

# Toward achieving a sustainable development of Lake Qarun, Egypt

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## Abstract

Living surrounding water is a very important element in Egyptian culture, because most Egyptian cities and villages are located at the coastlines of Nile River, Mediterranean and the Red sea. Conserving this limited resource and developing it is a basic target to achieve development to the Egyptian society. Lakes in Egypt are very special case because they are surrounded by a variety of wild and urban environmental.

The case study is Lake Qarun which represents an efficient part of Egyptian history; it is a specially protected area, under the Barcelona convention.

Lake Qarun and the Villages surrounding it are facing many environmental and urban problems. That's why it is very necessary to use new methods to get new opportunities to upgrade the quality of life and get new economic resources to cover the gap between the increasing population and limited resources.

This paper highlights the locale and international importance of Lake Qarun, the challenges facing developing plans of this lake and villages surrounding it, giving a framework using economic and environmentally friendly landscape projects to achieve sustainable development in Lake Qarun.

Key words: sustainable development, lake, conservation, landscape, environment

## Introduction

Egypt, as most countries seeking to achieve socio-economic development, is facing many environmental problems due to the rapid population growth, which doubled one and a half folds over the last 40 years and is expected to reach in early 2025 about 103 million.

Environment issues are getting attention worldwide. These issues include not only updating the rules and regulations that enforce sustainable development, but also the economic incentives to incorporate sustainable development designs. The news media began to publicize environmental concerns nationally, and that resulted public awareness spurred major legislation, which empowered planners to incorporate ecological values.

Lakes are extremely sensitive environments, whose status represents the equilibrium among climatic conditions, hydrological setting and human pressure. This equilibrium is particularly fragile in arid environments. Egypt has a large number of inland lakes; the largest of the freshwater is Lake Nasser and the saline Lake Qarun in Fayoum.

Egyptian cities and villages have faced the challenge of urgently stopping the continuous erosion of agriculture land caused by urban expansion. Being informal in nature, these villages are not shown in detail on traditional maps and data are unavailable. A rapid assessment of needs with the participation of stakeholders was essential, Waterfront development is one of the main products of contemporary urban revitalization yet there seems to be little connection between the new waterfront idea and the sustainable city.

## **Materials and methods**

### **Sustainable development**

According to the World Commission on Environment and Development "...sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within two key concepts: the concept of 'needs' in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

### **Principals of sustainable development planning**

The following principals depend on understanding the concept of sustainable development and needs of local communities, understanding the concept of integration between development, conservation and participation:

- Developing urban life
- Conservation of natural resources
- Participation the locale communities

### **Landscape projects and sustainable development**

In order to develop a sustainable solution to these obvious environmental problems, we need to reconceptualise the waterfront as a landscape. A landscape not just as in the traditional senses as a park, but rather as a field onto which larger social and environmental concerns can play out unconstrained by a limited urban typology. The landscape represents this multi-functionality that it provides and preserves the conditions for the great variety of needs for both human and non-human lives. This may include the preservation of a historical landscape image, but it may create as well some radical new landscape features, emerging from the realization of a sustainable land use in combination with new landscape design ideas. Using landscape projects in upgrading and urban development is very successful method in Egypt .this method was used before in small projects and small areas like Cultural Park for Children in Al Syda Zinab and Al AZHAR Park in Darb al-Ahmar. All of these projects made changes in the area surrounding them, the scale of this change depends on the scale of the project .A key principle for the planning and management of large, complex systems like the Lake Qarun is that social, economic and physical history must be respected.

### **Challenges facing achieving sustainable development**

Conflicts between ecological and socio-economic aspects tend to obstruct the implementation of traditional landscape policy instruments, which frequently ignore the multifunctionality of urban landscapes. For these reasons in some urban regions protagonists involved in landscape policy have recognized that metropolitan open space depends not only on the top-down approach of public landscape protection, but also on active landscape management and development.

Egyptian cities and villages are thus confronted in the new millennium with the problem of accommodating the rapidly growing populations in cities and providing them with tenure, infrastructure, and shelter, while ensuring environmental sustainability as well as enhancing economic growth. That why it is very necessary to create new methods to get new opportunities to upgrading the quality of life and get new economic resources to cover the gap between population increase and limited resources .A major challenge for waterfront regeneration is integrating public sector objectives for sustainable regeneration with private sector 'know how' on efficient, cost-effective development processes.

