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Construction of Artificial Islands in Southern Coast of the Persian Gulf from the Viewpoint of International Environmental Law

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Abstract

Among the rapid and rampant costal developments of Persian Gulf region, creating artificial islands is one of new-emerging and developing phenomena in this area. Extensive activities initiated by The United Arab Emirates and other countries of the southern coast of Persian Gulf to create such islands, have had widespread environmental consequences and have led to the criticism of environmentalists. International environmental law has complied comprehensive rules and regulations in order to protect the environment, in particular, protecting the marine environment. Numerous conventions have focused on the issue of marine environment protection, and have mentioned the obligations and responsibilities of states regarding the damages and pollutions to the environment caused by their developmental activities. Persian Gulf coastal states, which are mostly a member of these conventions, are obliged to observe the environmental obligations and regulations related to their widespread activities in the coasts of Persian Gulf, which often leads to drying the sea and land reclamation.

Keywords: artificial Island, International environmental law, law of the sea, Persian Gulf

1. Introduction

While in the 20th century the main pollutants in the Persian Gulf, like other seas, consisted of oil, shipping, dumping of waste into the sea, seabed activities and land-based activities, since the early 21st century another main source of pollution has affected the environment of this region. This source of pollution is the construction of artificial islands, whose pioneer in developing was the United Arab Emirates. At the beginning of 2001 Sheikh Maktoum bin Rashid Al Maktoum, Ruler of Dubai, talked about the start of huge and ambitious projects to build three Palm Islands and World islands, the smallest of which was Jumeirah Island with an area of 25 km built in 2006 in Dubai coast. The building of other islands namely Jebel Ali, Deira and The World, each of which is bigger than the other, started in 2002 and 2004. Although the establishment and implementation of the projects were successful, but the global financial crisis beginning in 2008 postponed the completion of some of these projects.

The construction of these islands was started with economic and tourism motivations, but regarding the various consequences other political and geopolitical motivations played a role in Emirates' leadership in building these islands. This work by Emirates encouraged other Arab countries around Persian Gulf to build similar islands; in a way that Qatar, Bahrain, Kuwait and Oman started to expand their coastline with artificial islands. Regardless of the motivations of Arab nations to build such islands, legal and environmental consequences of these huge

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projects inside a semi-closed sea like Persian Gulf, in which every kind of human interference can have numerous consequences, can be investigated from several aspects. In the present study it is attempted to briefly mention the projects of building artificial islands in southern part of Persian Gulf and the environmental consequences, as well as stating the principles of international environmental law for such constructions, in order to determine the obligations and responsibilities of coastal states regarding protection of the marine environment.

2. Artificial Islands; A New-Emerging Phenomenon in Southern Coasts of Persian Gulf

Since the beginning of 21th century the Persian Gulf region has witnessed the emergence and development of a phenomenon in the coasts, which is called artificial islands. Once Emirate of Dubai, which is one of the seven United Arab Emirates, announced its intention to build Three Palm islands and World island other countries in the area also started similar plans to develop their land.[5] In order to understand the importance of constructions of some of the Arab countries in Persian Gulf in the southern parts brief information regarding the projects which have been or will be done in the mentioned countries, will be provided.

2.1 Artificial Islands in United Arab Emirates

2.1.1 Dubai

A. Palm Islands

Palm Islands is composed of three islands: Palm Jumeirah, Palm Jebel Ali, and Palm Deira. Palm Jumeirah covers 600 hectares of land and with Palm Jebel Ali add 120 kilometers of beachfront to Dubai. Palm Jumeirah spans approximately four by five kilometers. Palm Jebel Ali covers 6 by 7 kilometers. Palm Deira with an area of 80 square kilometers will be the largest island out of all of them.[6]

All three islands share their date palm tree form with a spine, fronds, and a long trunk, a crescent shaped breakwater, sub-sea vehicular tunnel and monorail, sub-sea horizontal directional drilling (HDD) crossings on both eastern and western ends of the site and pies on each side of crescent. Palm Jumeirah, in particular, has 17 fronds and a 1.5 km long trunk.[7] Construction of Jumeirah island completed in 2008 and completion of the two others were postponed because of financial crisis.

