mirhydar (2007) believes that the process of territorializing coastal states in the Persian Gulf formally, legally and based on the codification of related laws goes back to the years after holding the first conference on the law of the sea (1930). He considers territoriality as a sign of human tendency and effort to control and exert power over a place and also as a targeted effort. In the world and in the Persian Gulf region, artificial islands have been located near small and big cities in order to have access to more space for social, political, and economic goals. These constructions in many states have been considered as platforms for developing such infrastructures as airport, harbor, highway etc. They have been also used in reconstructing

native areas and establishing new tourist and residential places. Shorelines have been always interesting and attractive places for commercial, industrial and residential activities. Moreover, water-related activities such as sea transportation, fishing, agriculture and coastal tourism have increased the demands for expanding spaces in coastal cities and states. According to Nicholas was small, population density in these areas is three times more than world average population and immigration from rural areas to cities has worsened this issue. These conditions have posed some challenges. In the states of coastal cities, which almost have occupied most of the accessible territory, the circle of human and economy creates high demands for land. Moreover, political and geographical considerations added to these demands create many problems. For this reason, in some cases, cities are expanded by constructing new territory in the sea. Osaka, Singapore and cities of the United Arab Emirate can be mentioned as an instance. It should be mentioned that most new islands in Asia are artificial and have been used for construction of airport and harbor. However, such islands as Palm islands in the United Arab Emirates, in addition to the mentioned goals, are used for tourism and commercial activities, too. Artificial islands have also been constructed for environmental revival and refuge, such as Senobar and Hart Miller islands. Almost, among all registered cases, more than 80 percent of islands are in North America (Canada and America) and Asia (mostly in Japan, Singapore, China and United Arab Emirates) (Rabionet, 2008). Generally, the design and construction of artificial islands are mostly by sand or sand materials, normal rocks and coastal concrete engineering structures. The form of island and innovation in choosing the forms are also important and reflect cultural, social or symbolic grounds. The size and location of the islands have local, economic, social, and political effects on their neighboring areas. An area of 100-500 hectares has been established for commercial, transportation and recreational goals (Rabionet, 2008), which showed their vital role in the economy of the constructing states. Thus, artificial islands are used for many reasons and are proliferated during last years for solving lack of space issue and economic and political goals. Morphologically, artificial islands are of four categories based on the kind of use and construction goal:

- The first category includes artificial islands and constructions which are used for exploitation and discovery of natural resources (such as gas and oil wells, wind, energy generating waves, sea fishing).
- The second category relates to islands which are constructed and used for economic activities (such as harbors, tourism and recreational activities, and human habitats).
- The third category includes islands used for military purposes and governmental activities (military establishments and installations, land reclamation and prison construction projects).
- The fourth category relates to the islands for scientific studies (such as meteorological instruments, observing biodiversity, research platforms, and international organization's efforts) (Tsaltas *et al.,* 2010).

Singapore, Maldives, Okinotorishima and Hong Kong have been constructed to protect the land from natural disasters and also for establishing infrastructures of the state. But, the Persian Gulf artificial islands have been mostly constructed for tourism and economic activities and human habitats with political goals. According to Patrick, artificial islands had been used as a basis for industrial operations, including metal extraction and melting establishments, airport development, oil exploitation and production platform for ventilation structures of coal mine (Poole, 2009). Regarding the background of island construction, Omidi states that in the past, the present Salsa island in Miami consisted of several small islands which had been combined together during 1782 to 1838 and became a single island. To do

this, many hills were flattened and the island was expanded by filling the shallow depth parts and joining the islands together (Omidi, 2007). Today, Dubai and other southern states of the Persian Gulf are also constructing several islands including projects of the Palm islands, the world project, Dubai seaside island (Darya Kenar), Al Mouj Muscat, Nejoum Al Emarat, the Pearl Qatar, and Durrat and Amwaj islands in Bahrain. Now, the Palm Jumeirah is completed and becomes habitable and other projects have considerable physical progresses.

Reviewing the legal aspects of constructing artificial islands

According to the convention on the law of the sea in 1982, article 47, the territorial sea of states is 12 nautical miles. After this territory is the contiguous zone which is also 12 nautical miles. Next is the exclusive economic zone. Only coastal states can construct artificial islands in the Persian Gulf and all states around the Gulf should define their boundaries of the continental shelf and the exclusive economic zone. Except for the shipping through the exclusive economic zone and the right of innocent passage through the territorial sea, non-coastal states have no other rights such as discovery, exploitation, cabling, and etc. in the Persian Gulf and, according to article 21 of the convention which relates to shipping, protection of cables and pipelines, fishery, pollution, scientific research, customs, financial affairs, immigration and health, they should observe the laws and regulations of coastal state. The sovereignty in territorial sea is absolute and uncontested, just like the sovereignty of land (Bigdeli, 2009). The sea area behind the baseline is called internal waters. Some coastal states of the Persian Gulf have shorelines with direct baseline, which they use to measure their sea territories and as a result, extensive parts of the coastal areas are considered to be internal waters. There is no right for other states in this area. The position or location of artificial islands in various parts of sea territories can have different legal consequences. Artificial islands and their installations are human made, enclosed by water in all directions, exposed to high tide, and remain in a special geographical position for a defined time, thus, they act as a station with usual operation. Artificial islands have not the right of ownership and cannot have legal conditions of natural islands even when tide occurs, that is, these islands do not have their own sea areas such as territorial sea (12 nautical miles), contiguous zone (12 nautical miles) and exclusive economic zone (200 miles from the shore or sea area). Due to the authorities of the coastal states in the exclusive economic zone which are given to them based on the 1982 convention, they need to have safety zone of 500 meters (Mirhydar, 2007). The only regulations regarding artificial islands in the Geneva conference on the law of the sea in 1958 is paragraph 5 (Vosoughi, 2005) of the convention on the continental shelf which defines that installations used for exploitation and discovery of natural resources of continental shelf and are on continental shelf do not have the status and conditions of an island. They do not have territorial sea and do not have any effect in defining the limits of territorial sea of coastal states. Thus, artificial islands cannot be a shoreline or a baseline in measuring territorial seas. The United Nation convention on the Law of the Sea in 1982 supports paragraph (Glassner, 1993) and this conclusion. Paragraph 11 provides that the installations far from the shore and artificial islands have not been considered as permanent harbor establishments. Paragraph 60 (Rabionet, 2008) and 80 emphasize that artificial islands and installations constructed in an exclusive economic zone or continental shelf do not have territorial sea and their existence does not have any effect in defining the limits of territorial sea, exclusive economic zone, and continental shelf. Although artificial islands have been considered to be constructed in the high seas, this prohibition prevent states from subjecting any part of the high seas to their sovereignty (paragraph 89, 1982 convention) and from defining any territorial

