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INTRODUCTION

Egypt has a long tradition of centralized decision making reflected in a public sector that is unresponsive to the public service needs and that is failing to generate adequate economic growth and job opportunities. Inevitably, the highly centralized administrative decision making system has also affected the urban growth at the local, regional and national levels, causing regional disparities, informal growth around main economic poles and an urban/rural imbalance directly affecting the national stock of arable land. As part of the broader decentralization effort, the Egyptian Ministry of Finance set up a permanent intergovernmental fiscal committee to move a greater share of public resources closer to the people and had taken major steps toward adopting a ministerial fiscal decentralization strategy (Urban Institute Center on International Development and Governance 2011). Other undertaken measures towards decentralization include democratic elections in local popular councils, provision of technical assistance and training to the local planning staff and encouraging revolving fund systems in project operation. However, one of the most important steps towards improving the urban planning mechanisms in Egypt is the enactment of the new Building and Planning Law in 2008, setting forth many changes to ensure decentralization of decision making and plan formulation to the local level with a strong emphasis on community participation.

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In the same context, the structural spatial imbalances in Egypt have received considerable attention in recent years. Discussions have been characterized by both a focus towards the importance of the exploitation of the comparative and competitive advantages of regions on one hand, and on the other hand, the reduction of socio-economic disparities by directing development towards neglected or backward regions (Ministry of Planning; 2002 and UNDP, 2005). Those two trends reflect a swing in opinion between the view that the increasing agglomeration of activities has been desirable in boosting the nation's economy and saving the arable land, to the view that the evolving spatial concentration and congestion has been excessive and is affecting the quality of life in the urban settlements. The two opinions are drawing attention towards the need for an in-depth analysis of concentration and decentralization policies and their impacts on land use distribution in Egypt.

The urban and economic development pattern in the Port Said area sets up a good example of the contrast between the concentration of economic activities in a monocentric agglomeration that includes the city, the port, Suez Canal and the southern industrial cluster, and a sporadic decentralized rural growth on the major regional roads and highways around the city. The area is also described as having numerous untapped potentials in its hinterland that need a holistic view to development in order to boost the economy and to ensure the welfare of its inhabitants (ElBastawisy & Helmy, 2006 and MoOd, 1976).

The main aim of this paper is to analyze the urban growth scenarios in Port Said governorate within a framework of a decentralized concentration approach for the allocation of economic activities and urban centers. The purpose of this approach is to support the preparation of a spatial and socio-economic plan that could assist in closing the gap between the rural/urban inequalities and socioeconomic disparities. This research suggests that it is possible to achieve a compromised solution between concentration and decentralization on a regional scale, through the use of a balanced spatial distribution of economic activities and urban settlements. The paper is structured to include a theoretical review of the most relevant theories and approaches to urban growth and land use allocation. Next, the author investigates the opportunities to implement polycentric urban development in Port Said area, through an analysis of directions of urban expansion, urban-rural gradients, and growth types. The multidisciplinary methodology employed, based on theories and methods in change detection, geographic information systems, and socio-economic analysis, has been used to provide scenarios for future urban growth and to study the morphological aspect of polycentric urban development.

THEORETICAL BACKGROUND

Decentralization and concentration of urban growth has been studied in location theory since the beginnings of the 19th century. Location theory examined the mono-centric city and how to define, and delimit, the central business district (CBD). It addresses the important questions of who produces what goods or services in which locations, and why. As described by Pinto (Pinto, 1998), most of the major contributions to modern location theory literature have come from Von Thünen, who published his *Isolated State* in 1826; Alfred Weber who contributed his *Theory of the Location of Industries* in 1909; and Walter Christaller's *Central Places in Southern Germany* that was released in 1933. The scientific analysis and studies of land use change boomed after World War II due to advances in technologies, transportation modes, employment location dynamics and the specific characteristics of different cities in terms of complexity and policy orientations. The studies have become an integral part of economic geography, regional science, and spatial economics (Briassoulis, 2000).

Building on the classical work of Von Thünen, Weber, Christaller and others, a number of economists, geographer and regional planners have extended the analysis to apply to a wide range of problems and have attempted to synthesize location theory with other fields of economics and spatial planning. Assink and Groenendijk (Assink & Groenendijk, 2009) commented that over the last decades there has been growing criticism on the practical usefulness of the traditional location theory, considered to be too detached from current reality to adequately explain the location dynamics of economic activities. As an example, traditional location theory transport costs are accredited a very dominant position. Obviously since this theory came to life, transport possibilities have increased tremendously and transport costs have decreased. Moreover the service sector has grown in many economies, involving "products" which can be transported over large distances much more easily and at low costs through ICT-applications.

Instead of conducting a detailed review of the past and current trends and theories related to the distribution of agglomerations and land uses, this review will only focus on three main issues that are

considered as priorities in the current debate around the regional urban and economic growth and spatial allocation in Egypt. The three issues are (a) the debate on the balanced and unbalanced growth and its impact on urban and rural distributions, (b) decentralization and concentration of activities, and (c) polycentrism in large agglomerations.

