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Incorporating Local Urban Environmental Conservation and Regional Development: Port Fouad, Egypt

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Abstract

Incorporating local urban environmental conservation and regional development in Port Fouad town is the main concern of this paper. This paper focuses on investigating the regional development impact on local urban environment of Port Fouad town. The investigation of the national and regional development policies, particularly the current Suez Canal Zone Development policy, will be used to define goals, interests and objectives of the development of Port Fouad and adjacent. The analysis of these development policies will be explored along with the projects provided to Port Fouad area to define the urban planning and environmental issues that may arise in Port Fouad during the development process. The assessment of the potentials and constraints of Port Fouad development will be conducted to outline the criteria and guidelines for initiating the master plan of Port Fouad. A general development plan will be proposed to the area, particularly Port Fouad Island. In addition, a master plan for the development of Port Fouad Island, which could contribute to the conservation of urban environment of Port Fouad, will also be proposed. Finally, the environmental effect of the proposed master plan is also defined.

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Keywords: Local Urban Environment; Conservation; Port Fouad Town; Regional Development; National Development; Suez Canal Zone Development; Urban Planning and Environmental Issues; Urban Environment; Conservation of Local Urban Environment

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1. Introduction

Port-Fouad has a unique location. It is situated on the Mediterranean in the northeast corner of Egypt, east Port Said city at the main entrance of the Suez Canal Waterway, Figure 1. Port-Fouad district is one of the seven districts of Port-Said governorate. Port Said governorate is one of three governorates; Port Said, Ismailiah and Suez, that define Suez Canal Zone. Port Fouad district is separated from Port Said city by the Suez Canal waterway. Port Fouad district, until the beginning of the 1980s, was a part of Sinai Peninsula and, in turn, Asian continent.

The inhabitant areas of Port Fouad town were also segregated from Sinai Peninsula by establishing the new eastern waterway channel of Suez Canal. Currently, Port Fouad district is divided into two main parts, Port Fouad town and eastern part. Port Fouad town now is an island, which is surrounded by the Mediterranean in the north, the Suez Canal waterway to the west and the new eastern channel to the south and east. Eastern part of Port Fouad, moreover, is located in Sinai Peninsula. It consists of the new eastern Port Said harbor, free zone and a planned new city for about one million inhabitants, Figure 2. Both the island and rest of Port Fouad are connected to each other and to Port Said and Sinai by a ferry boat system.

Port Fouad location at the intersection of the historical routes between Asia and Africa is reflected on its physiography and climate. Port Fouad climate could be described as Mediterranean, with average annual temperature of 21.5 °C and average precipitation of 17 mm. The area is a geological and scenic entity with distinctive characteristics, which is the basis of its attraction for recreation, particularly on the shore of the Mediterranean and Mallaha Lake. The site, as well, supplies mineral wealth, fishing and a pleasant climate for living. This is in addition to the port opportunity. These resources are all valued regionally, nationally and, to some extent, internationally.

Port Fouad district extends over an area of approx 511 sq km. The area of Port Fouad district is about 40 percent of Port Said governorate. Port Fouad town, the inhabitant area, is 31 sq km with total population of about 81591 in 2015. The study site, therefore, represents a relatively large and significant part of the administrative and political system of Egypt. The area, currently, is facing economic interests at the regional and national levels, which are intensively ongoing. It is called Suez Canal Area Development Project (SCADP). The aim of the SCADP includes increasing the role of the Suez Canal Zone in international trading and to develop the three canal cities: Port Said, Ismailia and Suez. These economic interests involve: 1) building seven new tunnels between Sinai and Port Said and Ismailia; 2) improving the five existing ports; 3) increasing the waterway capacity by allowing ships to navigate into two different directions at the same time; 4) building a new city, new Ismailia city, an industrial zone, fish farms, completing the technology valley, transferring the canal cities into an important trading center globally; and 5) building new centers for logistic and ship services, Figure 3.

Within this context of economic development, urban environment of Port Foaud could be adversely influenced if this development is not well planned and managed. This is because the occupied area of Port Fouad town is one of the most inhabitable areas with density of approx 2632 per/sq km. Moreover, this location can allow Port Fouad district to play a great role in the economic development, particularly for urban and population growth to support this economic development. Other adjacent towns will also be directly affected by this development such as Baloza and Eastern Qantara towns, to the south of Port Fouad District.

This role could be achieved if the urban environment of Port Fouad is considered to the level of coping with the requirements of this economic development, particularly urban and population growth. Contradictory, if Port Fouad did not receive the right planning on the right time, during this stage of ongoing economic development, urban environment of Port Fouad will be adversely affected, in terms of spatial pattern and character, rate of urban growth, population density, environment, etc.