area around artificial islands even in the high seas. As was mentioned before, since the Persian Gulf has no high sea outside the exclusive economic zone, this law does not applicable here. Only coastal states are permitted to construct artificial islands, a point which is explicitly stated in paragraph 60 of the convention in 1982. However, regarding high seas, any state can construct artificial islands regardless of national jurisdiction (article 87) (Aghai, 2009). Thus, according to the United Nations convention on the law of the sea, artificial islands are not considered as harbor establishments (paragraph 11) and, in case they are included in the limits of 200 nautical miles (370 km), they are subjected to jurisdiction of the nearest coastal states (paragraph 56). Therefore, artificial islands are not considered to be like the islands which have their own territorial sea or exclusive zones (Diba, 2009).

Research Data and Findings

The government of the United Arab Emirates declares that it will construct 325 artificial islands in the Persian Gulf waters during next few years. In January 2002, the then Dubai Emir started to construct artificial islands. This plan, called "the Palm Project", was launched by Mohammed bin Rashid Al Maktoum and includes three artificial islands in the form of palm which are called "Palm Jumeirah", "Palm Jebel Ali" and "Deira islands". After the completion of these three islands and also the world island project, the Emirate coasts will be expanded up to 1200 km. Experts expect the projects to be completed by the years 2010 to 2020. There is also another new project beside the Palm project which has been carrying out: an artificial island that takes the form of the earth map (the World) and itself consists of 300 small islands. This island has 6 km width and 9 km length, and the names of its small islands are based on the name of the world countries. The Palm Jumeirah with a main trunk and seventeen branches is expanded through an area of 5×5 km. The Deira island itself is about 46 million m^2 and is designed in the form of a palm tree with 41 branches. The Deira island can settle about one million people. Dubai has big plans which are carrying out in southern coasts of the Persian Gulf (Moran and Russell, 2008). The World island is being constructed on an area of the Persian Gulf with 6 km width and 9 km length. A vast breakwater and several drowned long rocks which are placed around the island protect the world island from big waves. Each of the private islands of the crown prince is about 23225 m^2 to 83612 m^2 and it is estimated that they will be sold at the cost of more than 6085 milliard dollars. The only way of transportation between this island and the main islands is by the sea. Recently, the developer of artificial islands (the Nakheel properties) has announced constructing new island in Dubai named "Waterfront" project. This vast-area project that forms a big circle beside the second Palm island of Dubai will cover a vast area of the coast. Based on Nakheel properties' plan, the Dubai coastal project will settle 400000 people. These planned (and apparently successful and purposeful) projects have encouraged Emirates and other states bordering the Persian Gulf to construct and develop tourism settlements. They are thinking of having a share of the growing and flourishing tourism industry. Dubai Eastern Emirate, Sharjah, has announced that it will construct the artificial archipelago named "Nojoum" by investing 4/9 milliard dollars. Nojoum Archipelago consists of 10 islands and covers about 5/6 million m^2 of the northeast coast, that is 15 km away from the Sharjah center. Ras al -Khaimah Emirate at the far east has planned to construct its own artificial islands. This 500 million dollars Emirate is planning to construct the artificial islands (Soraya or Saraya) with an area of one million m^2 (Salahuddin, 2006). In 2005, Sultan of Oman started to dredge and carry out his projects which were to be completed during 2008 to 2009. The Oman Al Mouj project which costs 805 million dollars, occupies 7/3 km of the shoreline and the adjacent area. The Al Mouj Muscat also covers 400000 m^2 of the reclaimed lands.

This island has 850 luxury apartments, 700 magnificent villas, recreational settlements and 250 boats, and thus it will have the capacity to increase and construct luxury hotels and resorts. The small island state of Bahrain competes hard to have considerable share of the tourism industry. Bahrain also constructed two artificial archipelagos (Amwaj and Durrat islands) (Fowler and Stephen, 2009). Bahrain fish island is a 1/2 milliard dollars archipelago and it was planned to be completed during 2009 to 2011. This archipelago consists of 13 islands with an area of 2 km^2 and needs 27 million m^2 gravel and sand. Bahrain fish island includes villas, hotels, estates and shopping centers with the capacity of 30 thousand people and two thousand people can visit this place daily. On the left, Qatar constructed an artificial archipelago at the distance of 350 m from the shores. The Pearl Qatar will be expanded up to 4 km^2 and 30000 people can inhabit there. Its construction costs 2/5 milliard dollars. The island includes widespread recreational areas, luxury hotels, retailers and dwelling places for the upper class. As a case study, each of these projects of artificial islands will have revealing and enlightening role in understanding the environmental impacts of artificial island construction on the sea.