Balanced and Unbalanced Growth: the Rural/Urban Debate

The United Nations Population Fund (UNFPA, 2007) estimates that more than half of the world population will be soon living in urban areas. It is also expected that by 2030, the towns and cities of the developing world will make up 80% of urban humanity. This urban growth has been influenced by continued global economic integration and the struggle for countries to be competitive in the global marketplace. It is however noted by Cohen (Cohen, 2004) that most urban growth over the next 25 years will not take place in mega-cities as expected but will occur in far smaller cities and towns. This urban growth could not be attributed solely to rural-to-urban migration, but also to simple natural increase and the annexation and reclassification of land around the periphery as urban.

Another issue noticed specifically in Egypt is the convergence of urban and rural lifestyles in a manner that could not be easily captured by a simple urban/rural dichotomy. The ease of transportation and communication has blurred the distinction between urban and rural areas. In parts of the Delta, especially on the main Cairo/Alexandria Agricultural Highway it could be clearly noticed that some zones of intense economic activity (e.g. in Kalyoubeya) have emerged in the intersection between cities and rural areas. These zones are neither urban nor rural in the traditional sense although they contain essential elements of each. This urban/rural mixture prototype is usually characterized by a landscape that appears essentially rural (e.g. cultivated land); while most income is generated by non-agricultural sources (e.g. industries provide employment for village members and/or rural labor force commute to the city for job opportunities).

The rural versus urban (or agriculture versus industry) debates are also tied to the controversy regarding the concepts of unbalanced and balanced growth scenarios. The unbalanced growth scenario suggests that growth should concentrate only on developing the leading sectors of the state economy on a spatially selective investment pattern. The resources generated by this scenario could then be used to uplift the sectors that are lagging. As described by Mercado (Mercado, 2002), the advocates of the unbalanced growth have also been adherents to the growth pole theory that was very popular during the 1960s. Industrial fundamentalism was associated with both the unbalanced growth advocates as well as the growth pole theorists, which all think that development was essentially spotty and that it could not be started everywhere. This is primarily due to constraints in resources and therefore the optimal option is to invest the limited resources in selected sectors and places. On the other hand, the balanced growth scenario argues that the concentration of resources in few sectors (usually related to industries and technologies) shall inevitably refrain growth on other important and labor intensive sectors (e.g. agriculture).

The adoption of only one of the approaches discussed above could turn to be unfavorable in Egypt. This is due to the diversity of settlement types, the variety in development situations, and the relative importance of particular sector, region or city. It is suggested that both approaches could be applied based on the analysis of issues, requirements and socio-economic conditions of each region or city. A highly influential and adaptable contribution to this suggestion is the concept of 'urban functions in rural development' (Belsky & Karaska, 1990 and Rezvani et al., 2009). The concept assumes that the most effective and rational spatial strategy for promoting rural development is to develop a well-articulated, integrated and balanced urban hierarchy. This network of small, medium sized and larger urban centers allows clusters of services, facilities and infrastructure that cannot be economically located in small villages and hamlets to serve a widely dispersed population from an accessible central place (Tacoli, 1998).

The balanced development growth between rural and urban areas, and accelerated rural economic growth through agricultural activities and farm-based industry could further be enhanced by adopting the 'agropolitan approach', originally envisaged by Friedmann and Weaver (Friedmann & Weaver, 1979). This approach suggests that rural development could be best pursued by linking it to urban development at the local level. The rural town is seen as the principal site for non-agricultural and political-administrative functions rather than as a growth pole. Starting such processes of development requires at least three factors; (a) access to agricultural land and water, (b) the devolution of the political authority to the local level (decentralization) and (c) a shift in national development policies in favor of a diversified agricultural production (Tacoli, 1998). As stated by Adell (Adell, 1999), the agropolitan approach has contributed to the

promotion of decentralization and participation on the Asian planning agenda. It shares with the bottom-up strategy a similar ideological approach to planning for rural development that is decentralized, participatory, and local oriented.

The paradigms of regional planning in Egypt could benefit from the urban function and agropolitan approaches in rural development and the planning for the new desert hinterland villages. In this respect, a structural definition of the functional relationship between main agriculture zones, existing agglomerations, resettlement areas of the desert hinterland and community economic zones could assist in achieving a balanced linkage between urban and rural areas and in alleviating existing socio-economic disparities.

Centralization and Decentralization

Similar to the urban-rural or unbalanced-balanced debate, the centralization and decentralization approaches to development have been intensively argued. From the point of view of the United Nations and other donors' communities, decentralization of decision-making power from the national to the regional and the local level is regarded as necessary in developing countries to seize new economic opportunities (UN Policy, 2001). Decentralization could ensure that policies and programs match the needs and conditions of the local population and that good and fair use is made of regional and local resources for development. It is also considered as one of the possible solutions to provide a certain territorial balance of the social and economic development. As commented by Mercado (Mercado, 2002), the arguments for decentralization are many and generally grew out of the weakness of and dissatisfaction over a centralized system of governance. It has been pointed out that popular participation, which is an important element of development, is weakened by centralization. Moreover, a decentralized system is more able to be in touch with the people's socio-economic realities – meet the basic needs of the people, ensure popular participation in development and mobilize the material and human resources for development on voluntary basis.