Therefore, the purpose of this paper is to define the expected role of Port Fouad during the process of economic development in the area. In addition, urban planning is the main tool that can allow towns to cope with the economic development requirements and without adversely influencing the environment. This hypothesizes could be proved as

follows: first, investigate economic development policies provided to the area. Second, address the natural and cultural resources, population growth and Port Foaud development potentials. Third, define the expected role of Port Fouad during the development process. Fourth, analyze current land-use pattern and urban issues that may occur by the implementation of the economic development policies in the area. Fifth, define urban planning guidelines and criteria to decrease the environmental impact on the area. Finally, propose the master plan of urban development for Port Fouad Island and define its environmental impact on Port Fouad.

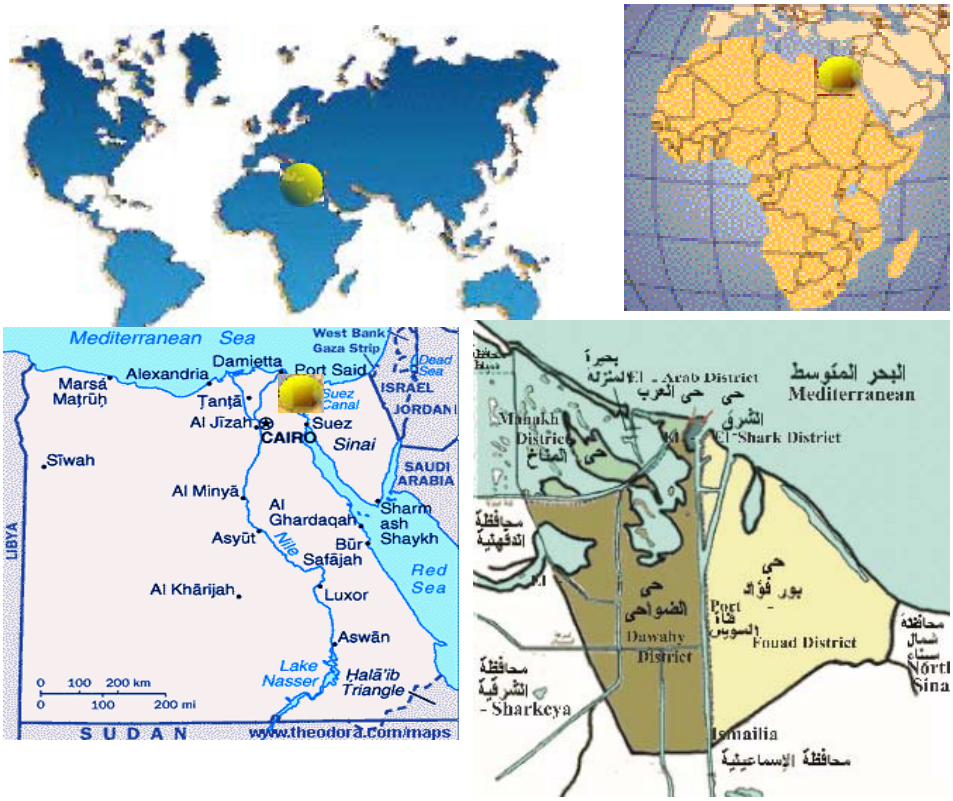

Figure 1: Port Fouad Location

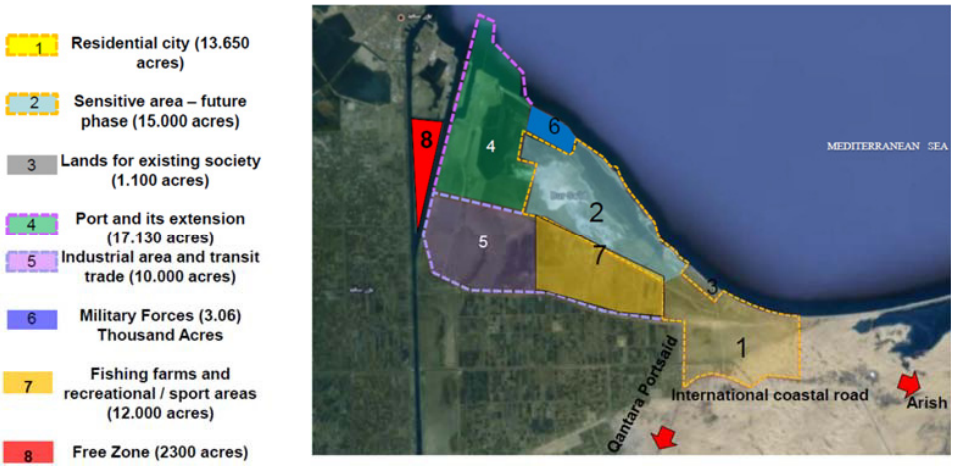

Figure 2: Port Fouad Island and Eastern Part, and Development Land Use for Eastern Part

2. Background

Port Said governorate was defined in 1859 with the establishment of Suez Canal Waterway and authority. The function of Port Said and Port Fouad was mainly serving the Suez Canal waterway; as a main gate and transit port. This is in addition to few port activities and industries. The lands of both are defined by back filling the Mallaha Lake with the excavated soil of Suez Canal. The growth of Port Said and, in turn, Port Fouad is much affected by the navigation of Suez Canal waterway. Both cities faced a real massive decline for more than six years, 1967-1973, during the wars. The canal was reopened for international shipping in June 1975 as rapid progress was being made on the major task of reconstructing the war-damaged areas. This reconstruction had to proceed in advance of the preparation of comprehensive plans, at the national and regional levels.