Environmental impacts of artificial island construction on the Persian Gulf

With the help of oil revenues, the Arab states, especially the United Arab Emirates, have constructed challenging engineering masterpieces including the world tallest buildings and towers, the world most expensive inhabited islands as well as the world biggest airport. But these developed and exciting evolutions have cost a lot for environmental and water resources of these desert countries. Dubai has the biggest shopping malls with the biggest cloth stores, numerous hotels, cinemas and restaurants. Burj Al Arab which is the world second tall tower has been constructed on one of its artificial islands. Another Dubai important project is Atlantis Hotel which is located 20 m under the Persian Gulf and consists of 220 suites. It attracts large population which can have great impacts. These islands have been expanded in the sea using three pillars to be secured from external powers like wind. Since underwater projects are carrying out under the sea, they have to do with the life of people, environment, sea animals and things and sea currents which raises some concerns. In the United Arab Emirates, due to the mass constructions, the amount of greenhouse gases has increased intensively. The sea level has risen and it is expected that the artificial islands will go underwater up to next 50 years. Thus, due to these construction projects, the Arab states of the Persian Gulf, especially Emirates, face many environmental problems in the sea (McCreery and Khurshid, 2009). Based on a research project by the World Environmental and Water Resources Congress, Arab artificial islands have been constructed without any environmental studies and considerations and thus, the Persian Gulf environment is in danger. The islands and residents of the region are also facing natural disasters like earthquake, tsunami and tropical storms. These islands are being threatened by earthquake because of their flowing, weak and non-gradient nature. The earthquake from Iran's coast can terribly damage the structure of the islands. The 1945 tsunami of Makran earthquake had impacted on the entire Persian Gulf region. If such tsunami occurs again, artificial islands will encounter the resulting flood water (Kumar, 2009). Since the constructions in Arab states impacts on the residents and the surrounding countries, they should observe environmental laws. Global warming, evacuation of pollutants and the resulting natural dangers, etc. are environmental problems which should be solved in order to prevent other forthcoming dangerous impacts. As to the biodiversity of the Persian Gulf, at present, there are numerous biological species in the region. There are more than 50 kinds of fishes, 15 kinds of shrimps, and 5 five rare kinds of turtles. Experts have warned regarding the destruction of unique coral coast in Dubai. Turtles' habitat is the first place to be

destroyed. The water quality of the Persian Gulf has been also under the impact of these constructions. Iran asks for the conformity of artificial island construction in the Persian Gulf with the international environmental standards and regards construction of artificial islands as opposed to the 1958 and 1982 conventions on the sea. Moreover, erosion of Dubai coast has raised some concerns. More than 50 percent of the 66 km Dubai shoreline is being eroded. Engineering megaprojects, including constructing artificial islands, have had unpleasant impacts on the environment. The Persian Gulf artificial islands have endangered the sea life, destroyed coral reefs, added to the darkness and pollution of the sea water and buried the wild life (Butler, 2005). The projects of World and Palm artificial islands have created vast and attractive view in Dubai. Important changes have inflicted deep wounds on the environment from the sea level to the downward. Because of excavation and re-deposition of sands and gravels, the limpid waters of the Persian Gulf are covered by the sludge, which causes the sea to be too dark. The constructions also endangered marine inhabitants and habitats, shells of the seabed and fish species. The shells of the seabed are covered by two inches of sediments. While the coasts are being severely eroded by the sea currents, Dubai is thinking about standardizing the sea environment, and since it has endangered the native species, it has imported new foreign and destructive species into the Persian Gulf. Coral reefs and Avicenna marina or mangrove forests have different functions at different levels. These environmental elements provide united services including providing food and shelter for a wide range of marine species, protecting coastal areas from storm, preventing coastal erosion, protecting commercial fishing and recreational activities such as diving and sport fishing. Due to the construction of artificial islands, these functions have been disrupted to a great extent. During last 50 years, coral reefs have been destroyed and the artificial islands projects have intensified this process. The environmental experts believe that, unlike the opinions and reports of the company constructing the Palm island, due to the extensive excavations, the amount of the resulting sludge is so that creatures and rocks had been little by little buried under the sediments. Due to the presence of excavators and their dangerous equipments and also decrease in water clarity, three other places (Jumeirah artificial rock and Mallati dhow and barge) have become insecure and unsuitable for diving (Salahuddin, 2006). Review of the construction plans of Martin Meydist company showed that Jumeirah Palm island had impacted on the transport of coastal sediments and other environmental physical processes and has disrupted natural processes at different levels. Water transportation, especially waves along the coast, deviated the process of washing sand and mud and this can lead to considerable changes in the local oceanography. Also, the employees at the Martin company predicted that the increased salinity and darkness of water near the construction zone would be intensified. Now, these estimations have come true and the artificial islands have had the mentioned unpleasant results (United Nations University, 2005). Although Jumeirah Palm island attracts tourists and produces economic income, this income is at the expense of destroying some part of Dubai natural coasts. Jumeirah island has disrupted transport of coastal sediments and thus the coast has faced sediment loss. Sediment loss can be expected in downstream. Coastal current has to go around the construction which increases speed of the current and as a result the process of coast washing is increased in some regions. In fact, the coasts near Jumeirah island (especially eastern coasts) suffer from intense loss of gravel and sand. The main contractor of excavation for the Palm company, in its database, has shown that Wenword company has evacuated 8 km of Dubai coasts from west Jumeirah island. Such widespread evacuation of coast needs more than 3500000 m^2 of sands and will expand the coast about 30 meters. Wenword company