The implementation of decentralized policies has also caused some tensions regarding striking a balance between the implementation of central policies and the generation of local economic initiatives. While resource based theorists argue that the trigger for economic growth lies in the basis of the presence of the exploitable natural resource, the advocates of decentralization in most developing countries seem to ignore this essential ingredient for growth. As a result, most planned growth centers usually exhibit an inevitable stagnation (Manyanhaire, 2009). Furthermore, decentralization places a heavy burden on local governments and local communities, which have to assume many new responsibilities and undertake many new tasks. Building the capacity of local governments and local communities is a prerequisite for decentralization that requires the support of a central government that assists local institutions rather than adopting policies that imply for a continued centralization.

Egypt has a long tradition of centralized organization, mainly at the level of the political decision and of the public resource administration, which was reflected in a market economy characterized by a main central area with a high concentration of political decision power. Applying decentralization in Egypt should take into consideration the need for a gradual change in the local administrative and managerial mechanisms. According to Mercado (Mercado, 2002), each country is admonished to seek the dynamic balance between centralization and decentralization at each stage of their development rather than subscribe to one form of governance system altogether. Under such circumstances, it comes as a possible solution to reduce territorial discrepancies in Egypt, the regional definition of the main urban agglomerations (growth poles) that have the ability to generate development opportunities and boost the population living standard. As described by Popa (Popa, 2010), development spreading could also be facilitated by levels two and three of the urban network, represented by the local urban poles. The father of the polarized development and growth poles' theory is considered to be Francois Perroux, who in 1955 stated that 'Growth does not appear everywhere at the same time; first, it occurs in points or growth poles with fluctuant intensities; then, it spreads on different channels and with variable final effects for the whole economy' (Popa, 2010).

Polycentrism

As a new form of decentralization, polycentric or multi-centric urban growth could be defined as the decentralized, but clustered formation of economic activities in sub-centers rather than their concentration in one main center. According to Dühr (22), polycentricity is primarily about the creation of synergies from local assets through cooperation between cities and city regions. The idea of polycentricity relates to other political ideas such as

balanced regional development (cohesion), taking local assets and endowments as the point of departure for regional development and economic growth (competitiveness) and widening the ownership of political decisions (governance). While early location theorists considered the properties of the mono-centric city, and criteria for the geographical delimitation of the central business district (CBD), polycentrism reflects the dynamism of twenty first century cities characterized by the decentralization of economic activities, increased mobility, complex cross-commuting and fragmented spatial distribution of activities (23). The above mentioned descriptions of polycentrism give the impression that the concept promotes sustainability and social cohesion. This statement should be treated carefully, since there are some researches that identify inconsistencies in its implementation. As described by Pessoa (Pessoa, 2009), there is a study in a French context which alerts that polycentric system tends to increase the average of commuting distance. On the other hand, the polycentric development will improve the distribution of commuting pattern temporally and spatially, changing from pendulum to cross-commuting model.

All the above described urban growth models and trends are in-line with the current directions towards the pressing need to fix the imbalances in the Egyptian urban structure. There is a strong need to create new employment centers along new transportation corridors to create polycentric regions, each functioning as an integrated socio-economic system that is formally independent from the others, yet connected and concentrated. Meanwhile, rural development has also to be considered and promoted as independent functional units that form an agropolitan system. The combination of urban polycentrism and rural concentrated decentralization could present a solution to the unmanaged urban growth on arable land, rural to urban migration and the low quality of life at the urban fringes of the main urban centers. In the following sections the research will investigate the urban and rural conditions in Port Said governorate, analyze the urban growth scenarios, and evaluate the impact of each scenario on the urban and socio-economic development of the area.

DEVELOPMENT SCENARIOS IN PORT SAID GOVERNORATE

Governorate background

Port Said governorate is located on a narrow peninsula between Manzala Lake and the Mediterranean at the north gate of Suez Canal (figure 1). On the regional level, the Port Said urban setting represents the north pole of the Port Said – Ismailia – Suez development corridor, which extends from north to south parallel to the Suez Canal. Due to the corridor's strategic location, as well as the surrounding land and water resources, the whole area is endowed with unique and underused economic development opportunities. Port-Said governorate is currently consisting of the following administrative units: Port Fouad city, as well as Sharq, Arab, Manakh, Zohour, Dawahi and Ganoub districts. The governorate is one of the Egyptian urban governorates and extends over an area of approximately 1352 sq.km (about 1.5 % of Egypt), with a populated area of 23 sq.km and a total population net density of 24,809 persons/sq km. This density exceeds 32,000 persons/sq km in some districts, such as Zohour and Manakh (table 1). As depicted in figure (1), the urban setting in Port Said governorate consists of a monocentric agglomeration (Port Said and Port Fouad cities), as well as sporadic small settlements south and west to the city.