B. The World archipelago of Dubai Islands

Beside the projects for creating sea palms, Dubai has another huge project; the project for building an island called "World". The World Islands is an artificial archipelago of 300 various small islands constructed in the rough shape of a world map and the lands are in the forms of the continents on earth, located in the waters of the Persian Gulf, 4.0 kilometers off the coast of Dubai, The World islands as the Palm Islands are composed mainly of sand dredged from Dubai's shallow coastal waters, and are one of several artificial island developments in Dubai. The total district of the World Island will be 9 in 6 km, which is encompassed by a huge oval-shaped breakwater. The size of each island will vary from 23000 to 84000 square meters and the height is between 50 to 100 meters from sea level.[8]

C. Dubai Waterfront

Dubai waterfront will be in the form of a star and a crescent, and it is in a way that will perform as a shelter around Jebel Ali Palm Island. This project is a conglomeration of canals and artificial archipelago; it would occupy the last remaining Persian Gulf coastline of Dubai. The waterfront is designed to be a combination of a series of multi-functional areas including commercial, residential and recreational ones.[9] The implementation of Waterfront Project was put to a halt following the 2008 world financial crisis, and Nakheel Company had to stop many projects.

2.1.2 Abu Dhabi: Alsaadyat Island

Beside Dubai other Emirates of United Arab Emirates also created islands in their coasts, among which Abu Dhabi Emirate can be mentioned. The biggest island build in this Emirate will be "Alsadyat" Island with an area

5 . Aghai Diba, Bahman, Legal Regime of the Artificial Islands in the Persian Gulf, 10 September 2009. Available at: http://www.iranreview.org/content/Documents/Legal_Regime_of_the_Artificial_Islands_in_the_Persian_Gulf.htm

6 . The Impact of the Palm Islands, United Arab Emirates, available at: https://sites.google.com/site/palmislandsimpact/general-information/construction-of-the-islands

7. Ibid.

8. The threat of Iran's maritime boundaries by the United Arab Emirates (UAE), Fars news agency, 2012/4/20.

9. United Arab Emirates Yearbook 2006, P. 179.

of 27 km. For the construction of this island 100 billion Dirham be will paid.[10]

2.1.3 Ras al-Khaimah: Al-Qasr Island

Emirate of Ras Al Khaimah also started the project for building Al-Qasr artificial island and the project is led by the Saudi al-Wassam company. This island will be constructed by 1.1 billion Dirham investment of Alwesam Company in Persian Gulf. Al-Qasr Island has been built to develop tourism in Emirate of Ras Al Khaimah with an area of more than 500000 square feet.[11]

2.1.4 Sharjah: Al-Nojoom (Stars) Island

After Dubai, the Emirate of Sharjah also decided to build artificial islands named Stars in the waters of Persian Gulf. Stars Islands consist of 10 islands, the total area of which is 33 square km. This project involves the construction of more than four thousand villas and commercial units. For the first phase of these islands 16 billion Dirham was spent. Al-Nojoom Islands will be built between Sharjah and Dubai, and the 10 islands will be connected so that tourists can easily visit them. The construction of these artificial islands will be done by financial assistance of Abu Dhabi Islamic Bank.[12]

2.2 Other Southern Coast of the Persian Gulf Countries

Beside United Arab Emirates, other countries in the coast of Persian Gulf started to build artificial islands in their coasts. Some of these projects are as follows:

2.2.1 Bahrain

Amwaj Islands: Amwaj Islands are a group of man-made islands located in the Persian Gulf to the northeast of Bahrain, near the coast of Muharraq Island. It covers roughly 2 798 000 m² of the sea with an area of 9.5 km, and at the end this island is connected to Muharraq area near Jalali City. The project of Amwaj Islands, which is a modern engineering project in Bahrain, was done in three main phases which included land reclamation, developing infrastructures and finally developing the facilities. The project is being developed by an Ossis Property Developers with a $1.5 billion investment.[13]

Durrat Al Bahrain: Durrat Al Bahrain is the largest artificial island in Bahrain after the Amwaj Islands. The US$ 6 billion project will consist of a series of 13 large artificial islands, covering an area of over 20,000 km2. It will comprise six atolls, five fish-shaped islands and two crescent-shaped islands.[14]

2.2.2 Qatar

Pearl Island: Qatar made similar attempts with the start of Pearl (Morvarid) Island, a luxurious residential island, which was opened in 2009. Qatar Pearl Island is 2.5 dollars project built in an area of 1000 acres. One the project was finished; 32 km of new coastline was added to Qatar. Qatar Pearl consists of 13 small islands.[15]

2.2.3 Kuwait

Towers Island: In recent years, Kuwait also following Dubai and Bahrain has started to build an artificial island named Towers Island in the waters of Persian Gulf. This project is a tourist one, which is the first of its kind in Kuwait. This island will be connected to the main land by a 1-km bridge.

3. Artificial Islands; The New Pollution Source of Persian Gulf

Persian Gulf marine environment has always been affected by pollutions mentioned in Convention on the Law of the Sea (1982), and the level of its pollution is 47 times the normal condition. However what has increased worry in recent years is the various pollutants as the consequence of construction developments in the shores of the Persian Gulf Arabic countries, especially the United Arab Emirates.