has used 450 million tons of stones to construct three breakwaters and has expanded them to prevent fast erosion in the future. Wenword says that the coasts need periodic protection in future. In its their database, it they had already shown a map of Dubai Emirate which is related to the affected region. Instead of artificial island, the company deliberately blames the nature and explains the impacts of the Palm (artificial islands) in such a way that shows them as secondary reasons comparing to the natural losses. Dubai coasts have been always ready to be eroded by the rough and roaring waters and winds, and coastal developing activities and great progresses in Dubai have impacted on the sediments of the coastlines (Salahuddin, 2006). Dubai coasts are so small that cannot compensate for the loss or lack of gravel and sand. Moreover, they cannot compensate for the loss and waste of sediments and sands which are naturally caused by transport of the coast. For this reason, the Palm company has to refill the impacted coasts of the Palm island. Williams confirms in his studies that the Palm artificial islands have intensely disrupted transport of the sediments along the shores and have deprived Dubai natural shores of the required gravels and sands. He estimates that the destruction of coastal sediments by the Palm islands will cause loss of gravels and sands in more than 40 km of the coast, which is 60 percent of Dubai 65 km shoreline. It is not only the Dubai coasts that require permanent reconstruction; tides have changed the tree branch of the Palm artificial island. Therefore, the Palm company has to periodically filled the coasts with gravels and sands or sediments, especially when it tries to have an ideal and controlled status. For stability and periodic nourishing of the coast with gravels and sands, human measures and natural erosion should be balanced. So, permanent use of gravels and sands has caused serious environmental damages in the region. The affected region by Jumeirah construction will be expanded up to 25 km^2. In fact, only one third of the affected region will be directly under the island (after construction). According to estimations by Dr. Williams, 10 to 15 percent of this region is covered by corals and the artificial Palm island has destroyed at least 0/83 to 1/25 km^2 of the corals. More or less, one million m^2 of the corals have destroyed and converted into some part of the Jumeirah island's foundation and column. Each of the coral within the range of 25 km has been destroyed under the pressure of permeation of excavation's sands, transportation and the island's pressures. The corals have been suffocated under the pressure of constructions. These pressures will destroy 1666667 to 2500000 m^2 of other corals. Thus, constructing Jumeirah island will destroy 7/5 to 11/25 km^2 of the corals, and by now, a widespread area of them has been destroyed. At the end of construction, the dead corals can form a line bigger than the Jumeirah island itself (that is the rate of coral mortality will be increased). The Nakheel properties has recently formed a new group to survive about 1869 fish species. These fishes have been trapped in the dam which was constructed in the Palm islands. The Nakheel properties needed a dam to construct a tunnel through which the seabed can be seen. They understood that when the dam is closed or discharged and drainage is started, the fishes will be died. Therefore, a group started to work to survive 35 marine species. However, some scientists, like Dr. Williams, believe that this measure was not taken for the buried corals in Jumeirah island and many of the fishes were died too (Salahuddin, 2008). If these figures are compared with estimations of Sultan Bin Salim and research and development manager of the Nakheel properties, the difference is revealed. The Emirates ruler has stated that the islands can be constructed without any environmental destruction. Natural beings and recourses of the region will remain safe. The process of construction project has no connection with various groups of live corals. The results by the expert group of the UN University showed that "island construction which has destroyed unknown number of regional sea things, animals and shells within

small rocks and coral rocks" has increased the widespread salinity of water and has always changed coastal currents and waves patterns. Therefore, transport patterns have impacted on and changed the neighboring sediments (Salahuddin, 2006). Emad al Hafar, the research and development manager of the Nakheel properties, claimed that the Palm projects artificially link corals to the surrounding area of Jumeirah island and for this reason, artificial islands reinforce sea natural environment. The construction region of the Palm islands, especially Jumeirah artificial island, is of the most prolific natural ecosystems in the region. This region has 34 coral species and 77 rockfish species, and the corals grow on hard lands. The region is ecologically very important and is located just beside Jebel Ali artificial island, which is a free zone and the biggest artificial excavated harbor in the world (Riegl, 1998).

Constructing artificial islands from geopolitical perspective

In various definitions of national power and its components, the emphasis is on the objective elements of the power like area, position, resources, population, accessibility, and etc. which have been the basic part of those concepts and extensions. The pleasant feeling of power inclines human societies and political units to make it permanent and widespread; an inclination which has been frequently theorized by various concepts and propositions. The vital space approach in the foreign policy of the governments is based on owing land and its resources to become self-sufficient and increase national power. Such approach has an undeniable role in the advent of colonialism and expansion of powers (Krane, 2005). The approach, called lebensraum (vital space), together with other racial tendencies had substantial role in directing Nazism foreign policy in Germany and its expansionism. It seems that properties of political geography in Emirates and other Arab states of the Persian Gulf and the pragmatic political ideology are the cause of aggressive foreign policy of these states. Lebensraum is a German word meaning vital space and a space for living, a space which is occupied by a nation with an increasing population. This notion is basic in the idea of Ratzel (1901), the founder of political geography in German, and in theorizing the government as a living being (animal). According to this viewpoint, government is better to be considered as a natural and biological phenomenon and not a social and mechanical one. The government functions differently by different institutes. Good functions showed that all constituting parts of government are healthy. Lebensraum in Ratzel opinion is a land with an organic framework. In the vital space, governments, like human and plant, need to be nourished by expanding lands and resources. On this basis, governments are in permanent competition with each other (Jones, 1980). Ratzel considers the biological notion of development as a key concept in geography, especially political geography, according to which border has a variable and dynamic notion. Using biological metaphors and similes, he talks about government as an organism in political and geographical analysis. In his opinion, governments have an organic and grow-able nature and in their growth and development, borders have temporary function. Just as humans live on the earth, the government also links to the natural laws like an organism on the earth. Therefore, development depends on the natural environment because the government is itself an organism. In the view of organic government, border expansion reflects the health and ability of the government; the governments grow like animals and, in lack of vital space, they become incapable and at last, they will die. Ratzel idea regarding lebensraum (vital space) developed the notion of organic government (Costachie and Damian, 2010). Generally, Ratzel introduced land expansion as a way to gain space. It seems that constructing artificial islands in the Persian Gulf can conform to the lebensraum (vital space) theory which can have effective and important role in the geopolitical status of the constructing country, and of

course, can be a threat for regional security of the Persian Gulf, too. Constructing Emirates artificial islands with the length of tens of kilometers have such positive and strategic impacts on their coasts that they can add thousands of hectares to their states.