After the 1973 war, Egypt has embarked on a major economic development program at the national level. This program intends to cater for increasing needs, particularly the population growth. One important aspect of this program is the 'Open Door Policy'. The objective of this program is to allow Egypt to return to the path of economic development on a firm basis, which will allow sustained economic growth and social advancement at an accelerated rate. This would take place within a framework of Egyptian control.

The regional plan, in addition, sets out the broad strategy for development of Suez Canal Zone, Port-Said, Suez and Ismailiah governorates. The purpose of development is to: a) promote a development strategy for this zone that will meet the national goals and regional objectives; b) propose policies in the main economic, social and physical fields, which are relevant to these strategies; and c) outline methods of managing development, assessing progress, monitoring change and revising the plan in the light of change. The regional plan has been prepared in parallel with the sub-regional plans for the three cities.

Moreover, the implementation of rehabilitation of Sinai plan comprises agriculture, industrial, mineral and tourist fields. The aim of this plan is to provide living areas for 5 million persons, and expand and utilize free industrial and commercial zones in Sinai along the Canal and north of the Suez Gulf. This means the construction of a resourceful hinterland for this area, which necessitates the construction of a highly equipped commercial port to cope with the expected imports and exports. To increase cultivated land in Sinai, it is found that supplying Sinai with the Nile Water is essential. Therefore, Al-Salam Canal has been established to transfer Nile water to Sinai via siphons under the Suez Canal waterway, at the southern part of Port-Fouad.

Sinai Peninsula, at the same time, is separated from the mainland of Egypt by the waterway of Suez Canal, with total length of 162 Km running between the Mediterranean and Red Sea. The dimensions of Suez Canal Waterway have been steadily increased since its construction to match the maritime traffic growth. Future plans of the Suez Canal Authority (SCA) predict in some sections a doubling of the Canal width for southbound convoys in ballast. Therefore, the five years plan for developing the Sinai Peninsula points out the importance of integrating the peninsula to the mainland of Egypt. This integration requires the creation of safe, permanent and durable links across the Suez Canal. Currently, Ahmed Hamdi tunnel located in the southern section of the Suez Canal, at km 100 from Port Said, is presently operating as a fixed link. Al-Salam Bridge was also constructed at Ferdan, km 67 to the south of Port Fouad. Sinai Peninsula also connected through ferry boat terminal locations alongside the Canal at 14 different locations. In addition, a tunnel is planned to be located at km 20 south Port Fouad to integrate Sinai and the mainland.

In 1997, consequently, the Egyptian government has initiated the development of a free zone area in the eastern part of Port Fouad. The project comprises the construction of a Hub Port, called eastern port, and special industrial zone. The port was constructed over an area of 69.3 sq km (17130 acres) with the associated container and general cargo terminals. The area of the industrial zone is about 40.5.0 sq km (10000 acres). It is planned to develop industries oriented towards export. The objective of constructing the port is to serve for import and export activities of the industrial zone and to meet expected growth in the Egyptian economy. It is feasible that the port will attract a

considerable portion of the anticipated increase in international container handling and transshipment. In addition, it is also expected that the industrial zone will require dry bulk/liquid bulk quays, Figure 2.

After more than a decade of neglect and decline, the Suez Canal Zone in 2015, turned into focus for economic interest and development. It constitutes a major part of a national and regional development plan for Egypt. The Suez Canal Zone development plan, in 2015, became a mega project, called Suez Canal Area Development Project (SCADP). The vision of the SCADP, as defined by the government, Figure 3, is to:

> *"Exploit the enormous potential of the Suez Canal; to develop a vibrant, internationally competitive economy that is a magnet for international investment, stimulates substantial employment opportunities and transforms the region into a world-class, global logistics hub and industrial processing centre that provides gateways to both the European and Asian markets."*

At the regional level, the SCADP involves developing a Regional Development Strategy for the areas in the hinterland of the Suez Canal, called 'core influence'. Identified priority sites include Port Said East and Ain Sokhna. Strategically located at the two gateways of the Canal, these sites offer high potential to be developed into global hubs for port, logistic and industrial activities. Opportunities around Ismailia are also being developed, Figure 3.