The milestone for the modern development of Port Said returns back to mid-1970s, after the end of 1973 war and the start of a new open-door policy in economy, introduced by Sadat. Extensive importing of foreign goods was a main characteristic of this scheme. During this period, the city was refurbished, new housing areas were built and a tax-free commercial and industrial zone was instituted to attract immigrants. Based on Landsat Imageries and an unsupervised classification technique, figure (2) presents an analysis of land cover changes from year 1973 till year 2000. This analysis reveals the following facts about the land characteristics and on-going development trends in the study area:

The Port Said geomorphology consists of flat and low lands that are mainly sabkhas, clay and salty soils. The urban areas have increased during the last three decades based on landfills in Manzala Lake as well as on sabkhas east of Port Said and Port Fouad.

The amount of reclaimed land for agricultural uses increased at the expense of fish farms south and south east of the urban areas.

The sandy soil extends on the seashore as a linear strip from the governorate's western boundaries (Deeba) to its eastern boundaries in Balouza area.

The transformation of the city to a tax-free zone was reflected on the dominance of the trade sector over all other economic activities: At least 15,000 retail facilities are currently operating in the city, providing direct job

opportunities for at least 20,000 workers, as well as 200 wholesale trade facilities providing more than 1,500 additional job opportunities (MOP, 2004). On the other hand, the dominance of trade activity had its negative impacts on the other economic sectors. For example, the agriculture sector exhibited a sluggish performance during the last three decades, and in spite of an ambitious plan to reclaim over 56,700 hectares in the governorate, based on conveyed Nile water through Salam Canal, the actual reclaimed land did not exceed 30% of this number. The tourism sector is also suffering from a decrease in the international visitor's numbers, from 30.1 thousands visitor/year in 1986 to 9.7 thousands visitor/year in 2003. The city is currently highly depending on local tourists (95% of the total tourists' number) who are mainly shoppers and one-day visitors. And in spite of the city's high potential regarding industrial development and the presence of two trade sea ports and an important regional and national location, the city's industrial production is limited to only 1% of the total national production. The main industries are textile (15%), chemical (23%), metal (23%) and food (21% of the total industrial categories) (MOP, 2004).

In general, the imbalances in the economic structure in Port Said are reflected in the unemployment rates that could be estimated to exceed 11% of the total labor force (+15) in year 2006. The labor participation in vocational activities (% of the total labor force above 15) is 7.2%, which is below the national average (13.7%), and is one of the lowest in Egypt. In contrast, the main labor force is concentrated in the public sectors (39.2%), a number that lies above the national average (25.6%), and validates the high tendency of the service sector to absorb labor force from the sluggish production sectors (UNDP, 2008).

Table (1): Population and densities of Port Said districts (2006).

District	Total Area (Km ²)	Populated Area (Km ²)	Population (2006)	Gross Density (Person/Km ²)	Net Density (Person/Km ²)
Port Fouad city	511.9	3.0	75668	148	25223
Sharq	4.2	4.2	29103	6929	6929
Arab	2.7	2.7	46977	17399	17399
Manakh/Zohour	265.9	8.5	272544	1025	32064
Dawahi/Ganouh	566.8	4.6	146311	258	31807
Total	1351.5	23	570603	422	24809

The deficiencies in the socio-economic structure are also clear in the imbalances in the spatial allocation of land uses and economic activities. Those deficiencies are reflected in the population distribution and densities, as depicted in table (1). Based on CAPMAS data (CAPMAS, 2006), the differences between the gross and net densities are very prominent in the districts that have a large unpopulated hinterland, such as Port Fouad, and Ganouh. The higher population densities are detected in the governorate's main urban center, which includes Port Said city and Port Fouad. In this respect, it is also worth-noting that the CAPMAS classifies the whole Port Said governorate and its districts as 'urban' with no distinction between the main urban centers and the smaller 'rural' agglomerations that are mainly emerging based on agricultural and fishing activities. In future census data, it is recommended that those population that are mainly rural in nature to be segregated from the urban population data.

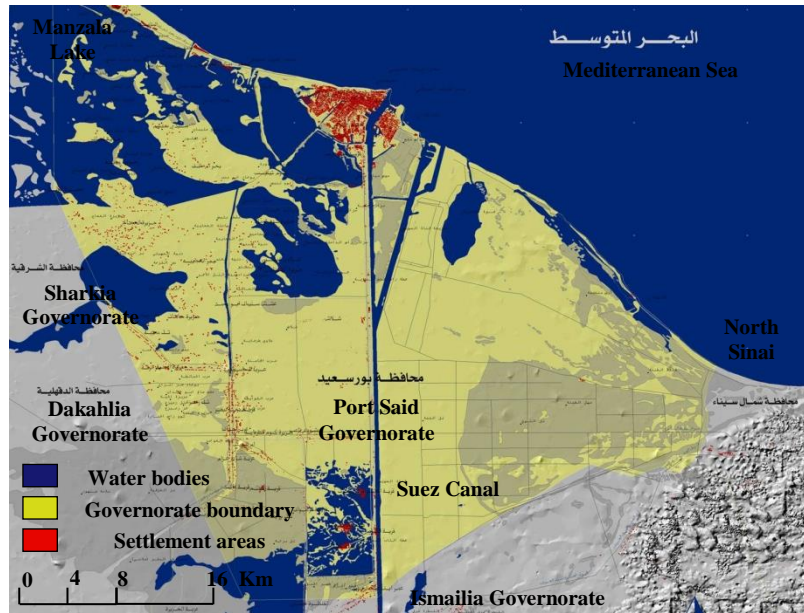


Figure 1: Location of Port Said governorate in relation to its surrounding context.