Developments in the Persian Gulf over the past decade was usually away from the land and has been in the form of artificial islands extending into the sea, which is in fact the advancement of environmental pollution from the land

10. Saadiyat :http://www.saadiyat.ae/ar/about-saadiyat

11. Dadandish, Parvin, Rahnavard, Hamid, The Artificial Islands in the Persian Gulf: A Political and Legal Analysis, Iranian Review of Foreign Affairs, Vol. 3, No. 4, Winter 2013, p. 116.

12 .Ibid. See also: Sharjah to go ahead with Al Nujoom Island project, available at: http://www.emirates247.com/eb247/companies-markets/construction/sharjah-to-go-ahead-with-al-nujoom-island-project-2010-04-08-1.104372.

13. See also: Fowler, Jack, Stephens, Thomas C., Santiago, Mario and de Bruin, Pieter, Amvaj islands constructed with geotubes, Bahrain, available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.540.700&rep=rep1&type=pdf

14. Ibid.

15. 10 Most Awesome Artificial Islands,available at: http://10mosttoday.com/10-most-awesome-artificial-islands/

territory to the sea. In other words the construction of installations and artificial islands inside waters of Persian Gulf is a kind of direct transfer of pollutants to the ecosystem of the region, which will have direct and indirect environmental consequences.

New wave of construction of man- made islands in the Persian Gulf that began early in the present century was followed by the criticism of environmentalists and various discussions. While the builders of artificial islands believe in trivial effects on the environment, environmentalists consider destructive impacts of such activities. Mentioning some of the environmental consequences of such activities indicates the severity of the disaster for the environment of the area.

3.1 Environmental Studies about the Consequences of the Construction of Artificial Islands

Although a comprehensive assessment of the processes and the environmental impact of human activities, especially the construction of artificial islands have not been done, but the small number of studies regarding the effects of these activities on the marine environment and ecosystem show that the islands have had serious environmental consequences and interfere with natural processes at different levels. Not only do these projects threaten the entire ecosystem, but they are a threat for the people who live along the shores of the Persian Gulf. It is obvious that the negative consequences of dangerous activities, when happened in a mass of closed or semi-closed waters such as Persian Gulf, will be much more serious. Environmental scientists believe that the marine environment of the Persian Gulf has had the maximum amount of pollution as a result of human activities. In fact, marine environment of the Persian Gulf is several times more polluted than the open seas. Although most of the pollution has been from oil and gas exploitation activities, but in recent decades developmental activities and in particular the construction of artificial islands have had a major role in increasing pollution.

According to research conducted by the Geological Survey, Satellite studies of different years show that till 2001 coastal constructions of Emirate (Dubai) are restricted to platforms and breakwaters which were used for economic and commercial needs of the country. But since 2001 the United Arab Emirates have attempted to build artificial islands to develop the tourism industry and attract foreign investment, regardless of its bad effects on the region.[16]

According to the organization "by comparing satellite images at multiple time periods morphological changes on the shores of the emirate are clearly evident as a result of human activities. These geo-morphological changes have changed the pattern of deposition or altered the coastline. These establishments near coast and in shallow water, have led to fast deposition around the islands. Using huge ship dredgers and moving the depositions at seabed in order to provide the needed material have led to the disturbance of depositions and creation of a huge volume of suspending particles, which in turn will change the ecosystem and lead to the death of coral".[17]

In a report by Institute for Water, Environment and Health of United Nations University titled: “Managing the growing impacts of development on fragile costal and marine ecosystems: lessens from the (Persian) Gulf”, the issues of environmental aspects and increasing impacts of coastal development and also the construction of artificial islands in the Persian Gulf on the natural cycle of water, waves and sea currents, ecosystems and aquatic resources, destruction of coral, change of various environmental – biological, marine, Oceanography and Geology uses, have all been studied.[18]

The report also considers the evaluation of various environmental factors such as pollution, oil and other industrial pollutants, illegal fishing, the risk of invasive species and climate change, risks of manipulation in the reproduction of aquatic animals, the challenges of rapid urbanization, rapid population growth, competition for access to energy resources and also the investigation of the effect of increasing coastal development on vulnerable marine and coastal ecosystems of Persian Gulf, and evaluates the ultimate solution for crisis management with the adoption of sustainable coastal management approaches, protection of marine protected areas, regional integration and a unified vision and approach in dealing with vulnerable marine ecosystems and coastal area. Based on the suggestions of the research, the governments of the region and existing industries, must consider the fact that economic benefits from valuable marine sources and Persian Gulf tourism are highly dependent on a healthy marine ecosystem without pollution.