This mega project is intensively ongoing. For instance, the Suez Canal waterway, in a year, is already doubled for about 45 percent of the total length of the waterway. The expansion was expected to double the capacity of the Suez Canal from 49 to 97 ships per day. The New Suez Canal is expected to expand trade along the fastest shipping route between Europe and Asia. The revenues from the Suez Canal are projected to jump from 5 billion dollars to 12.5 billion dollars annually in the coming decade. In addition, seven new tunnels are planned to connect the Sinai Peninsula to the Egyptian mainland. These tunnels are already under construction. Three tunnels will be in Port Said, two for cars and one for railways; and four will be in Ismailia, two for cars, one for railways and one for other special uses, Figure 3.

In fact the mega project of Suez Canal Zone consists of several projects that cover the three sub-zones. These projects extended across the northern coast from western port of Port Said to Arish port to the east. These projects also spread along the Suez Canal from Port Said to Sokhna to the south.

In one hand, Port Said Eastern port is located on the north eastern part of the Suez Canal branch, connecting three continents, Figure 3. The port was built in 2004 to serve international trading and act as a transit center between the continents. The port covers an area of 35 sq km. The development plan for the port encompass building docks up to 12 km long and an industrial zone south to the port covering 78 sq km. Three stages are still remaining to fully complete and improve the eastern port, which will create 44 stations with docks of 48 km long. Moreover, Arish port lies on the northern coast of Arish city, which was transformed from a fishing port to a trading ships port in 1996. The port contains two main docks of 242 m and 122 m long that serve big-size and small-size ships. The port also includes covered and uncovered storage areas of 2 and 2.47 sq km. This port is important because it directly allows exporting Sinai products to the Mediterranean countries. New development projects are planned for Arish port comprise building a 2 km dock for containers station and a general goods station; new storage areas; a dock for yachts and new logistic centers.

On the other hand, the SCADP also plan incorporates industrial activities in the three sub-zones: first, in east Port Said the industrial activities focus on light-intermediate activities connected to the port and logistics center. This includes agribusiness, textiles, automotive assembly and parts, pharmaceuticals and other general manufacturing. Production here is primarily export-oriented. Second, Ismailia sub-zone is also planned for light industries including agribusiness and textiles. Other economic activities in the sub-region include renewable energy generation and testing. Finally, Sokhna area to the south of Suez sub-zone, the industrial zone allocated at the hinterland of the Sokhna port with

supporting logistics center. Development consists of a mix of light, intermediate and heavy industries. This includes petrochemicals, energy production components, building materials, automotive assembly etc. Figure 4.

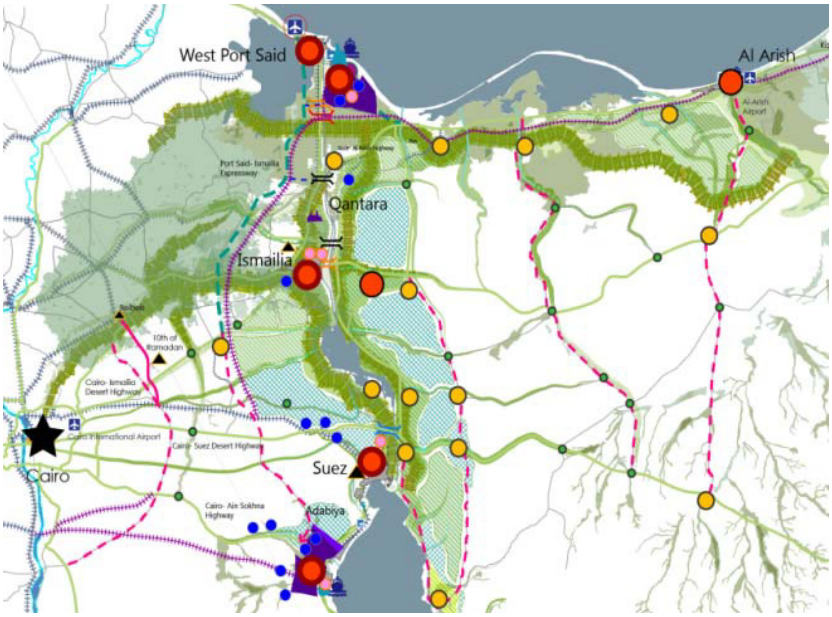

Figure 3: Suez Canal Area Development Project (SCADP), (Dar Al-Handasa)

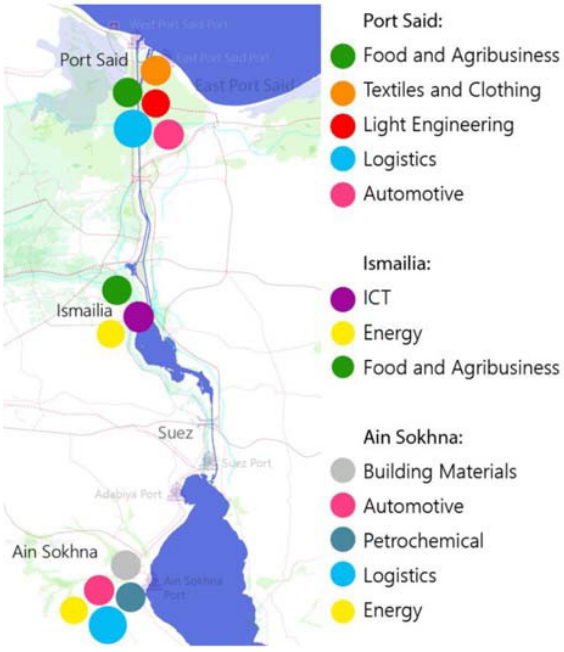

Figure 4: Planned Industrial Activities in the Three Sub-Zones, (Dar Al-Handasa)