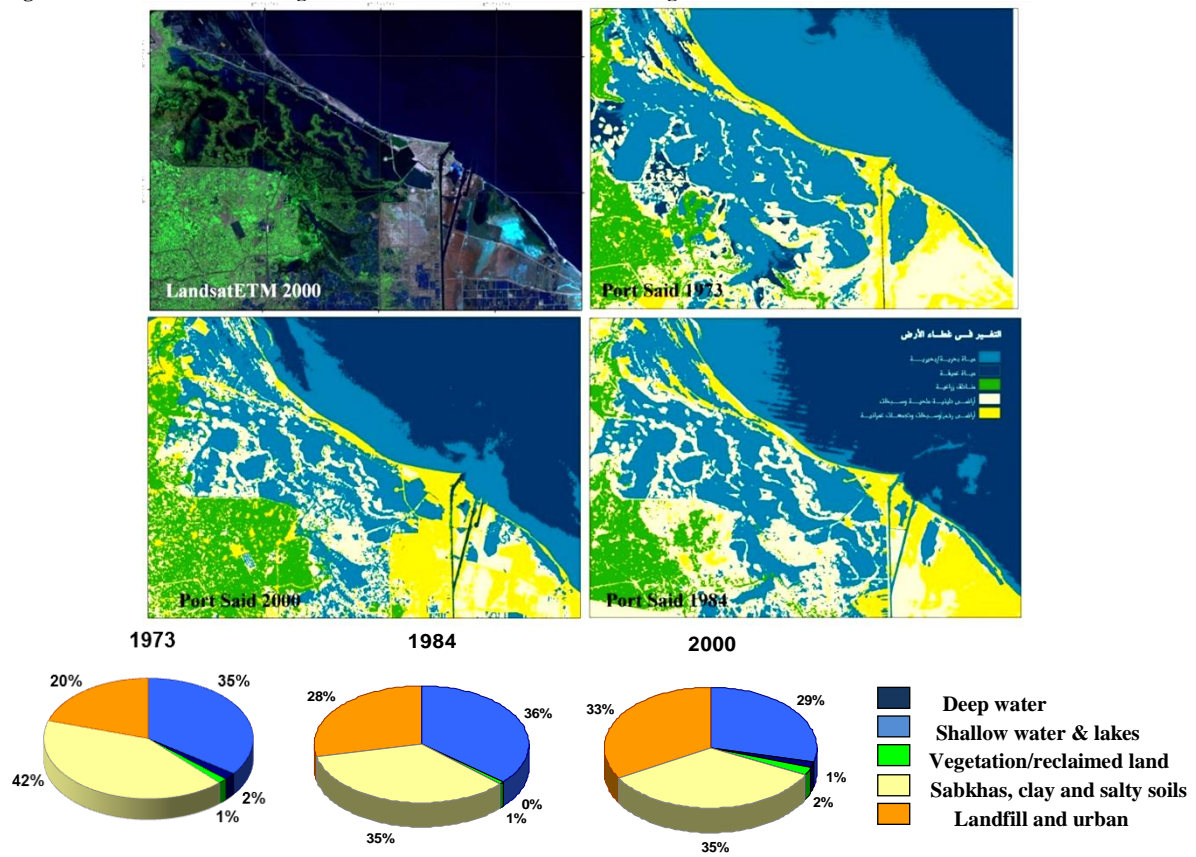


Figure 2: Land cover change in Port Said area in 1973, 1984 and 2000, using Landsat imageries and an unsupervised classification method.

Acknowledging the need to improve the governorate’s economic structure and performance, the Ministry of Economic Development prepared a socio-economic plan for the governorate till year 2022. The plan is based on optimizing the spatial use of the governorate’s assets and diversifying its economy in the following areas (MOP, 2005):

The agricultural expansion on 35.7 thousand hectares west of Suez Canal and 21 thousand hectares east of Suez Canal in El Tina plain.

Livestock development on 147 hectares south of Port Said city.

Increasing the production capacity of fisheries to 50 thousand tons/year.

Expansion of East Port Said Port to receive 1.5 million containers/year, in addition to improving logistics and operational efficiency of the West of Port Said Port.

Increasing the city's competitiveness in the international tourism market, by supporting the development of a new yacht marina, ecotourism and historical tourism.

Development of a new industrial cluster based on oil and gas production west of the city, in addition to providing the necessary infrastructure and services to the existing industrial zones south of the city in order to increase their efficiency and attractiveness.

The proposed economic activities could be carefully allocated in the governorate to overcome the imbalances in the land uses distribution and to emphasize the creation of new economic and urban centers west and east of Suez Canal. The Plan suggests that the proposed economic activities could not only improve the socio-economic conditions of the local communities but could also assist in relieving population pressures on the already highly dense urban center.