### **Egyptian Sustainable development indicators (ESDI)**

The United Nations Conference on Environment and Development in 1992 recognized the important role that indicators could play in helping countries make informed decisions concerning sustainable development However; the sustainable development remains a renewed process and variable due to renewed humanitarian needs and changing economic and social. So the planers and designers should develop measurement and analysis tools to keep pace with these changes. Three sources of sustainable development indicators is a component of the initiative of the

**Egyptian Environmental Policy Program (EPPP). Commission of Sustainable Development Indicators (CSD)** This set of indicators is reviewed and updated on regular basis and in this respect, representatives from EEAA (Egyptian Environmental Affairs Agency) have contributed to experts meetings organized to this end. Egypt' participate in two regional frameworks for the sustainable development criteria (The Mediterranean Action Plan and The Arab League Indicators).

**The Mediterranean Action Plan/Blue Plan Indicators:** the Blue Plan is the framework of the recommendations adopted by the Contracting Parties of the Barcelona Convention at their Eleventh Meeting in Malta in October 1999; these recommendations aimed for setting up a common system of indicators for sustainable development in the Mediterranean region.

**The Arab League Indicators:** In 1997, **the Arab League**, through its General Department for Economic Affairs, selected a set of 29 indicators to describe and assess the environmental status in Arab states. 3.4. Development of Environmental Indicator for the Government of Egypt .By using the Egyptian sustainable development indicators (ESDI) we measured the current status of urban environmental conditions of the lake and the villages surrounding it.

## Study area

Lake Qarun is a salt water lake in south west of River Nile delta in governorate of Fayoum. Lake Qarun is a saline basin, The Lake is bounded on the east and south by the agricultural cultivated lands, and it located inside the



Fig 1: Fayoum Governorate.

Fayoum oasis, covering an area of 240 km<sup>2</sup>. It occupies the deepest part of the Fayoum depression, so the water surface is at approximately 45 meters below the sea level. The average depth is about 4 meters, reaching a maximum by 8 m at the centre, west of the only island. Lake Qarun is also an Important Bird Area (IBA).

Lake Qarun is part of a Ramsar wetland sites and a specially protected area, under the Barcelona convention, where it has various economic resources (agriculture, industrial and tourism), and the site is considered to be a world heritage site by UNESCO because of the splendors of some of the world's best fossils recently designated in 2005.

Mixing between farmer's, fisher's and Bedouin's life made various societies. Different cultures live together surrounding this lake giving this site very special character. Villages surrounding lake are confronted with the problem of accommodating the rapidly growing populations, Its direct vicinity are mostly rural communities inhabiting 17 villages along Lake Qarun's shorelines People in these areas are mainly occupied with agriculture, except for the Southern part ("Shakshouk" village) who is engaged with both: agriculture and fishing. Ethnically, most of the inhabitants are originally Bedouins.

The total population number of study area is of 131481 persons. Males are 52% and females are 48% and the average age of 20 years makes up 14.5% of the population. Male drop outs reach 39.4% and among females the drop-outs are 79% persons from 5 schools primary, preparatory and one-class schools. Peasant's male up 34%, farmers 16.5%, fishermen 20%, craftsmen 8.4%. Residential buildings are 86.1% of the total number of buildings and more than 12% of village buildings are commercial residential. Although the ratio between the activities are good for residential and commercial but Land uses distribution doesn't achieve the economy growth for the villages. These commercial buildings are just for local people needs with small fish restaurants. More than 83% of buildings are in bad condition, 13% are intermediate condition and 3.8% of them are in good condition. Construction systems varies between load bearing walls (89.1%) concrete structure buildings (5.9%) and 5% are cottages. 1-3 floors buildings are 94.6% of all buildings. Buildings that more than three floors are 5.4% of all buildings.