16. Lak, Razieh, Coral death and disruption of Persian Gulf ecosystem by building artificial islands in Dubai (Director General of Planning section in the Geological Organization) Accessible at: http://danakhabar.com/fa/news/1173852

17. Ibid.

18. See also:

Van Lavieren, Hanneke, Burt , John, Feary, David A., Cavalcante, Geǿrgenes, Marquis, Elise & Benedetti, Lisa, et al., Managing the growing impacts of development on fragile costal and marine ecosystems: lessens from the Gulf, UNU-INWEH, Hamilton, ON, Canada, United Nations University, 2011.

According to the report, the development of coastal and in particular environmental pressures on coastal ecosystems, in smaller countries of the Persian Gulf, including Bahrain, Kuwait, Qatar and the United Arab Emirates have dramatically caused severe destruction or loss of rare species including coral reef, and on the other hand artificial island projects, waterfront cities, ports, marinas and man-made artificial stream, have entered a strong pressure on the natural environment of Persian Gulf. According to this analysis, current trends indicate that increasing human progress and human development, especially in the Persian Gulf has failed to keep pace with the demands and environmental conditions of the area.[19]

According to the mentioned institution, artificial islands on the southern coast of the Persian Gulf have been made regardless of environmental studies and have endangered the environment in this region. In addition to this, the island and the residents of the area are faced with natural disasters such as earthquakes, tsunamis and tropical storms. Due to the smooth nature of these islands they are being threatened by earthquake. On the other hand lack of the fertile natural habitats and marine life as a result of these developments is a major environmental issue which has emerged in Persian Gulf. Coastal development and the pollution related to that can change the important habitats near coast or damage them, or may interfere with the environment and destroy all animals.[20]

The report of Institute for Water, Environment and Health from United Nations University remind us that during the last decade in order to find a place for developing industries and because of the rapid growth of population around coastal areas which were ecologically fertile (intertidal reef flats, sea grass beds, mangrove forests, fringing coral reefs and sandy embayments) have been degraded, altered or converted into artificial islands, lagoons, canals, marinas, hotels and other infrastructure. Apart from the breakwater reef, making most of these projects have been based more on the dredging of marine sediment. To date, a large volume of dredging is done: 94 million cubic meters for Palm Jumeirah, 135 million cubic meters for The Palm Jebel Ali, and 330 million cubic meters for the World Island. In order to make comparison one can refer to 55 million cubic meters of dredging for Busan Port in South Korea, which is the fourth largest container terminal in the world.[21]

Potential effects on the marine ecosystem including the effects of dredging (Such as loss of productive habitats and species in sea floor) and also the impact of the destruction process have not been clearly defined. However, some researchers have shown that land reclamation and dredging sea floor has caused permanent loss of primary nursery grounds for shellfish breeding and fish species in the Persian Gulf.[22] Most of coastal developments are carried by dredged material and very little understanding of the scope and size of its potential environmental impacts exists. But dredging and dumping of dredged material can lead to decreased water transparency, increased suspended solids and increase the amount of sedimentation.

3.2 Harmful Impacts of Building Artificial Islands

In addition to geomorphological changes that turn over the coasts of artificial islands, other environmental factors of these constructions on creatures of such regions have also been demonstrated. To get aware of environmental outcomes of under-construction or completed civil engineering projects in the southern coast of the Persian Gulf, it is enough to study the researches on the environmental impacts of building the first artificial island by Nakheel Company in Dubai coasts. Since methods used for other under-construction projects are almost similar, and as a result, they involve the same impacts. Therefore, environmental impacts given for *Palm Jumeirah* artificial island, as the first island in United Arabic Emirates Palm Islands series, show the environmental impacts of other artificial islands.

Environmental studies delivered on Jumeirah project show that governmental executive agencies have not observed international and regional environmental standards. They have also violated many national, regional and international regulations during the construction of this project. Since the executives of this project have been under the support of government, or at least a part of the project was backed by government, the environmental impacts of the project have not been fully evaluated. This violation increases the concern over the real impact of these islands on the marine environment of Persian Gulf.[23]

However, the depth of this disastrous project by United Arabic Emirates Palm Islands could not be fathomed

19. Taghizadeh, Zakie, Development of artificial islands off the coast of the southern Persian Gulf from the perspective of international law, Monthly magazine of Persian Gulf and Security, Year 13, No 134, October 2012, pp. 8-9.

