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SUSTAINING OF ENVIRONMENTAL IDENTITY IN NORTH EGYPT BY FACING THE CHALLENGES ON BURULLUS LAKE

Sherein El-Shahat
Nile Higher Institute for Engineering and Technology, Egypt.
sherein.shahat@yahoo.com

ABSTRACT

North Egypt is featured environmentally by four coastal lakes. As Burullus Lake, one of these lakes, has many ecological and cultural values, it has rare and sensitive landscape and seascape elements. Accordingly, it has been characterized by a unique identity socially and environmentally. In the coming future, the lake might be existed from the category of protected areas, if the current deterioration continues with the same trend. Moreover, it might be disappeared, and the environmental identity in North Egypt might be diminished. By addressing the constraints that could decrease the probability of the lake's existence, the research aims to develop a group of sustained actions associated with some recommendations to protect the sensitive environment of the lake. Finding deteriorations from field visits should be considered in management planning for the lake's sustainability to be considered by decision-makers. To restore the health of the lake, it should be taking action to protect the habitats and green economic opportunities. The proposed solutions are empowering actions, which focus on the engagement of civil bodies and social participation. The wetlands protection builds on changing the unsustainable practices, which is an opportunity to mainstream the environmental identity, which aims to inactive the encroachment and pollution in the lake's water and its surrounding wetlands. Finally, the study recommends with a group of considerations, through the investigated study, to be a concern for a wider application on the distinctive environmental features.

Keywords: Environmental identity, Burullus Lake, North Egypt, sustainability.

INTRODUCTION

Places and ecosystems interact like humans. Accordingly, each of them has a unique and special identity, even if it had passed with certain anthropological and physical changes that impacted on its daily circumstances, but it will remain on its huge spirit. Not only the culture and social events make a sense of place and our identity, but also the habitats and their ecological diversity make our environmental identity [1], [2], [3]. Without a liveable and healthy environment, the man could not make his living standards (e.g. shelter, food, water). The deterioration could eliminate traces of environmental identity.

Nile Delta has formed across many geological ages by the sedimentation process of Nile River branches. These riverine branches were various that latterly disappeared, except the existed two branches. Its coast is sensitive and dynamic due to its complicated subsystems. There was a continuous fight between land and sea in the coastal region. The sea has retreated by certain natural circumstances, which left the northern lakes in the Nile Delta region. Recently, the majority of Egypt's land is arid land, except very few parts. From these few parts are the northern lakes, besides having their valuable wetlands and high fishery production.

Burullus Lake is one of four lakes located in North Egypt, bordered by the Mediterranean Sea in the north and bordered by agricultural lands in the south, as shown in fig. 1. It exists in Kafer el-Sheikh Governorate. It is considered the second largest natural lake in Egypt in terms of the area that extends approximately 47 km in length and its width ranges from 5 to 11 km with a shallow depth (20-200 cm), its current area is about 410 km ^{2} [4]. It is connected with the Nile River by a freshwater canal (Barimbal Canal) from the southwestern side [5]. Marines and wetlands in the lake have various rare habitats. It provides society with many recreational opportunities associated with rich and rare

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ecosystems. In addition, it provides fishery production. There is an ecological diversity in the lake (i.e. salt marshes, plant species, aquatic habitats, migratory birds). Since 1971, this site has registered in the International Wetlands Convention known as the Ramsar Convention [6], it was classified as a seascape protected area. It has been distinguished by its spatial features, such as its location, geomorphology (e.g. plains, dunes), geology, and climate. These features have increased the economic and social values of the area. It presents a vital place for accumulated activities, such as fishing, ecotourism, and agriculture.