Lake Qarun it has suffered from many problems can be summarized in three main directions:

**Administrative and managerial problems:** of the ruling system of the lake because the conflicts between ministries and authorities (Ministry of Agriculture, Irrigation, Tourism, Environmental Affaires and Fayoum governorate)

**Environmental problems:** beach erosion, land subsidence, sea-level rise, water pollution, land encroachments, water logging, this problems caused by water polices and management .other problems caused by lack of environmental awareness. There are a number of sources that lead to pollution of lake water and sanitation, the most important and agriculture is also under the lake to lose in capacity in addition to her problem Increase in salinity and low productivity of fish.

**Urban problems:** Most important problems facing the mentioned villages:

- Fluctuation of the lake water and the decrease of fish production
- Unemployment
- Health problems
- Irregular irrigation and drainage system
- Fishermen immigration with negative social impact on families leading to family separations and increase of deviant behaviors
- Cultural and environmental unawareness

## Previous Plans and Policies

Interest in the concept of sustainable development has increased in 90s in Egypt .most of these plans were directed to tourism , environment, fishing and agriculture our team has reviewed the previous development plans in the Fayoum Governorate including the following studies:

- "Indicative tourism development plan for Lake Qarun and Wadi El Rayan" prepared by TDA, 1991
- "Horizon of the Development in the Fayoum Governorate" prepared by Cairo university, Fayoum branch and Fayoum Govenorate, 1998.
- "Ecotourism for sustainable development in the Fayoum Oasis" prepared by TDA and NSCE, 2000.

- “Preparatory phase for ecotourism in Fayoum ”, prepared by NSCE, 2004.
- Conservation management plan of Wadi El Rayan protected area, prepared by nature conservation sector, EEAA, 2001
- “The Preparatory Phase for Ecotourism in Fayoum”. Prepared by Fayoum Governorate in cooperation with North South Consultants Exchange NSCE, 2004.
- “Tourism Development Plan for the Northern Coast of Lake Qarun”, prepared by TDA, 2004
- Fayoum Ecotourism Development Plan 2005-20015, Fayoum Governorate (2006),
- Environmental Action Plans of the Government of Fayoum from, Fayoum Governorate 2004 till 2010

Careful analysis has shown that very few of the above mentioned plans and its suggested approaches have been implemented. Issues of the regional economic crisis, conflicts between relevant authorities, lack of financial resources, environmental deterioration, language barriers, and availability of documents, local awareness and lack of specificity can be seen as some of the reasons for the difficulty and inability of implementation. For the development of these studies as sustainability plan must take into account the social and physical dimensions and dealing with the lake and the surrounding environment in one framework to achieve the desired integration of these plans.

### Sustainability plan:

Understood in the frame work of sustainable landscape plans in Lake Qarun depend on the main idea linking between design system and information system with decision-making in one framework. And develop solutions to the problems facing the system of urban and environmental system of integration using multi-functional landscapes