3. Expected Impact of Development on the Suez Canal Zone

It is expected that the new mega project, during establishment and by the end of its phases, will have direct impact on the growth of Suez Canal cities and, in turn, on the expansion of Port Fouad town. Several industrial commercial, agricultural and service projects, as mentioned above, will be established in Suez Canal Zone. Moreover, the impact of the mega project is expected to create new projects such as promoting existing natural resources and accelerating the role of the zone geographical location in the world trade between east and west. It is also expected that logistic centers will be established alongside the Canal. Consequently, the chance of attracting foreign investments is highly estimated. World companies and foreign investment are also expected to be attracted in the fields of transportation and logistics. Fortunately, the mega project will provide job opportunities in all areas of specialization, mainly in the technical and craft fields. The project is estimated to provide more than one million job opportunities.

Furthermore, it is projected that the new project will contribute to change the population map of Egypt, restructure the population congestion and accelerate population migration from the narrow valley to new urban communities in Ismailia, Port Said, Suez and Sinai. Meanwhile, the existing cities and towns have to handle considerable portion of this population migration. Port Fouad, consequently and according to its location close to the Eastern Port, will have to play a major role in this process.

4. Development Policies Applied to the Development of Port Fouad

As a result of national and regional development policies, Port Fouad district is planned as a candidate for immediate growth at much higher rates than the national urban average. The development policies are designed to make the maximum contribution to the socio-economic development of Egypt. The area has both assets and potentials which, if exploited, will bring about real and tangible benefits throughout Egypt.

The General Authority for Urban Planning (GAUP) in 1991-2000 has provided a master plan for the physical and economic development of Port Fouad district, the island and the eastern part, as a part of the physical planning of Port Said governerate. This plan also included the north part of Port Fouad Island (existing inhabited area), Figure 5, considered as one of the main axes to receive the normal urban expansion of Port Said. The north part of Port Fouad, coastal portion on the Mediterranean, was developed for tourism. The rest of Port Fouad district, north and south Al-Salam Canal, Port Fouad to Baloza, was developed for agriculture, Figure 6.

This master plan is adapted in 2013-2014. The detailed under implementation projects of the development policy could be described as follows:
First, the Eastern Port, located parallel to the eastern branch of the Suez Canal, is for loading and unloading goods, Figures 5, 6 and 7. The quays are designed for the storage of containers, while the business of the transit is located near the naval harbor; second, enhancing tourists and commercial land-uses of the navigation-lake throughout establishing villages for fishermen, fish industrial district, as well as tourist villages. Areas defined for heavy industrial are located beside the Suez Canal, at the south side of the free district. Areas for medium and light industries are located in the south side of the city near the public services area for the city. To connect the industrial areas, stores, harbor, and airport, a large net of pedestrians, routes, roads and railways will also be applied between the inhabited areas and the commercial center of the district, Figures 2, 6 and 7; third, the city center was planned in a middle location. This center includes a free zone and an exhibition area, which enables a complete contact between the center on one side and the industrial areas as well as the inhabited and entertainment areas, Figures 2 and 6; fourth, the inhabited areas, the north coastal area could be used as living areas for the businessmen, tourists and managers. Living areas for employees is located on the eastern side. The sea views of the Mediterranean, in the north, could be used for tourist buildings, villages and entertainment, Figures 2 and 6; fifth, the entertainment places and the green lands will be used as the physical separation between the different activities; inhabited, commercial, industrial, etc.; as well as around the road, Figure 2 and 6; sixth, roads and main streets will determine the use of the lands and plots boundaries. These roads are surrounded by green belts. The width of the road is of 50 meters of both sides, Figures 5, 6 and 8; and finally, since it is difficult to extend to the north and west sides, the expansion, therefore, will be toward east border

for the inhabited areas. The extension for the industrial areas will be toward the southeast, Figures 2, 6, 7 and 8.

It is estimated that the employees of that area will reach 500,000. Accordingly, this area is estimated to receive a total population of 1.5- 2.5 million persons. Three main inhabitable areas are expected to carry out this population growth, Port Fouad, Baloza and Qantara East. It is estimated that Baloza could receive 0.5- 0.8 million, Qantara 0.75- 1.25 million and Port Fouad 0.25-0.40 million. Accordingly, Port Fouad is one of the main inhabitable districts that expected to be targeted by the employees and population growth. If this massive and rapid economic and population development to the area is not considered and well planned, the result will be more slums and environmental hazards to the area. Port Fouad Island, accordingly, is expected to handle the majority of this population demand particularly during the establishment of these projects. Therefore, the paper will provide a general land-use layout to Port Fouad Island. The purpose is to allow Port Fouad Island to cope with the required development and safeguard its environment. Before discussing this development plan, it is found that investigating the potentials of Port Fouad is essential.