Since the existence of the human revolution is in many aspects of life, man has deteriorated the natural systems. The lake has its share of deterioration. It faces many stressors by human actions, besides the natural changes. Climate change is an obvious example of the natural stressors, which has impacted negatively on the lake, especially sea-level rise, and droughts. About the negative actions of a human, a vast area of the lake has been converted to fish farms and agricultural lands [7]. Also, there are seven drain pours in the lake, which discharge approximately 3904 million m^3/year, including agricultural, industrial and domestic wastewater [8]. Moreover, the source of trace elements in Lake Burullus is due to the input of domestic, industrial, and agricultural drainage from human settlements, factories, and reclaimed lands in its catchment area [9]. Since 1965, pollution and eutrophication have increasingly threatened the ecosystem of the region [10]. The field studies confirmed a decrease in species numbers in the lake's area [11].

Fig. (1): Boundaries of Brullus Lake, based on Google Earth.

RESEARCH'S METHODOLOGY

The research provides an analytical study based on a case study approach. It investigates the sustainability of our environmental identity in North Egypt, particularly in the Burullus Lake, because it witnesses a high deterioration due to negative human and natural actions. Although of the increased concern with the environmental health in Egypt by many local and international agencies, the lake is still deteriorating. The study focuses on the challenges and issues that face the lake's environment, based on the observation of its current state through field visits. By addressing these challenges, it could be using the deductive method to assign the sustaining and facing actions to protect the lake. As the challenges are considered in the management cycle and planning for ecosystems and humans, the national identity will be diversified and sustained.

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ISSUES AND CHALLENGES FACING THE LAKE

While social identity is influenced by behaviors, environmental identity is influenced by the quality and quantity of the natural elements. The identity could be destroyed by exposure to threats. Firstly, the lake is exposed to threats related to natural changes and disasters. The sedimentation has increased that settled on the shallow lake's bed, especially at its inlet. Moreover, the lake's coastal strip has been eroded by the action of long currents that could turn it into marine bays. As well as, the lake is exposed to desertification due to sand mobility from the closed shores. In addition, there are the impacts of climate changes induced droughts and sea-level rise. Any rise in sea level can penetrate the dunes and flood the lake. The increased temperature has caused droughts, which impacted the ecological equilibrium.

Secondly, through the field visits, it has been found that the lake is exposed to severe degradation by the human factor, which worsens the lake's health in terms of its environmental characteristics. If this degradation will continue with the same course, it could eliminate the lake's rank in terms of being a protected area at the national and global levels. The same behaviors are being in the other three coastal lakes. Accordingly, these circumstances could change or eliminate our environmental identity in North Egypt. The human behaviors that have negative impacts are intense and various, from these actions are the followings:

- Although of unused lands in the lake area, there isn't an adequate sanctuary for the lake or a buffer zone between the lake and urban areas (e.g. at Borg Al-Burullus) as shown in Fig. 2. Also, the high rate of urban encroachment on large areas of the lake's wetlands, such as in Al-Shakhloba, Borg Al-Burullus, and Hanafi and Maksaba Villages, led to the shrinking of the lake catchment through the past years. The lake has already been lost many thousands of acres. It is subject to be diminished during the coming decades if the management has a blind eye to the violations.
- Throwing of household wastes on the shores of the lake, as shown in Fig. 3. Moreover, the intense drains network that pours into the lake basin passes through the villages and receives household waste, sewage water, agricultural drainage, dirt, and industrial waste, which exposes the lake to severe pollution and water quality deterioration. Also, this network decreases the salinity in the lake, which changes the environment of the ecosystem there.
- Building and repairing ships directly on the shore of the lake, exposes the lake to pollution from manufacturing wastes (e.g. wood, grease, ...) as shown in Fig. 4.
- Penetration of the international road and its bridge in the fragile area of the lake (between the sea and the lake), which attracts the invasive ecosystems and slums expansion as in Fig. 5.
- Fishermen cut off parts of the lake basin as private property for fishing by the constructed banks as in Fig. 6. There is illegal ownership of large areas in the lake body by the owners of fish farms. Also, big fishermen prevent small fishermen from free fishing except for a few areas, under the eyes of all localities and other governmental bodies. Moreover, the illegal fishing of small fish from the lake by launches to sell them to owners of fish hatcheries and fish farms to get huge financial gains.
- The over-cutting of the reed plant for handicraft industries (i.e. mats, furniture, ...) as shown in Fig. 7.
- Sweeping the beaches and mining the adjacent soil for the benefit of the brick industry and other building works as shown in Fig. 8, which exposes the lake to inundation risk by any rise of sea level and erosion by marine currents.
- By asking the people there, it is found that there is a lack of awareness and knowledge of the society with its vital role in saving the ecological diversity to increase sustainable development.
- Drying of many parts of the lake for reclamation projects in the eastern and western parts.