Scenarios for the urban growth patterns

In this section, the paper studies the impact of the suggested economic activities on the growth of urban centers, through the preparation and evaluation of three growth scenarios. The purpose of formulating growth scenarios is to explore the possibility of adopting both polycentrism and the agropolitan approaches in the spatial planning of Port Said governorate, in order to; (a) refrain unplanned growth and increased population growth in Port Said city and its fringes, (b) encourage the formation of new rural centers that function independently from the city and provide services and networking facilities to the southern small rural agglomerations and (c) create an urban multi-center composed of Port Said city, its western extension and Port Fouad. The centers are meant to be well connected, independently functioning and concentrated.

Current growth directions

As a result of the natural boundaries surrounding the city (the Mediterranean from north, Suez Canal and salt marshes from east and Lake Manzala from south and south west) as well as its role as a closed free zone, the urban growth in Port Said governorate is characterized by the following (figure 3):

The city expands mainly towards the south and south west on landfills from Manzala Lake. In general, the limited land availability affects the form and intensity of urbanization in favor of a core compact city. This form of urbanization could be efficient from the point of view of service and infrastructure efficiency. But it could also impose threats to the quality of life and open spaces availability, if the population growth rates in the city remain the same and the decision makers fail to direct the population increase to newly-created urban centers.

Port Fouad has a prospect for a future growth towards south, but still limited by the 'Tafria' triangle, salt marshes and sabkhas.

The small agricultural based settlements located directly south of the city (Ezbet ElEslah, ElFerdos, Soliman, etc...) are growing on landfills and reclaimed land. In the future, those settlements could merge and form a crest of unorganized expansions that surround the southern city gateways. They could also interfere with the industrial zones, and therefore impose a threat to one of the governorate's important economic assets.

The governorate is exhibiting a spontaneous growth of small settlements in the west (Garabaa, Manasra and Diba). However this growth is interfering with the expected development of petrochemical and gas extraction industries located in the same area.

The southern zone of the governorate consists of some rural settlements (Bahr ElBakar, Omm Khalaf, Omm ElReesh, Naser Project, etc...) characterized by their proximity to land reclamation projects on Salam Canal and their intermediate location between the main urban settlements in Port Said, Ismailia, Dakahlia and Sharkia governorates. In spite of their current deteriorated living conditions, those settlements could grow as a possible nucleus for rural development.

In spite of the ambitious plans for land reclamation and urban development east of Suez Canal, the current area development is sluggish due to the lack of services, infrastructure and governmental support for farmers and youth graduates who are supposed to inhabit the area. The only rural development is located in the southeastern part of the governorate in Balouza, Rommana and El Tina Plain.

As depicted in figure (3), the current urban growth has four main directions: (a) to the west towards Damietta governorate, providing the implementation of quick action plans that organize settlements' expansion without interference with the growing industrial activities in the same area, (b) to the south, in those areas that are attractive for future development due to their strategic location and the availability of developable land, (c) to the east, where the presence of small scattered settlements as well as land reclamation activities could offer a long term development opportunity and (d) within the existing city boundaries, through urban densification and controlled growth on the peripheries.

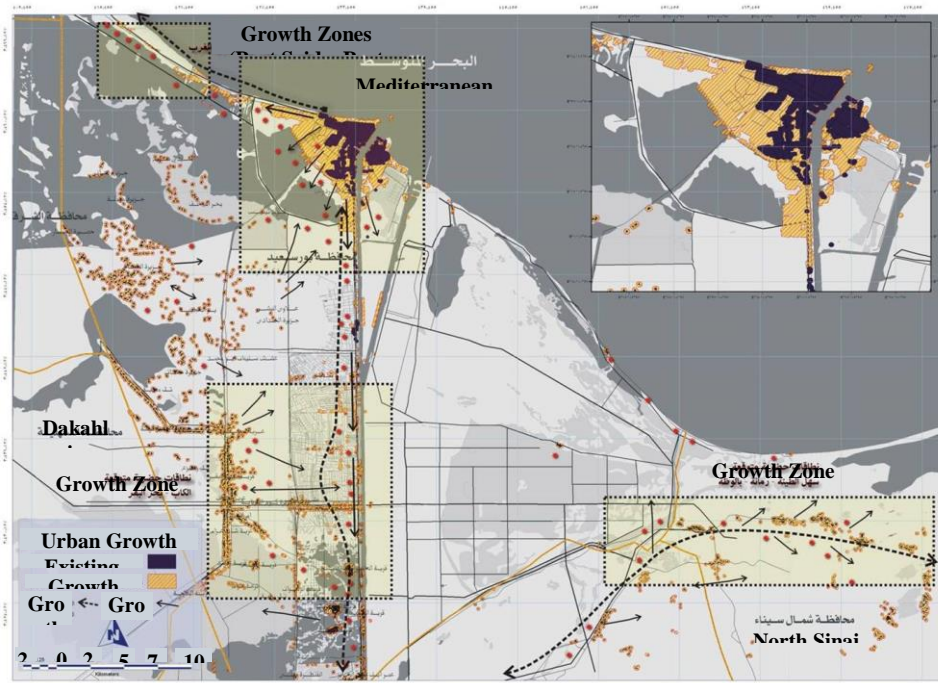


Figure 3: Urban growth directions in Port Said governorate (prepared by researcher).