Figure 5: North Area of Port Fouad Island and the Port

Figure 6: Development Plan for East Part of Port Fouad

Figure 7: Areal Image for the New Development

1- Business Area 2- University Area
3- Housing 4- Tourism

Figure 8: Detailed Land-use for the Residential City

5. Potentials and Constraints of Port Fouad

Port Fouad Island is classified as an urban district of Port Said governerate. Physically, as mentioned above, Port Fouad Island is partially inhabited with residential areas in addition to few scattered public buildings. Port Fouad Island is also sub-divided into two sub areas, Figure 1, 2 and 5.

The size of the inhabited area of Port Fouad is 31 sq km. The percentage of the inhabitable area to the total area of Port Fouad is 6 percent. The population size of Port Fouad is 81591 in 2015. The percentage of population size of Port Fouad to the total population of Port Said governerate is 12 percent. The average rate of population growth is 2.1 in

2015. The average population density is 2631 per sq km in 2015. This high density is calculated in accordance to only the inhabitable area of Port Fouad. The average density to the total area of Port Fouad District is 160 person per sq km. Both population densities are high comparing to the national population density, 90 persons per sq. km in 2015. In addition, the distribution of population of Port Fouad is concentrated in a small portion of the land close to Port Said. The rest of Port Fouad is not well exploited enough. The population of Port Fouad is estimated to increase in the year 2025 by additional 250000 person due to the development policies provided to the area, which is more than three times of the current population size.

Port Fouad offers considerable potential for development, in terms of physical, environment, natural resources, etc. The infrastructure is already developed and currently undergoing improvement to serve the links between Port Fouad and Sinai, Suez Canal cities, Cairo and delta coincides, via Port Said, with adjacent areas of flat dry desert land at elevations low enough to permit the economical provision of water supply. An advantage can also be achieved by exploiting the Mediterranean and Red Sea coasts and the shores of the island to provide urban waterfront locations.

Climate, in fact, is important in the creation of satisfactory environment for human settlement. In this regional context, the advantage offered by exploiting the offshore winds from the Mediterranean at Port Fouad by development along the coast is a considerable potential. The inland Mallaha Lake also provides microclimatic relief. In addition, surface temperature varies from a minimum of 14 ^{O}C in the west and 17-18 ^{O}C in the east, while maxims are generally around 25 ^{O}C in open water. Maximum temperatures in shallow or enclosed areas can significantly exceed this. The advantage to be obtained from these climatic features can be greatly enhanced locally by giving attention to spatial arrangements in the planning of urban areas and by carefully located and designed.

Lake Mallaha represents valuable natural resources. In contrast to the overall regional potential for urban development based on existing infrastructure, in addition, the potential of the coastal lakes is for rural development based in part on the naturally productive wetlands and clay swamps. Fish yields can be greatly increased in the coastal lake. Careful attention to the conservation and improvement of the lake and wetlands will bring benefits to the area in the fields of recreation and tourism, increased fish production and in improved exploitation of water resources. The major fisheries of the area are sardines and shrimps. Mullet, sea bass and sea bream are also caught close inshore.

Moreover, the restrictions to the creation of agricultural land demand the maximum protection of land already in agricultural production and such land should not, therefore, be available for other forms of development. Potential for the reclamation of desert to create new agricultural areas does exist. In agriculture, the area of Sahel El-Tinah is a cultivable to many crops. The Al-Salam Canal, which carries the Nile water to Sinai, is passing through the south part of Port Fouad, at Sahel El-Tinah. About 420000 fedanns (acres) identified as most likely to have soils suitable for agriculture. All of those soils can actually be irrigated by the Nile water. The potential growth of Port Fouad, finally, is also promising in industry. In industry, its wealth has much more impact on the national than on the regional economy. Port Fouad has mineral potential such as Sodium Chloride and natural gas. Port Fouad produces food salt, natural gas and detergents.

The main constraints of Port Fouad to offer this kind of development are the limitation of land suitable for massive residential development, in terms of size and characteristics of soil, high population density, and transportation system between the island and other areas. First, Port Fouad Island is the only place that will be able to receive population, mainly during development. At the same time, this area is preserved for the normal physical expansion of Port Said toward the east. This area is originally a lake which back filled. Therefore, its soil characteristics are suitable only for buildings of one to three floors in height at the maximum. In addition, the soil characteristics of the south part of the island are suitable only for lightweight of construction. Second, the island of Port Fouad, as mentioned above, is separated from Port Said, mainland, and Sinai Peninsula by the waterway of Suez Canal and the eastern channel.