Constructing artificial islands from the viewpoint of Kuwait convention, 1978 (ROPMI)

Iran, Bahrain, Qatar, Iraq, Kuwait, Oman, Saudi Arabia, and the United Arab Emirates are the states which have concluded "Kuwait regional convention for cooperation on the protection of the marine environment from pollution" and subsequently established "the regional organization for the protection of the marine environment (ROPME)". The Kuwait convention in 1978 declares that the Persian Gulf is of the special regions and takes some measures to protect regional natural ecosystem by concluding the mentioned convention and the additional protocols. In the introduction to the convention, the parties undertake to observe the following goals:

- Mindful of the peculiar hydrographic and ecological qualities of the marine environment of the area and its specific vulnerability to pollution, and conscious of the need to guarantee that the procedures of urban and provincial development and resultant land use must be done in such a way as to protect, quite far, marine resources and coastal amenities, and that such development must not prompt deterioration of the marine environment.
- Convinced of the need to guarantee that the procedures of industrial development must not, in any capacity, harm the marine environment of the area, risk its living resources or develop hazards to human wellbeing.
- Perceiving the need to develop an integrated management way to deal with the utilization of the marine environment and the coasts which will permit the accomplishment of ecological and development objectives in an amicable way.

According to article 3 of the convention, the contracting states undertake to, jointly or individually, take necessary measures referred in this convention and the protocols in force to which they are a party to prevent, abate and combat environmental pollution of the sea area. Also, the contracting states shall co-operate with the competent international, regional and sub-regional organizations to establish and adopt regional standards, recommended practices and procedures to prevent, abate and combat pollution from all sources in conformity with the objectives of the present convention, and to assist each other in fulfilling their obligations under the present convention (Francis *et al*., 2002). Article 13 of the Kuwait convention, like article 235 of the convention on the law of the sea, defines a general obligation to formulate regulations as to the liability and compensation of the contracting states. As per this research: "The contracting states attempt to co-operate in the formulation and adoption of appropriate guidelines and methodology for the evaluation of:

Civil liability and compensation for damage resulting because of pollution of the marine environment, remembering appropriate global rules and techniques identifying with those issues.

Liability and compensation for damage coming about because of violation of obligations under the present convention and its protocols .

The convention prescribes two types of legal liability: A) liability resulting from violation of international regulations, B) liability resulting from violation of obligations under this convention and its protocols. Under these conditions, the states constructing artificial islands in the Persian Gulf, besides the regulations set in the convention on the law of the sea, should respect regional regulations. Based on this convention, the constructing states are responsible for any damage to the environment, and in case of any damage to the environment of the region or the

neighboring states, they are obliged to compensate it while accepting its liability. Moreover, before taking any action, they are obliged to review the environmental consequences. However, the present evidence and documents show that the constructing states do not consider environmental regulations and public rights in construction of the islands.

Legal consequences of constructing artificial islands in the Persian Gulf and the Gulf of Oman

The convention on the law of the sea in 1982 has special emphasis on the necessity of considering marine environment in construction of artificial islands. Based on this convention, the required condition in constructing artificial islands is not to cause damage to the environment and living and non-living resources on the seabed and under the seas (article 235, 1982 convention) (Kim, 2015). The considerations to be observed during constructions are water deepness, weather, amplitude of the biggest wave, tidal amplitude, marine currents, conditions of the building foundation, earthquake risk, sources of materials, shipping lane, existing pipelines, legal aspects, environmental considerations, and fishing considerations. Failing to observe these principles results in environmental challenges and problems. Legal findings showed that article 56 of the convention on the law of the sea in 1982 permits governments to construct artificial islands. According to this article, governments have the right to discover, extract, protect and manage living and non-living resources. Also, constructing and using artificial islands and other installations are within governments' competence. Based on the convention on the law of the sea, the governments are permitted to construct artificial islands, and article 60 of the convention concentrates on this issue. The article sets that governments have the right to construct, regulate and use artificial islands in the exclusive economic zones as well as the right to exploit living and non-living resources. Also, according to this article, coastal government has exclusive jurisdiction over installations, customs, fiscal, health and immigration laws, and establishment of a safety zone around them based on international standards and to secure navigation. However, these islands should not interfere with the international navigation, and more important, the islands do not have natural or marine territories and they have no effect in defining the limits of territorial sea (Churchill and Lu, 1988). Another important point is that artificial islands should not be constructed without considering the rights and interests of others and environmental impacts, and the constructing states are obliged to respect others' rights and to observe mutual interests. Therefore, in constructing artificial islands some other principles should be observed. In designing artificial islands, a developed technology should be used, and it should be economically practical and, most importantly, it should protect the environment (all national and international security laws on the protection of ocean and marine environment should be observed). The design of artificial islands should be confirmed by the Department of Environment and Shipping. Artificial islands should be responsive to the needs of appropriate excavation, discovery and exploitation of oil, and disassembling parts and transportation after intentional and unintentional destruction. Thus, due to all this necessities, various installations have been constructed in the sea and this means more pollution of the sea. The states can construct artificial islands only in case that they observe all environmental conditions, otherwise, their act has unpleasant impacts on the marine environment and mutual interests of the states. In the studies carried out on this issue, Ashqaly refers to four other basic principles which should be considered by the states in constructing artificial islands. The principle of liability of states for protection of the environment, the principle of taking protective measures before any action, the principle of paying compensation by the polluting states, and the principle of sustainable development (Ashqaly, 2010). The findings showed that