20. Ibid.

21. Van Lavieren, Hanneke, Op. Cit., p.14.

22. Ibid. p.15

23. Salahuddin, Bayyinah, The Marine Environmental Impacts of Artificial Island Construction- Dubai, UAE, the Nicholas School of the Environment and Earth Sciences of Duke University, 2006, p. 84.

until the end of the construction of the first island; when it was formally announced by the executives, it was determined that in order to carry out this project, 65.1 billion cubic meters of sand and 87 million tons of stone rock are needed to laying the foundation. To complete the sites, one billion tons of rocks (provided from rock contraband from Iran) were brought there. From the most disastrous environmental impacts of building artificial islands disclosed by few studies especially those carried out by the mentioned institute (Institute for Water, Environment and Health of the United Nations University), the following could be pointed out:

- Environmental threat to the security of migrating birds and others creature living in Uninhabited islands Persian Gulf
- The destruction of live coral cover as one of the important potentials of bioaccumulation Persian Gulf
- Change of natural flow of water with causes discomfort in the natural assimilative capacity Persian Gulf.
- The destruction of natural seabed mapping and to disassemble the natural structure of the Persian Gulf
- The disposal of different types of waste materials and phosphoric pollutants etc. inside Persian Golf
- The destruction of one of the most precious marine ecosystems in the world by ruining the aquatic habitat of 400 to 450 fish species and 300-400 other sea animals, including sea turtles
- Climatic and environmental effects of changing several parts of sea to dry lands, lowering specific heat capacity of the region, growth of aridity, increase of sand storms, which altogether affect the quality of economic and social life of people especially those who live in the eastern Iran.

4. International Environmental Law and Responsibilities of States to Protect Marine Environment

Environmental international law as part of international law has developed during the past decades. Exponential attempts have been made to regulate human activities affecting the environment. Hence, the topic of sea environment pollution is one of the most regulated sections of international law on environment, since this type of pollution causes great concern for economic and health systems in different societies.

International environmental law has highlighted a few concerns over sea pollution via a number of regional and international conventions on environment and multilateral environmental agreements; including United Nations Convention on the Law of the Sea (UNCLOS), Convention on Biological Diversity(CBD) and United Nations Framework Convention on Climate Change(UNFCCC). In the Persian Gulf region, states have also reaffirmed some of their obligations for protection of marine environment in the Kuwait Regional Convention on Protection of Marine Environment. These conventions also adjust environmental behaviors of governments and their activities on regional and international scale.[24]

4.1 Environmental Principles and Rules Governing Development Activities in the Sea

Besides discussion on artificial islands from the viewpoint of international law of the sea, the environmental impacts of such islands are discussed in the light of the principles of International environmental law. International environmental law has established firm principles via 16 conventions and treaties in order to take the proper measures in case of any activity with negative impact on sea environment. Basically, International law creates binding rules upon the states through international agreements and customary rules and states are responsible for their breaches of international law principles and norms. States are responsible if they breach international laws. Therefore, if a violation happens, the victim government could take measures by using diplomatic interactions and arbitration as well as other peaceful means noted in international law.

Over the past 40 years, international environmental law has established and developed a number of principles in different areas to protect environment. Many of such developments occurred after United Nations Conference on the Human Environment in Stockholm in 1972. Stockholm Conference in 1972 provided Stockholm Declaration as the first international document that clearly identifies the relationship between individual human rights and the quality of environment. Principles stipulated in this conference and another in 1992 about the environment and development in Rio de Janeiro are of prime importance. Both of the conferences made declaration of principles that were accepted by United Nations General Assembly. Together with hundreds of international agreements on the protection of environment, the principles of Stockholm Declaration (1972) and that of Rio de Janeiro (1992) form the basis of international environmental law. [25]

24 Nellemann, Christian & Corcoran, Emily (Eds.), Our Precious Coasts: Marine Pollution, Climate Change &

The Resilience Of Coastal Ecosystems,United Nations Environment Programme, Norway (2006)

25. Kurukulasuriya, Lal & Robinson, Nicholas A., Training Manual on International Environmental Law, translated by Seyyed Mohammad Mehdi HosseinI, Tehran, Mizan Publication, 2012, p. 96.

Furthermore, the emergence of cross-border environmental problems, which were resolved through cases such as Trail Smelter Arbitration and Lac Lanoux Arbitration, played a significant role in the formation of international environmental law principles. The following principles, which are derived from international conventions and public agreements by governments, are established in the literature of international environment law. In The Rio Conference in 1992, these principles were determined or reviewed. Although there is no consensus over the content of these principles, they are identified implicitly by a few international conventions, EU treaty and Environmental Charter.[26]

These principles should be put into action to protect the environment. The important identified principles with legal value are as follows:

- Prevention
- Cooperation and Common but Differentiated Responsibility
- Precautionary principle
- Environmental Impact Assessment
- Sustainable Development
- Polluter pays principle
- Inter-generational and Intra-generational Equity[27]

Some of these general principles or rules reflect customary law, others may reflect emerging legal obligations, and yet others might have a less developed legal status. In each case, however, the principle or rule has broad support and is reflected in extensive state practice through repetitive use or reference in an international legal context.[28]