The only transportation system between Port Fouad, and Port Said and Sinai is the ferryboat, which is not reliable for massive population growth. Third, the population density of Port Fouad, as mentioned above, is actually high comparing to the international standards and to the average population density of Egypt. Consequently, special kind

of activities should be used for developing this area such as residential areas for businessmen entertainment, recreational, conference centers, hotels, etc. These activities should be compatible with the overall development of the area, in terms of land-use. In addition, it is proposed to allocate the new tunnel at the 18 kilometer, south to Port Fouad, which should be accessible to Port Fouad. The purpose is to facilitate the connection to and from Port Fouad. In other words, the target is to have direct connection between Port Fouad and Port Said-Cairo road, and to Sinai.

6. Planning Criteria for developing Port Fouad Island

According to the above analysis and investigations, it could be concluded that the conceptual development direction of Port Fouad Island depends on the following facts:
6. 1. The development in this area is too limited because of its surroundings sea coasts.
6. 2. The population could be adopted in the area not exceed 250,000 persons as a maximum limit, in addition to the existing.
6.3. The population categories for developing Port Fouad are businessmen, managers of industrial zones and high income people of free zones.
6. 4. The building classifications will be low height of buildings, 2-3 floor heights.
6. 5. The architectural character of the development must respect the conceptual planning and architectural styles in this area wherever French styles.
6. 6. The net population density should not exceed 50 persons per feddan.
6. 7. Establishing tourist and recreation and entertainment zones along the seashores to serve Port Said region.
6. 8. Setting up high level commercial center for the free zone productions in addition to different commercial activities.
6. 9. Other related activities should be encouraged such as hotels, higher education, universities, office buildings, etc.
6. 10. Facilitating the Connection of Port Fouad to the rest of the region through connecting Port Said, Port Fouad and East of Port Said to the tunnel, which is under construction.
Figure 9 shows the selected master plan. It gives indication about proposed land-uses, roads, pedestrians and open spaces. This master plan is selected from 3 other different land-use alternatives. The purpose is to develop Port Foaud in more suitable plan for its character of climate, existing districts, environment and expected role for the future.

7. Objectives of Proposed Master Plan for Port Fouad Island

The objectives of providing the master plan for Port Fouad Island are as follows: 1) providing a reasonably attractive living environment for the dwellers of Port Fouad, current and future dwellers; and 2) preserving the environmental characteristics of Port Fouad and its surroundings during and after the development process by treating and handling the expected negative impact of economic development undergoing in the area.

Currently, Port Fouad Island consists of one district. This district includes the old part, the original of the city, and newly added parts to the city. The original part mainly includes the houses of employees of the Suez Canal Authority. Figure 9 shows current residential areas of Port Fouad and their development over time. The master plan, therefore, depends on developing the whole island in accordance with the main characteristics of the existing parts of Port Fouad, particularly the old part, in terms of pattern and type of streets, architecture, urban design, landscape, etc.

8. Explanation and Description of the Overall Spatial Organization of the Proposed Master Plan

The overall spatial planning, design and organization of the proposed master plan, Figure 9, could be explained and described as follows:
1) Setting up 6 new housing communities which could accommodate up to 250000 persons in 20-25 years process. These new communities are facing the seashores of the Mediterranean and both channels of the Suez Canal. In addition, service, utilities and infrastructure are provided to these new communities according to standards of new towns. 2) Proposing longitude center of the town. This center includes commercial center for domestic and international products as well as services for the businessmen and companies of the free zone. 4) Proposing a

technological university and operational centers. The purpose is to cope with requirements of the rapid economic development undergoing in the industrial and free zones. 5) Renovating and rehabilitating the old part of Port Fouad. The master plan also considered the conservation of the old district. This includes the buildings, residential and public, urban character, landscape, architectural types, etc. Moreover, the master plan also considered the renovation of the existing residential areas, newly added to Port Fouad, with relevant architectural types and characters to the original part. Different renovation and conservation methods could play a great role within this context. 6) Providing a recreational land use. The master plan also provides a recreational land use in the southern part of the island, within the triangle, of Port Fouad. This recreational and entertainment could serve the whole area, industrial and free zone, including the other two cities, Baloza and Qantara. The proposed land use includes hotels, cultural and conference centers, forests, Disneyland, tourist villages, etc. and 7) Proposing an airport, and a yacht terminal and club to the island. The master plan also include proposing an airport, and a yacht terminal and club to the island. The purpose is facilitating and attracting businessmen, tourists and investors to the area and the island of Port Fouad.
The percentage of the footprint of the proposed buildings to the total area is 25-30 percent. The average population density is about 50 persons per sq feddan (acre). The average heights of residential buildings are 2-3 floors.