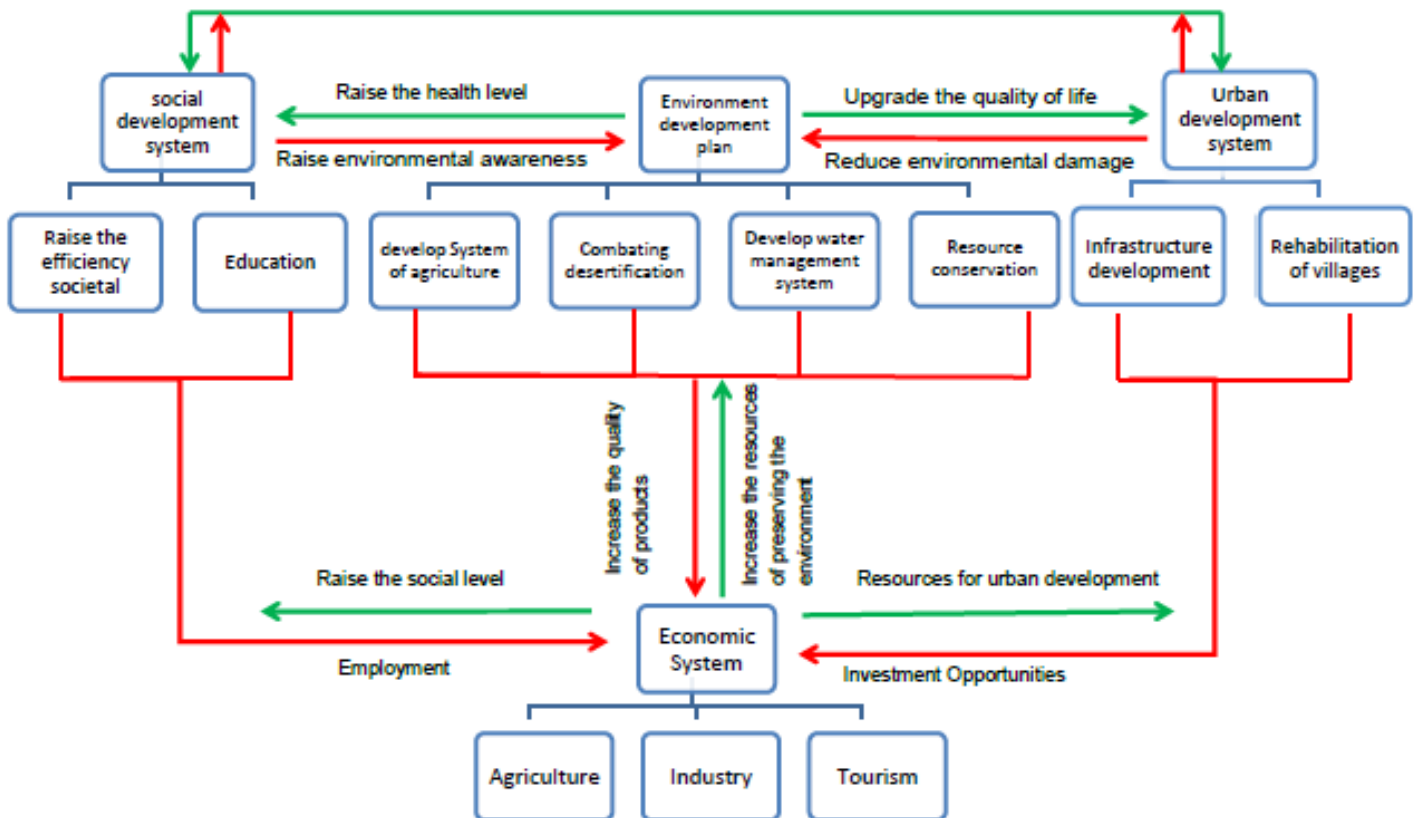


Fig: 2 presents the frame work for sustainable development in the Lake of Qarun and mutual influence between the systems of the four components of the environment in this region

- Linking the environment monitoring systems offered by research centers and water stations in all ministers and organizations in one database to have a better understand of changes on the lake and the environment surrounding it. Fig2 Shows the sources of information and the relationship between them and the indicators of sustainable development

Indicator Themes	Sources			Authorities
	IDSCC	APMAS	EEAA	
Poverty	•	•		Fayoum Governorate , Ministry of Social Solidarity
Governance	•			Fayoum Governorate, Council of Ministers
Health	•	•		Ministry of Health
Education	•	•		Ministry of Education
Demographics		•		Central Authority for Public Mobilization and Statistics
Natural hazards			•	Ministry of State for Environmental Affairs
Atmosphere			•	Ministry of State for Environmental Affairs
Land		•	•	Ministry of State for Environmental Affairs, Ministry of Agriculture
Freshwater			•	Ministry of State for Environmental Affairs, Ministry
Biodiversity			•	Ministry of State for Environmental Affairs
Economic development	•			Ministry of investment, Ministry of Tourism, Ministry of Commerce
Consumption and production patterns	•	•		Ministry of investment, Ministry of Commerce

Fig 3: Shows the sources of information for monitoring system

- Resent case studies proved that the success of any development project depends on Contribution of development partners like local communities, government, civil society organizations and investors in each phase in the project.