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- Multiple governmental entities are responsible for the lake. Also, there is poor coordination between the different governmental entities. Moreover, there are limited financial and institutional capabilities. Also, there is a lack of necessary policies, laws, and regulating standers associated with the weakness of laws implementation and wise management.
- Lack of technology and expertise. And there is a lack of knowledge and practice with management approaches related to ecosystem management.
- Disappearing of many species of aquatic plants, birds, weeds, animals, and fish, due to unsustainable consumption and production patterns.
- Over extraction of groundwater for drink and irrigation caused severe land subsidence there.

Fig. (2): There isn't an adequate sanctuary for the lake.

Fig. (3): Dumping of household waste on the shores of the lake.

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Fig. (4): The wastes of ship construction and maintenance directly on the lakeshore.

Fig. (5): The penetration of the international road and the high-pressure towers in the lake inlet.

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Fig. (6): Cutting off parts of the lake basin as private property for fishing.

Fig. (7): Over-cutting of the reed swamps inside the protected environment.

Fig. (8): Mining the lake's shore soil.

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SUSTAINED AND FACING ACTIONS

The wetlands that surround the lake have environmental, social, and economic values. Due to its vital significance locally and internationally, and due to the high sensitivity of its environment to the negative human actions and natural changes, the lake should be protected by efficient management methods. It should be creating a sort of balance between these factors and lake characteristics. Through the studying visits, the human impact is more likely damaging to the lake than the natural impacts. These human actions are sourced from negative attitudes; hence it could be mitigated by promoting and training on sustainable practices in both environmental and socioeconomic considerations. Therefore, it could be facing the issues and challenges on the lake as the followings:

- The environmental considerations:
  - ✓ Zoning of the area to three zones; area of core, buffer, and transition, and setting every area with its measures and procedures.
  - ✓ Assessing and periodic monitoring of any change in the environmental characteristics of the lake. And controlling invasive species.
  - ✓ Giving high priority to the ecological systems when developing the area due to its high sensitivity.
  - ✓ Rehabilitation, restoration, and conservation of the ecological diversity in the protected area.
  - ✓ Maintaining the rare species of fish, plants, etc. in marines and wetlands of the lake.
  - ✓ Identifying the managed hunting areas, preventing the hunting of migratory birds, and cutting of rare plants.
  - ✓ Encouraging and mainstreaming of sustainable use.
  - ✓ Enhancing and mapping the visual images of the lake to promote the walkability of the area by adding landscape elements that are suitable to the local environment.
  - ✓ Enhancing the quality of sewage treatment that has been thrown in the lake in both the city of Baltim and the village of Burj Al-Burullus.
  - ✓ Enhancing the water quality of drains by strict tolerance with polluters.
  - ✓ Increasing public education and awareness of all society parts by managed environmental programs to raise the sound and positive aesthetics.
  - ✓ Comprehensive planning of the area based on sustainable development and livability basics.
  - ✓ Preserving the adjacent dunes to the shoreline and continuously feeding them to protect the barrier from the rise of sea level, in addition, using the soft coastal engineering methods.
  - ✓ Setting adaptation and mitigation programs to limit negative impacts and to take potential opportunities.