Growth scenarios

The possible future urban growth in each of the above mentioned areas could take different rates and forms according to the development goals and strategies. It is assumed in this research that the analysis of different growth scenarios could assist the decision makers to formulate planning strategies that enhance the spatial distribution of urbanization, improve the socio-economic conditions of local communities and achieve a functional and efficient regional urban structure. The proposed scenarios are based on the same population forecast till 2022 (table 2 and figure 4). They all acknowledge the importance of supporting economic growth towards south and east in order to alleviate population pressure from existing urban settlements and explore development opportunities based on Salam Canal conveyed Nile water. In this respect, the rates of population growth in the southern and eastern districts are expected to be higher than the other districts, providing that the land reclamation projects attract more population from Delta and Nile Valley. However, the scenarios differ from each other based on the allocation of development activities and services and their impact on the urban structure, densities and the urban/rural relationship.

Table 2: Population forecast for Port Said governorate (2006-2022).

	2006	2012		2017		2022	
	Population	Growth Rate	Population	Growth Rate	Population	Growth Rate	Population
Sharq	29,103	2.1	32,968	1.9	36,221	1.5	38,261
Arab	46,977	2.1	53,216	1.9	58,467	1.4	61,153
Manakh	61,346	2.1	69,493	1.9	76,350	1.5	80,649
Port Fouad	66,379	2.1	75,194	2.1	83,428	2.1	92,564
Dawahi	99,994	2.2	113,941	2.4	128,286	2.6	147,283
Ganoub	24,265	2.4	27,976	4.0	34,037	6	50,100
Zohour	208,519	2.1	236,211	1.9	259,520	1.5	274,132
Port Fouad 2	6,719	1.2	7,218	2.4	8,126	4	10,684
East Tafria	2,570	1.1	2,744	5.2	3,536	12	8,524
West Port Said	2,679	2.1	3,035	3.1	3,535	4.2	4,579
Ganoub 2	22,052	1.7	24,399	5.8	32,345	12	75,780
Total	570,603	2.1	646,394	2.29	723,852	2.7	843,710

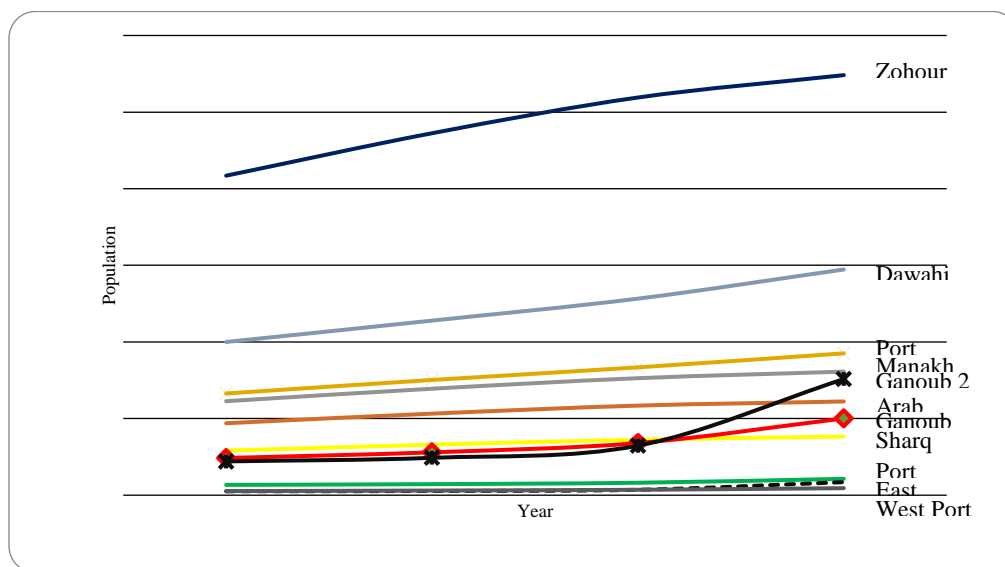


Figure 4: Population growth trends in Port Said governorate (2006-2022).

Scenario 'A': this scenario suggests that the development will occur spontaneously inside and around the current urban agglomerations, based on the desirability of those existing settlements in terms of service provision and economic activities. It is assumed that the public budget required for service upgrading and economic development is distributed in a decentralized manner amongst governorate's settlements. The direct impact of this scenario on the built environment is the increased densification in the current urban setting – especially in Port Said and Port Fouad cities, and the uncontrolled growth around those cities and along major transportation corridors (e.g. Port Said/Ismailia & Damietta/Port Said highways). The growth will also spread around the existing smaller rural settlements and villages south and east of the governorate. The issues related to this growth scenario are:

The population increase will be concentrated around Port Said city, causing the enlargement of the city and an increased pressure on the existing infrastructure and transportation networks. In addition, the process of landfilling in Lake Manzala will continue in higher rates, and eventually producing deterioration in the environmental conditions and decline in fishery resources.