### The proposal plan depends on:

- Developing the administrative system of the lake to avoid the conflict between responsible authorities and contributing association.
- Establishing a marinating system for the environment Depends on linking research centers in the bodies involved in the management of the lake and one database containing all the information and help in decision support for designers and planners to develop plans and architectural designs.
- Development of local communities around the lake to participate in the development process
- Develop a system to purify water drainage before it reaches the lake with the conversion of some of the paths of banks to stations far from the lake



- Use of GIS in the development of modern maps of the villages and to link these maps of environmental monitoring system
- Increased publicity and media awareness about the importance of environmental
- Develop a network of roads around the lake and the road linking the regional increase investment opportunities in the lake
- Create a set of anchors distributed on the regions of the lake and the island to link the movement within the lake
- Promotion of environmental industries that depend on the outcomes of the lake and surrounding villages
- Promoting investment opportunities in the field of eco-tourism and the development it me plans for the implementation of these projects

## Conclusion

The research study proved that the Lake Qarun have a great importance for the Urban Future development plans in Egypt. The potentials in this region qualify it to be a magnet for investment in environmental and urban future. Development efforts in the lake need to be an integrated system for environmental management and urban development to solve the problems facing this region. The lack of complete data for planners and designers has led to a lack of clarity in the vision of the future. Using landscapes Projects as input to the socio-economic development is one of the most important methods are capable of developing this region. Eco tourism activity is Influential in the future development plans of the local communities of Lake Qarun.

## References

1. Ministry of state for environmental affairs. 2005, Egypt State of the Environment Report 2004 ,Cairo, Egypt
2. Mufid A, Samarai.( 2007) .Planning Sustainable Mega Projects in UAE, World Housing Congress Affordable Quality Housing, Malaysia
3. Gabriele, E.M ,(2010),Atmospheric correction issues for water quality assessment from Remote Sensing: the case of Lake Qarun (Egypt), DICAM†, Università degli Studi di Bologna (Italy)
4. United Nations Human Settlements Programme (UN-HABITAT), 2006, Location of rapid urban sector profiling for sustainability (RUSPS) in Egypt United Nations Human Settlements Programme, Regional Office for Africa and the Arab States,
5. Someswara Rao Irrinki, Naga Lakshmi Irrinki.(2007).Implementing Sustainable Development in the Lake Kolleru, India, Roskilde University, Denmark
6. BRADBURY, Matthew, (2010). The Sustainable Waterfront, 16thAnnual International Sustainable Development Research Conference, Hong Kong, China.
7. Christina von Haaren, (2002)Landscape planning facing the challenge of the development of cultural landscapes, Landscape and Urban Planning 60 (2002) 73–80,ELSEVIER Science B.V.
8. Soledad Garcia. (2009 ).The Cool Sea Waterfront Communities Project Toolkit, , The City of Edinburgh Council, UK
9. (2007)Indicators of Sustainable Development: Guidelines and Methodologies ,Third Edition, United Nations ,New York, USA
10. Moussa Ibrahim.(2006).Information Exchange Among All Ministries and Authorities to Build Indicators of Sustainable Development Journal of Applied Sciences Research, 2(12): 1384-1398,, INSInet Publication
11. Mediterranean Commission of Sustainable Development. (2000).Indicators for The Sustainable Development in The Mediterranean Region, Blue Plan, France

12. Radwan G. Abd Ellah 2009, Outlook on Past, Present and Future Status of Water Salinity in Lake Qarun, Egypt, World Journal of Fish and Marine Sciences
13. Central Agency for Public Mobilization and Statistics. (2008). Census for 2006 for the Arab Republic of Egypt, Fayoum Governorate Report ,Cairo,Egypt
14. Fayoum Governorate (2006), Fayoum Eco Tourism Development Plan 2005-20015, Fayoum, Egypt
15. Glenn L. Sia Su , Julio Cervantes.(2008). Public Perception of Local Communities towards the Sustainable Management of Laguna Lake, Philippines, American Journal of Environmental Sciences 4 (6): 615-619,USA
16. Fayoum Governorate (2008), Environmental Action Plan of the Government of Fayoum ,Fayoum, Egypt
17. Riffat Abdel Wahaab. (2003). Sustainable Development and Environmental Impact Assessment in Egypt: Historical Assessment, The Environmentalist, 23, 49–70, Kluwer Academic Publishers. Manufactured , The Netherlands.