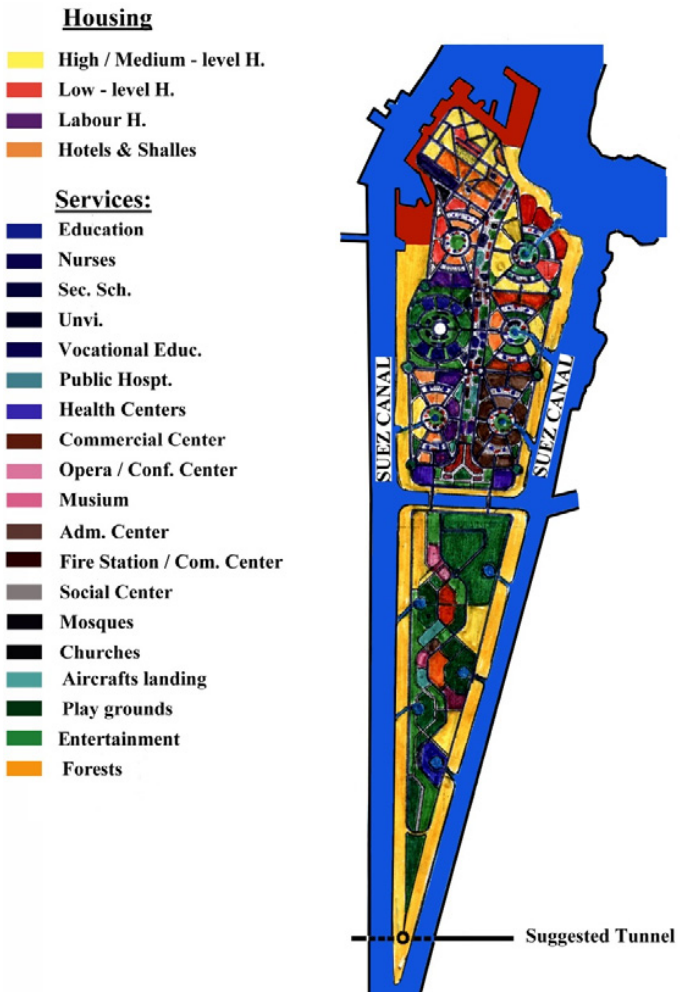

Figure 9: Proposed Land-use for Port Fouad Island

9. Environmental and Social Impact of the Proposed Master Plan on Port Fouad Island

Based on the overall spatial planning, design and organization; the proposed master plan of Port Fouad island could have a potentially significant environmental effect in the following areas: increasing and improving the level and quality of aesthetics, air quality, cultural resources, geology/soils, water quality, public services, recreation, transportation/traffic, utilities and service systems; reducing the level of greenhouse gas emissions, hazards, hazardous materials and noise; and preventing slums establishment possibilities as a result of rapid economic development in and around Port Fouad. The master plan, moreover, is based on the objectives of sustainable development and is aimed at ensuring equal conditions for development of social, economic and ecological sectors. These objectives encompass minimizing atmospheric pollution; using water resources rationally and reducing water pollution; protecting land cover, landscapes and green areas; minimizing harmful impacts of wastes; protecting against physical impacts, including noise, electromagnetic radiation and vibration; and reducing negative impacts on human health.

10. Conclusion

The study has discussed the possible impact of regional development on local urban environment to reduce environmental hazards in Port Fouad, Egypt. Urban planning is used for developing Port Fouad, by which Port Fouad will be able to cope with the massive and rapid economic development ongoing in the area. The results obtained from the above analysis, background and development policies provided to the area, provide strong evidence that there is considerable economic development is undergoing in the area. The impact of this development on Port Fouad, if not highly pre-considered, will adversely affect its urban environment. In addition, the findings of the above investigation of potentials and constraints of Port Fouad define that the area posses nationally significant natural and recreational resources. These potentials have some limitations, which should be considered during the development process.

The outcomes of the analysis provide strong evidence that urban planning could constitute a major part of the preservation policy of the area. Urban planning could be a developing tool. It exhibits a relationship with the environment through the spatial reorganization of urban settlements, the preservation of historical and cultural areas and infrastructure improvements. This, obviously, will reflect on the quality of Port Fouad environment.

The procedure developed will have a wide application to other areas in Egypt, such as the rest of area around Port Fouad, Baloza and Qantara. Similar development requirements will face both of Baloza and Qantara. Their physical development will face urban and environmental issues due to the expected massive and rapid development process undergoing in the area. Therefore, the findings of this study could be directly applicable in the formulation of the planning policy and legislation. It could guide the reconsideration and implementation of the economic development policy in both Baloza and Qantara.

Future directions for further research on impact of development on urban environment, finally, can include procedure for public participation during the process of preparation of its planning concept and master plan. In our work, public participation has focused only on public concerns regarding the character of urban design and architecture of the development areas. This public participation achieved through interviews with inhabitants, authorities and visitors to Port Fouad. To accomplish the preservation of urban environment in the area, further research is needed. This

research may include urban development of Baloza and Qantara. This could be achieved through planning a general master plan including Port Fouad, Baloza and Qantara.

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