4.1.1 Prevention

In studying the way that principles of international environmental law are established, the first point is the Trail Smelter Arbitration case, which was a dispute between US and Canada. This case formulated the fundamental principle of Prevention of Harm. In its historic decision, the tribunal held that under principles of international law and law of the United States, no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another when the case is of serious concern and the injury is established by clear and convincing evidence.[29]

Scientific experts believe that principle of prevention of harm to the environment is regarded as a "golden rule" from the perspective of ecology and economy. Because, compensation for most of environmental damages is often impossible or has heavy costs.[30]This principle became an undisputed part of international law principles, and is repeated in Stockholm and Rio Declaration respectively in principle 21 and 2. It is also seen in other international environmental agreements. International Court of Justice has acknowledged this principle in its advisory opinion on the legitimacy of using nuclear weapons. The court has repeated its decision in the trial case of Gabčíkovo –Nagymaro.

The prevention principle is a major success that causes the formation and development of many legal mechanisms such as the assessment of environmental threats, granting permits and authorization. These legal mechanisms determine different conditions for activity, breaching consequences and policy making. Determining certain limits for releasing greenhouse gases, setting standards for production process, using the best and newest existing methods, and using similar procedures could be understood as the functions of prevention as a concept.[31]

4.1.2 Cooperation and Common but Differentiated Responsibility

Besides the prevention principle, countries are liable to cooperate in environmental matters according to

26. Roush, Katerine, The requirements of environmental law, translated by Ali Mashhad, Tehran: Khorsandi Publication, 2011, p. 32.

27.Sands, Philippe, MacKenzie, Ruth, Fabra, Adriana and Peel, Jacqueline, Principles of International Environmental Law, 3rd edition, Cambridge University Press, 2012, p. 187.

28. Ibid.

29. Hosseini, Seyed Mohammad Mehdi, Artificial Islands in the Persian Gulf and International

Environmental Law Principles , The George Washington Law School, 2011, P.6.

30. Kiss, A., Sand, P.H. and Lang, W., Environmental Law, translated by M.H. Habibi, Tehran: Unversity of Tehran Press, 2nd edition, 2005, p.78.

31- Kurukulasuriya, Lal and Robinson, Nicholas A. op. cit, p. 118.

international law and especially international environmental law. In principle 24 of Stockholm Declaration, we read that international issues related to the protection and expansion of environment should be dealt with in a cooperative and peaceful atmosphere. Rio Declaration, in its 7th principle, points to the cooperation between governments in global cooperative atmosphere with the goal of maintaining, protective and reviving the health and totality of Earth ecosystem. This principle notes a shared but at the same time different responsibility, which is a method for considering different conditions based on the role of various governments in creating environmental problems. Article 197 of UNCLOS declares that States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features.

This responsibility to cooperate in order to protect environment is agreed upon in other agreements too. The International Tribunal for the Law of the Sea (ITLOS) in the Malaysia-Singapore Land Reclamation Case addressed claims raised by Malaysia regarding the adverse effects of the land reclamation project on the marine environment of Singapore through increasing sedimentation, increasing coastal erosion, and increasing salinity and pollution due to discharge. ITLOS also considered the formal responsibilities stipulated in UNCLOS concerning the necessary measures and steps that governments need to take to evaluate and cooperate in terms of environmental issues. The court stated that cooperation and attention to environmental concerns over artificial islands are a fundamental duty.32

4.1.3 Precautionary Principle

Caution is another principle that has been stated in binding and non-binding environmental agreements. This principle is also known as precautionary principle or approach that requires states to take necessary measures to protect environments even where scientific possibility does not exist. Principle 15 of Rio Declaration could be related to this principle, which is as follows:

"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".

This principle is very important in international environmental law, and many international agreements on environment, it is considered as precautionary principle.

In case of the dispute between Malaysia and Singapore, ITLOS noted the necessary measures that Malaysia had to take to prevent the emergence of potential environmental sea problems. ITLOS declares that "due to possible implications of land reclamation on the marine environment, prudence and caution is required"[33]. Therefore, today, precautionary approach is an accepted rule and norm in international law especially in regions where there is scientific uncertainty.[34]

Precautionary principle could be applied in a number of ways given the risk management. The most common of these ways is to take measures that prevent pollution or to direct the responsibility at the entity that executes the threatening project. Such an entity could be smugglers of drugs or other dangerous materials. Another method is to provide enough security for vulnerable groups and communities such as children more than what is directly identifiable by scientific information.[35]

4.1.4 Environmental Impact Assessment

The more fixed principle is Environmental Impact Assessment (EIA) that demands, prior to execution of any project; states evaluate the negative environmental impact of their development activities. This principle is of prime importance in international environmental law. It is very close to preventive principle and sustainable development principle. The 17th principle in Rio Declaration states that:

"Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant impact on the environment and are subject to a decision of a competent national

32. Case concerning Land Reclamation by Singapore in and around the Straits of Johor (Malaysia v. Singapore), International Tribunal for the Law of the Sea, Year 2003. Available at:

https://www.itlos.org/fileadmin/itlos/documents/cases/case_no_12/Order.08.10.03.E.pdf

33. Ibid

34 .Aghai Diba, Bahman, Legal Regime of the Artificial Islands in the Persian Gulf, 10 September 2009.