- As considering the environmental values, it should be considering the socioeconomic aspects by the following considerations;
  - ✓ Adaptive managing of the area based on an integrated approach to developing both environmental and socioeconomic aspects.
  - ✓ Strengthening and diversifying the social, cultural, and spiritual value of the place and promoting ecotourism locally and internationally.
  - ✓ Increasing the scientific experiences in the field of protected areas and engaging them in the management cycle. In addition, increasing scientific research capabilities is associated with the availability of an accessible database about the lake for research works.
  - ✓ Coordination between the responsible governmental bodies (i.e. ministries of state for environment, agriculture and land reclamation, irrigation and water resources, housing and

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new communities, health, defense, interior), and coordination with them and non-governmental bodies (NGOs).

- ✓ Developing and training the institutional structure to carry out its schedule according to certain indicators to achieve the national goals.
- ✓ Increasing the financial and technical capabilities associated with the green infrastructural network to be suitable for what is required to achieve the goal in a highly efficient manner.
- ✓ Increasing social participation and involving stakeholders in the cycle of management.
- ✓ Benefiting from local community experiences and knowledge.
- ✓ Increasing economic incentives for owners of fish farms and fishermen to raise their living standards.
- ✓ Supporting the cultivation projects of the economic plants (e.g. medical plants) that do not impact negatively on the ecological equilibrium of the area.
- ✓ Strictly implementing the principle; the polluter must pay back to repair the damage.
- ✓ The actual application of laws and regulations to preserve the protected area.
- ✓ Investing in the handicraft industries that are friendly to the environment.
- ✓ Searching for alternatives to uncleaned activities.
- ✓ Updating Landuse planning every 5-7 years to include the additional uses based on mixed-use and compact development.
- ✓ Encouraging volunteer groups to enhance the environment through their expertise and work.

CONCLUSION AND RECOMMENDATIONS

While social identity is influenced by behaviors, environmental identity is influenced by the quality and quantity of the natural elements. The environmental identity could be destroyed by exposure to threats. Climate change is a serious enemy to the Burullus lake's environment, its impacts are many, such as sedimentation, erosion, and droughts. From findings, human behaviors are more threatening to the lake's existence than natural threats. It is found that there is an adequate buffer zone, where there are urban encroachment, species disappearance, severe pollution, cutting off parts for various activities, mining the sand, and unwise management. To sustain our environmental identity in North Egypt, particularly in Burullus Lake, the accidental deterioration should be taken into consideration to be an environmentally conscious behavior of decision-makers, institutional bodies, and the public. By promoting and training on sustainable practices in both environmental and socioeconomic considerations., the perception will enhance our liveability, sense of place, and quality of life, as well as, it will be an environmental power to save nature to the next generations. The environmental considerations are such as zoning the area, periodic monitoring, restoration, conservation, sustainable use, strengthening the walkability, increasing the water quality, awareness, adaptation, and mitigation programs. The socioeconomic considerations are such as adaptively managing, promoting ecotourism, social participation, increasing the scientific experiences, Coordination between responsible bodies, funding diversity, the actual application of laws, cleaned activities, and volunteer groups. Finally, the research recommends the followings:

- The managed retreat of the urbanism to maintain a buffer zone or a greenbelt for the special ecosystems to protect their sensitive landscape and provide livability by limiting urban growth.
- Enacting the laws to regulate urbanism and activities expansion.
- Shifting the international road to the south of the coastal sector.
- Using the local materials to build structures (e.g. reeds, clay, rocks).
- Assessing the vulnerability of fragile habitats to different hazards.

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- Creating an integrated management framework
- Setting priorities of human intervention.
- Setting the approach of local environment fund.
- Searching for alternatives for clean economic activities and green innovations.
- Committing the local community to protect the environment.
- Providing innovative methods for the waste efficient household.
- Facilitating green jobs.
- Engaging partnerships, agreements, and collaborations for saving the different habitats.
- Enhancing activities and landuse of the waterfront.

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