the states constructing these islands have not observed these principles and this have unpleasant environmental and regional impacts. Moreover, the twelfth section of the convention on the law of the sea particularly refers to the marine environment. Article 192 of the convention in 1982 defined that the states are obliged to protect the marine environment. Article 193 recognizes the sovereign right of states to exploit natural resources in case that the marine environment is being protected and preserved. In article 194, the necessary measures for prevention, reduction, and control of the marine environment are discussed. These measures should be in such a way that keeping the marine environment away from any polluting resources and should include preventing the release of toxic, harmful or noxious substances into the sea, preventing pollution caused by vessels' accident, ensuring the safety in the sea, preventing intentional discharge of the ships, preventing the pollutions resulted from installations and equipment's used in exploration and exploitation of the natural resources in the sea, and ensuring their security. Paragraph 5 of article 194 also emphasizes on taking necessary measures to protect rare and fragile ecosystems and the habitat of various sea animals. Control of waters should be so that the pollution is not transported from one part to another. The studies showed that the Nakheel properties has violated paragraphs 97 and 98 of the Federal law, NO. 24, and has not taken any measures to submit and carry out a plan to value the environmental impacts of other artificial islands projects. Construction of these islands has destructed the second rich habitat of the Persian Gulf. Since the Persian Gulf is a closed and semi-closed sea, environmental pollutions remain in the sea at least for four years and they turn round themselves. Under these conditions, constructing marine installations and artificial islands have worsened the environmental situation. Changing regional structure has led to destructing environmental damages and these various damages to the life of regional plants and animals are the missing link of these plans which has forgotten during the construction process. During construction of the first Palm island, 1/65 billion m^2 of sands and 87 million tons of stones had been transported and at the end of construction, one billion stones had been brought to the site (Ponian, 2003). Deposition of carbonated sediments around the artificial islands during very short period, i.e. about five years which is completely evident from comparison of images and earth control, indicated that the islands are growing and thus, the Persian Gulf width is decreasing in these areas. In next 10 years, all shallow-depth shorelines will be changed into a more or less dry area by the artificial islands, and as a result, the parts which are more far away from the shore will become shallow and the Persian Gulf morphology will be changed, too. Due to the construction of Jumeirah island, three places suitable for diving are no longer usable and five other places also have been damaged severely. In 2004, the United Arab Emirates Diving Association also confirmed that construction of Jumeirah and Jebel Ali islands have impacted on nine public diving places. The parts which have been classified by the Diving Association as severely affected areas does not have limpid water anymore and the increased darkness and muddiness of the water have made the fishes to go away from those parts (the increasing constructions and noises have frightened the fishes). Totally, due to new activities and plans, the Dubai divining industry is being destroyed. Due to the large amount of sands and dusts being transported and their release into the widespread areas of the sea, numerous animals are killed or infected by toxic pollutions. Water darkness has spread up to kilometers and a lot of fishes, corals and sea animals have died or gotten damaged severely because many of these things, like molluscs, are sensitive to water turbidity and thus, they die. Moreover, since the movement of water has been with difficulty, the marine nutritious resources are also gotten damaged. With progress and completion of

these plans in future, the destructive environmental effects will be intensified. More coral coasts will be impacted and the widespread area of the islands will have more impact on the natural currents.

CONCLUSION

Constructing artificial islands certainly have positive and negative consequences. The positive consequences are that the Persian Gulf can be changed into a peace and economic gulf and as a result there is flourishing of tourist, political and economic activities. Also, it causes political stability. Since Arab investment for these islands is long term and huge, they cannot do anything against the interests of states in the region in order not to endanger their economic and tourist interests. Thus, the islands can help to grow regional economy and cooperation. However, these constructions have negative impacts, too. Generally, the Persian Gulf is a region with special and fragile environmental conditions. Each 4 to 5 years, its water changes and any changes in the form of the sea will have unpleasant impacts on all coastal states. During last years, environmental pollution has been caused by human activities and irregular exploitation. Water pollution is a big part of environmental pollution. In these conditions, it seems important to analyze political and environmental effects of this issue because any ignorance in pursuing the case can endanger national interests of the state. At present, the United Arab Emirates has control over 60 km^2 of the Persian Gulf islands, constructing these islands not only results in decomposition of the environment but it also causes geopolitical changes in the Persian Gulf. Therefore, the power of Arab in defining borders and controlling the sea will be increased. Totally, it can be said that non-coastal states do not have the right to construct artificial islands in the Persian Gulf. Constructing artificial islands result in increase of water turbidity, burial and suffocation of the wildlife, change and transportation of coastal sediments, and transforming sands into a swamp. Due to political pressures and legal excavations, the constructing company has ignored the environmental laws and constructed the islands on the corals. Increase of Arab states' share (twenty fold increase of the coasts), their claim for more rights, and increase of their dominance over the Persian Gulf are other resulting problems due to these plans which will be intensified in future. The bed of the Persian Gulf near Dubai coasts are mainly constituting of sands, non-adhesive and loose sediments. Sea infants cannot live on these non-adhesive sediments which cover the entire hard seabed. The sludge will increase water darkness, create a lot of swamps and affect the species. The pattern of tidal currents will also be changed. There will be an extreme deposition behind the island which will change the pattern of currents. Waste waters will increase and these conditions will worsen the life situation of plants and animals. The United Arab Emirates Diving Association (UAEDA) has criticized that Jumeirah Island has polluted this island with a grey, mortar- and silt-form material. The region of Jebel Ali Island is on the wildlife part of Jebel Ali and has impacted on the second rich habitat of the Persian Gulf. According to the convention on the law of the sea, coastal states can construct artificial islands in the waters under their control, but they should consider environmental programs and mutual interests of the marine neighbors, otherwise, these constructions are not acceptable from the international law viewpoint. Therefore, due to the destructive environmental impacts of emirates artificial islands, these islands have the least compatibility with the marine environment and interests of the states. According to these facts, the research hypothesis which states that constructing artificial islands is not compatible with environment and destructs the environmental conditions of the region is proved. Therefore, the legitimacy of these islands is considered to be a serious challenge.