35.Kurukulasuriya, Lal and Robinson, Nicholas A. op. cit, p. 117

authority".

EIA evaluates the impacts of a suggested project prior to its implementation. In some situations, evaluation of environmental impacts is done as strategic evaluation of environment. This strategic evaluation provides decision makers with a range of information on the impacts of developmental projects that are under study. Three functions are assigned to the evaluation of environmental impacts:

1) The integration of environmental issues in planning and decision making;
2) The prediction and minimization of environmental damages;
3) Public cooperation in decision making and environment protection.[36]

The greatest EIA was possibly carried out in Uruguay River case. In this case, the ICJ explicitly recognized EIAs as a general international law. In this dispute, the court believed that according to general international law, these evaluations were necessary to judge the possible cross-border impacts of industrial projects especially in a shared source. Although, the court does not determine the provisions and limits of EIA and passes them to the states, it reemphasizes international obligations to protect the environment. A proper relevant analogy in this case deals with the issue of economic development and environmental protection, which is very similar to the case for artificial islands. Therefore, conducting pure environmental studies and due diligence prior to implementing any project became part of international law.[37]

4.1.5 Sustainable Development

The emergence of sustainable development change the traditional viewing of environmental issues and significantly promoted international environmental law. The World Commission on Environment and Development defines sustainable development as a type of development that does not endanger the capacities of future generations besides fulfilling the needs of the present. The importance of this principle is in that it demands governments to focus on the protection of environment in their development projects and activities.

Although Rio declaration has not determined a topic for sustainable development, the first principle states that human kind is highly concerned with sustainable development. In the fourth principle, protection of environment is a necessity in the process of development and to reach sustainable development. This principle does not separate environment protection from development. However, Rio Declaration demands governments to take necessary measures in their economic activities. A Preamble to Agenda 21(Comprehensive Plan of Action agreed upon in 1992 conference in Rio) asks global cooperation for development. There are many binding international legal instruments that point to the sustainable development and responsibilities of states to integrate and concentrate their economic activities in protecting their environments.

Furthermore, in judicial precedent, this principle has been referred. In Gab kovo-Nagymaros case, the ICJ points to the principle of sustainable development as a part of international law. Hence, the states should observe sustainable developments in their economic activities, corresponding to international necessities.

4.1.6 The "Polluter Pays" Principle

Since the early 1970s the "polluter pays" principle has been a dominant concept in environmental law. Many economists claim that much environmental harm is caused by producers who "externalize" the costs of their activities. Accordingly, the purpose of many environmental regulations is to force polluters to bear the real costs of their pollution, though such costs often are difficult to calculate precisely. In theory, such measures encourage producers of pollution to make cleaner products or to use cleaner technologies.[38]

According to the "polluter pays" principle, the cost of the pollutant decontamination should be payed by polluter. The principle in one side recognizes the right of the other states for enjoyment of a healthy environment and on the other hand it is a precautionary action for protection of environment.

The "polluter pays" principle the first time suggested by the Organization for Economic Co-operation and Development (OECD) and is considered as an effective economic means.[39]

Today, this principle has been invoked in many international treaties and other important documents and procedures and has become customary international law. In this regard the 16th principle of Rio Declaration

36. Ibid., 737.

37. Hosseini, Seyed Mohammad Mehdi, op.cit. p.8.

38. Encyclopedia Britannica, Environmental law; principles of environmental law. Available at: https://www.britannica.com/topic/environmental-law/Principles-of-environmental-law

39. Kiss, A., Sand, P.H. and Lang, W., op. cit., p. 81.

states that:

"National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment."

Also in the 20th chapter of agenda 21 the states are asked to consider this issue in their internal and domestic policies, particularly in connection with the hazardous wastes.

4.2 Responsibilities and Liabilities of Costal States of Persian Gulf to Protect Environment

Given the previous discussions on international environmental law, it can be concluded that the mentioned principles are a part of the customary international environmental law and pose certain liabilities for all countries on international level to work according to the customary international law. Therefore, countries close to Persian Gulf as participants of conferences such as those in Stockholm, Rio, Johannesburg and other conferences in the last decade are responsible to observe and reinforce these principles. Many countries of Persian Gulf region are the member of many environmental treaties and agreements such as United Nations Conference on the Law of the Sea (UNCLOS), Conference on Biological Diversity (CBD) and The United Nations Framework Convention on Climate Change (UNFCCC). These treaties necessitate that the gulf countries protect their marine environment and take required measures to prevent the emergence of environmental crises.

According to customary international environmental law, Persian Gulf costal states including United Arabic Emirates are responsible to protect marine environment. These principles have been considered in different international and regional agreements such as UNCLOS, CBD and UNFCCC. For example, UAE as a member of CBD is required to take the necessary actions to support and protect biological diversity of sea in Persian Gulf.

Addition to customary liabilities mentioned above, costal states of Persian Gulf including: Iran, Saudi Arabia, Oman, Kuwait, Qatar, Bahrain and Iraq by establishing the "Regional Organization for the Protection of Marine Environment(ROPME)" and adopting the "Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution" in 1978, and by announcing the Persian Gulf region as an especial region, they have planned programs for protecting natural ecosystem of this region through this convention and its protocols.[40]

In Article 3 of Kuwait convention, the countries became responsible to perform all of the required actions either individually or collaboratively according to this convention and necessary protocols, in which they are also a member. Such actions aim to fight pollution in sea environment. To stipulate regional laws and suggested trends for prevention or reduction of pollution and polluting sources, the responsible countries in this convention are required to cooperate with competent international or regional organizations. They are also supposed to assist each other to realize such goals.[41]

UAE as a member of Kuwait convention is obliged to take preventive measures or precautionary actions to protect the marine environment. It is responsible to engage in information exchange with other neighbor countries, regarding its hazardous projects in Persian Gulf Sea. UAE as a signatory of the Convention on the law of the Sea (1982) is responsible not to act against the goals and intentions of the convention.

It is also one of the topics mentioned in the "Protocol on the protection of the marine environment against pollution from land-based resources (1990)" the issue of wastewater from coastal development activities that could significantly impact on the marine environment and member states including UAE have pledged to control and reduce the pollution. [42]

Therefore, with respect to building artificial islands in the southern coasts of Persian Gulf, UAE and other engaged states have the responsibility of preventing cross-border pollution. This poses an absolute responsibility to UAE government and other countries involved in building artificial islands to prevent all of the possible damages and to prohibit all of the activities that may cause damage to marine environment. If the Islamic Republic of Iran wants to build such islands in its own coasts, it is not an exception either. Furthermore, performing extensive assessment of environmental impacts, supervision and information communication on the projects of the neighbor countries are general responsibilities acknowledged in almost all of environmental

40. Alshaghi, Abbas, Construction of artificial islands in the Persian Gulf environment from the perspective of international law, Rahbord Journal,Year 20, No 58, Spring 2011, p. 59.

41. Ibid, p. 60.

42. Aghai Diba, Bahman, op. cit.

treaties. They are a part of customary international environmental law.[43]

5. Conclusion

Persian Gulf marine environment has specific ecologic conditions. Having the most various tropical plants, sea creatures and its matchless sea biology, Persian Gulf is one of the most valuable sea ecosystems in the World. However, various factors such as the increase of population, expansion of human activities, urbanism, development of industry, and especially the construction of artificial islands and harbor site close to its coasts have altogether resulted in the emergence of severe environmental sea pollutions in the region.

Given the environmental consequences of building artificial islands in this region, the legal study of development projects of Persian Gulf countries is very important according to the principles and rubrics of international environmental law. For more than four decades, a global collaboration has been started to expand international environmental law and to regulate the activities of different states' activities that endanger the environment. A great effort is put on protecting the environment, especially marine environment due to its vulnerable nature. Stockholm and Rio Declaration together with other global documents on the basic principles of international environmental law including the prevention of damage, precautionary principles, sustainable development principles and EIA have all assigned shared but different responsibilities to different countries.

Each principle has been repeated in most of international environmental treaties and agreements such as UNCLOS, CBD and UNFCCC, or it has manifested in regional environmental conventions such as in Kuwait convention. These principles have also been emphasized by international court of justice, ITLOS and other global and regional courts. They are a part of standard international law. Therefore, the current activities of Persian Gulf countries such as UAE, which negatively affect the sea environment, are an evident violation of customary international law, and as a result, it might be ensued by international responsibility.

However, protecting Persian Gulf environment and variety of its sea environment could be only realized if different countries are reminded of their responsibilities. It also necessitates the cooperation and interaction of Persian Gulf countries to reduce the environmental pollutions and hazards of human activities especially the construction of artificial islands in the south of Persia Gulf.

On the other hand, since no extensive analysis has been yet provided concerning the processes and environmental impacts of human activities so that they can be practical for the relevant organizations, it is not about time to perform a clear evaluation of the environmental impacts of human development projects especially the impacts of constructing artificial islands development programs on Persian Gulf.

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43. Hosseini, Seyed Mohammad Mehdi, , op.cit. p.15.

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