- The expert studies indicated that constructing

artificial islands impacts on the general circulation in the Persian Gulf and will have long-term and serious effects on it, the effects which have more serious impacts on the morphology of the coasts.

- The pattern of ebb tides in the Persian Gulf, the impact of which is usually on the northern coasts of the Persian Gulf (Iran), and of the flood tides, the impact of which is usually on the southern coasts of the Persian Gulf (Emirates), has changed. More detailed analysis of this case requires a mathematical model.
- Deposition behind the Emirates artificial islands, apart from adding thousands of hectares to the coastal lands, will increase the nutrition of shorelines in the areas located after the artificial islands (eastern Emirates), which is near the Hurmoz Strait. The resulting changes together with the impact of the sea waves should be seriously reviewed.
- The effects of geology, sedimentology (deposition – erosion), sediment hydraulics, natural filtration of the coastal sediments, environment, ecosystem, fisheries, seabed changes, marine corals, marine biology and law of the seas should be seriously reviewed in separate studies.

According to the report by the experts of international monitoring organizations, the primary consequences of obvious manipulation in the nature include:

- The sole recognized coral coast has been destructed during this operation.
- Coastal nests of the sea turtles, "of the special species of the Persian Gulf region", have been destructed.
- Natural water currents have changed their route.
- The resulting sludge of this operation has changed the limpid waters into a swamp within the limits of artificial islands and this process is advancing.

While the Persian Gulf coastal states have not yet shown any effective reaction in this regard, the second project has been started and even more than that, by constructing an artificial park under the sea for divers, they have evidently violated the international laws of the seabed. Moreover, the regional ecosystem and most of coastal corals have been destroyed. But, the main disaster of this project, which is at its first steps of the process, is that it totally destroys about 63 km^2 of the Persian Gulf ecosystem and, if the project be completed, it should be said "good bye the Persian Gulf". Also, generating the pollutions and not protecting the Persian Gulf environment against explorations, excavations, and pollutions of regional organizations are other consequences of this project, and more regrettable is that such states as Kuwait and Bahrain have recently declared that they also have similar plans to construct artificial islands. Changes of the sea level on universal and local scale have a considerable role in changing the shoreline. These changes result from the climate, sea surface temperature, wind speed and moisture which control the density of water, which itself depends on the evaporation rate. The Persian Gulf with an average depth of 42 m is also affected by these factors.

Marine currents

The invasion of seasonal unstable waters from the Indian Ocean to the Persian Gulf causes the sea level to rise. During seasonal changes, sea-level fluctuations impact on the coasts and change the sea level. When waves reach the coast, wave breaking causes the sediment grains to move from one part to another. Therefore, any obstacle in the Persian Gulf prevents sediment transportation and as a result they deposit there and current lines change. The speed of sea current has had a great impact on the amount of sediments being transported and during years, the currents lift up the sediments and transport them to another place. Constructing Emirates artificial islands with various lengths and shapes impacts on the natural cycle of tidal currents, which is the source of natural purity of water. The pattern of sea currents in Iranian coasts and Qeshm,

Table 1. The average and standard amount of density, salinity and temperature in the Persian gulf

The Persian Gulf	Temperature		Salinity		Density	
	Standard	Average	Standard	Average	Standard	Average
Jan-Feb	22.7	1.2	36.8	0.2	25.4	0.5
Mar-Apr	23.5	0.8	36.7	0.1	25.1	0.2
May-Jun	27.6	1.1	36.8	0.2	23.9	0.3
Jul-Aug	32.0	0.7	37.2	0.3	22.7	0.4

Abu Musa, Greater and Lesser Tunbs and Siri islands, and even, to some extent, the entering and leaving currents of the Hurmoz Strait will be changed in the long term which will result in serious changes of the regional ecosystem and probably will even transport Avicennia marina forests and coastal and marine trees.

Wind

The wind direction in the Persian Gulf is mostly NW and it has more intensity in winter compared to summer. Therefore, in winter, the Persian Gulf is under the pressure of more air due to the winds on the surface of water, and this factor affects the sea level. Constructing these islands also impacts on the wind generated currents, the pattern of which should be studied by mathematical models.

Density

At the far end of the northern Persian Gulf, in winter, the water density is more compared to the southern and western parts of the Gulf. Along the southern and western shorelines, due to more moderation of the climate in winter and high rate evaporation, water salinity is higher and this amount of salinity is considered to be a controlling factor in transportation of sediments. The obstacles created by the construction of artificial islands in the Persian Gulf can affect the water cycle and even change the pattern of density currents.

An example of average changes in the temperature, salinity, and density of the Persian Gulf is shown in the following Table 1

SUGGESTIONS

- The governments construct or owe artificial islands should notify regional states about the environmental effects of artificial islands.
- Artificial islands should not disrupt free ship transport and the necessary strategies for eliminating the environmental destructive impacts and compensating environmental damages should be prepared. Concerns of other states should also be considered.
- The flag or coastal state of artificial islands should cooperate with ROPME Environmental Organization on sharing information, exchanging experiences as well as planning for emergency cases and other related considerations in construction and function of artificial islands.
- The flag or coastal state of artificial islands should have required plans and preparedness in order to observe the rights of coastal and non-costal states, especially with regard to the right of Innocent passage through the territorial sea. This can include preparing traffic plans and transit ways.
- Considering the environmental impacts of artificial islands, the owner of artificial islands should prepare programs and regulations to minimize the destructive impacts of constructing artificial islands which can include creating an artificial environment to help natural habitation of species which have been endangered due to living around these islands.
- The flag or coastal state of artificial islands should cooperate with other regional states. The important point is that all coastal states of the Persian Gulf are Islamic states and there is a strong legal principle in Islam which is accepted by both Shiites and Sunnis and that is the principle of no-harm or preventing or stopping any harm to the interests of other Muslim

Brothers. This principle should be considered in constructing artificial islands and all other installations.

- The Nakheel properties would prepare a plan to value the environmental impacts of Jumeirah, Jebel Ali and Deira islands before their construction and all constructions should be stopped until the completion of this plan.
- The corals should be protected and the protectors should be used against the silt. The developers should prepare comprehensive environmental strategies to organize the behavior of inhabitants of the artificial islands.
- At the first stage, the construction of artificial islands in the Persian Gulf should be referred to the United Nations, and by submitting frequent complaint to the international courts, this state should be put under pressure.
- Public agencies and groups can also easily notify the world and international defenders by publicizing this issue, and in such a way, the United Arab Emirates will be put under pressure and at least, constructions of these projects by other states will be stopped. At the same time, regional states can notify the defenders regarding the plan of constructing artificial island on a very large scale in order to prevent such projects.

REFERENCES

Aghai B. (2009). Artificial islands in the Persian Gulf and the International Law of the Sea. *Persian Journal,* 4 (4): 2-5.

Ashqaly A. (2010). The construction of artificial Islands in the Persian Gulf from the perspective of International Law of the Environment. *Research and Scientific Quarterly* (In Persian).

Bahman Aghai Diba. (2009). Legal regime of the Artificial Islands in the Persian Gulf. *Soochow Law Journal,* 6(3): 1-3 (In Persian).

Butler T. (2005). Dubai's Artificial Islands Have High Environmental Cost the Price of "The World". Dubai's Artificial Future,

Christopher CE and Hopkins C. (2007). Test Report for 'Reef Systems' At the Palm Jumeirah. Astorp, Sweden, 19 p.

Churchill R and Lu A. (1988). The International Sea Law by Translation of Agai. The Office Poltical and International Studies, 5th ed. Sixth Publish, Tehran (In Persian).

Dolatyar M and Gray T. (1999). Water politics in the middle east: a context for conflict or cooperation?. Springer, 255 p.

Fowler J and Thomas Stephen C (2009). Amwaj islands constructed with geotubes. Bahrain, 14 p.

Fowler SW. (1993). Pollution in the Gulf, Monitoring the Marine Environment. IAEA Bulletin. 13 p.

Francis J, Nilsson A and Waruinge D. (2002). Marine protected areas in the Eastern African region: how successful are they?. *A Journal of the Human Environment,* 31(7): 503-511.

Glassner MI and Martin Ira. (1993). Political Geography. New York: John Wiley and Sons, INC.

Greta Jones. (1980). Social Darwinism and English thought: the interaction between biological and social theory, Harvester Press, the University of Michigan, 234p. Available from: http://www.politicsprofessor.com/ politicaltheories /organic-theory-of-the-state.php.

Kim SK. (2015). Marine Pollution Response in Northeast Asia and the NOWPAP Regime. *Ocean Development and International Law,* 46(4): 17-32.

Krane J. (2005). Arab Island Resorts Are Reshaping

Geography. Associated Press, Available from: http://www.stumbleupon.com,

Kumar A. (2009). Reclaimed Islands and New Offshore Townships in the Arabian Gulf: Potential Natural Hazards. *Current Science,* 96(4): 1-6.

McCreery K and Khurshid M. (2009). Introduction to Civil Engineering Critique.

Mirhydar D. (2007). The Trend of Territoriality of the Littoral Countries in the Persian Gulf. *International Quarterly of Geopolitics,* 3(1): 1-20 p (In Persian).

Mojtahed Zadeh P. (2001). Security and territorial issues in the Persian Gulf Geopolitics. Marine Institute for Political and International Studies, Tehran, Iran.

Moran D and Russell AJ. (2008). Militarization of Energy Security. *Strategic Insights,* 7(5): 1-18.

Omidi A. (2007). International Law and the Construction of Artificial Islands. *Magazine of Information of Political-economic,* 23(3): 73-77 (In Persian).

Ponian C. (2003). The effects of the 1991 Gulfwar on marine and coastal Environment of the Arabian Gulf. M. S. C aquatic resource management, King's college, London. 44 p.

Poole E. (2009). The Dubai Palms: Construction and Environmental Consequences. World Environmental and Water Resources Congress.

Rabionet IC. (2008). Indicators for Evaluating the Impact of Artificial Islands on the Barcelona Coast. *Coastal Management,* 36(3): 254-273.

Ratzel F. (1901). Der Lebensraum: Eine biogeographische Studie, in: Festgaben fur Albert Sch ¨ a¨ffle zur siebenzigsten Wiederkehr seines Geburtstages am 24. Februar 1901, edited by: Bucher, K., Laupp, ¨ Tubingen

Riegl B. (1998). A new reef marine reserve in the southern Arabian Gulf-Jebel Ali (Dubai, United Arab Emirates). *Coral Reefs,* 17(4): 398-398.

Salahuddin B. (2006). The environmental impacts of the artificial islands construction in Dubai of the UAE. Duke University.

Salahuddin B. (2008). The marine environmental impacts of artificial island construction (Doctoral dissertation, Duke University). 96 p.

Silviu Costachie and Nicolae Damian (2010). Ratzel and the German geopolitical school-the inception of culture as an essential element and factor in the political geography. *Revista Română de Geografie Politică,* 12 (2): 298-308.

Tsaltas G, Bourtzis T and Rodotheatos G. (2010). Artificial island and structure as a means of safeguarding state sovereignty against sea level rise. A law of Sea Perspective, 17 p.

United Nations University (2005). International network on water, environment and health. Coastal Zone Management in the Persian Gulf.

Vosoughi MB. (2005). On Persian Gulf and neighboring countries. Samt Publication, Tehran, Iran.

Ziai Bigdeli MR. (2009). Public international law. Ganjedanesh Publications (In Persian)..