The unorganized expansion around Port Said will affect the efficiency of the industrial and agricultural activities allocated in the urban fringes. This possible conflict in land uses will cause the emergence of more informal settlements characterized by low quality of life as well as a decline in the economic prospects of the area (e.g. loss of agriculture land, decrease in land available for gas extraction and petrochemical industries, etc...).

An increased discrepancy in the spatial distribution of services and infrastructure in urban and rural settlements may occur.

The areas located east of Suez Canal and Tafria will exhibit a sluggish development, in contrast to the areas located west of Suez Canal, which will be exposed to an increasing pressure on their land resources.

Scenario 'B': the second scenario suggests that the public financial support for services and economic activities will be distributed in favor of the main agglomerations and along transportation corridors. As a consequence, smaller and dispersed settlements will repel population and will exhibit a very low growth rates. On the other hand, larger settlements located near main transportation corridors will grow in higher rates and will merge to form a continuous urban corridor that links Port Said and Port Fouad cities with the southern settlements in ElKab and Bahr ElBakar, and with the western settlements of Manasra and Deeba. This interconnected urban mass will have the following regional impact on the environment and socio-economic conditions:

The aggravation of uncontrolled urban expansion and congestion in Port Said city, resulting in more landfilling, erosion of agricultural land and land use conflicts.

The increased pressure on the main road network, due to the concentration of population in the adjacent agglomerations.

The encouragement of the rural to urban transformation process in the city peripherals and in ElKab/Bahr ElBakar area.

However, this scenario resolves some important issues related to the current imbalances in the urban structure as follows:

It defines important growth corridors, and therefore assists in the definition of urban functions for each settlement.

The development around major road networks will assist in the upgrading of this network and therefore will increase the attractiveness of the whole area for economic development.

The reduction in the size and number of scattered settlements will assist in concentrating the governmental budget dedicated to the provision of services and infrastructure in defined development corridors, instead of the currently inefficient and intangible dispersion of this budget among large numbers of small and scattered settlements.

A new development corridor could emerge east of Suez Canal and Tafria, especially along Kantara/Arish highway. This corridor could assist in alleviating population pressures from the main urban agglomerations and in encouraging agricultural and agro-industrial activities in the area.

'Scenario C': the third scenario suggests a concentration of urban growth in multi-centers and selected economic development zones. It also attempts to refrain the development of unfavorable informal settlements around Port Said city and in the rural areas of the governorate. This scenario requires a substantial investment in a public transportation scheme that includes a fast transit train and an adequate road network, in addition to the decentralized concentration of services and economic activities in selected centers and sub-centers. The main issues related to this development prototype are as follows:

The required investment in the transportation sector is higher than the other two scenarios. This type of investment is required to achieve an efficient interconnection between settlements at the local and regional levels.

Smaller and remote rural settlements are most vulnerable to market volatility due to their dependency on the newly generated rural center in El Kab and Bahr El Bakar, as well as the shift of major public investments to larger centers and sub-centers. In general, the vulnerable local communities need to be supported by social capital infrastructure programs that enhance their accessibility to services and job opportunities.

On the other hand, this scenario is an attempt to achieve a balanced approach between concentration and decentralization. It investigates the opportunities and strengths of the current urban/rural structures and attempts to overcome some of the most common weaknesses related to the urban/rural relationship in most Egyptian settlements. The adoption of this scenario could assist in:

The creation of new urban and rural centers in south and east of the governorate. The new centers could ensure a balanced distribution of population growth in the governorate and therefore could relieve the pressure on the existing main urban services and infrastructure.

The definition of urban centers, sub-centers and development corridors could assist in exploring the urban functions and role of each center, and therefore in achieving a regionally integrated economic base.

Delimiting urban sprawl west of Port Said and providing possibility for waterfront recreational development.

Progressing towards the achievement of a sustainable urban environment that depends on a multi-modal public transportation network.

The development of the southern agglomeration of ElKab/Bahr ElBakar as an economic agribusiness center that is equipped with city-like facilities. This ‘agropolitan’ center could assist in providing required services for surrounding rural settlements and in reducing urbanization processes of Port Said city.

The clustering of economic activities in several urban centers (Port Said, Port Fouad, west of Port Said, etc...). This clustering will formulate a multi-centric urban growth that will assist in creating specialized economic hubs and work agglomerations.

RESULTS AND DISCUSSION

The three proposed urban growth scenarios reflect different development strategies and policies, and were analyzed in terms of their spatial impact, in light of the paradigms of regional concentration and decentralization. As previously mentioned, the assumed population forecast is kept unchanged for the three scenarios. Table (3) presents the estimated areas and densities for each proposed scenario and could serve as an indicator of the degree of dispersion and concentration of each scenario in each district of the governorate. In general, scenario ‘A’ exhibits the largest area and lower density and therefore the most dispersed pattern. In contrast Scenario ‘C’ represents a solution for a concentrated urban pattern. This concentration is also depicted in the development of new growth areas (e.g. Ganoub district). The urban pattern of scenario ‘C’ is also characterized by the emergence of multi-centers that are connected by a well-defined transportation network. The qualitative description of the urban and socio-economic characteristics and impacts of each scenario is presented in table (4).

Table 3: the analysis of areas and densities of each urban growth scenario.

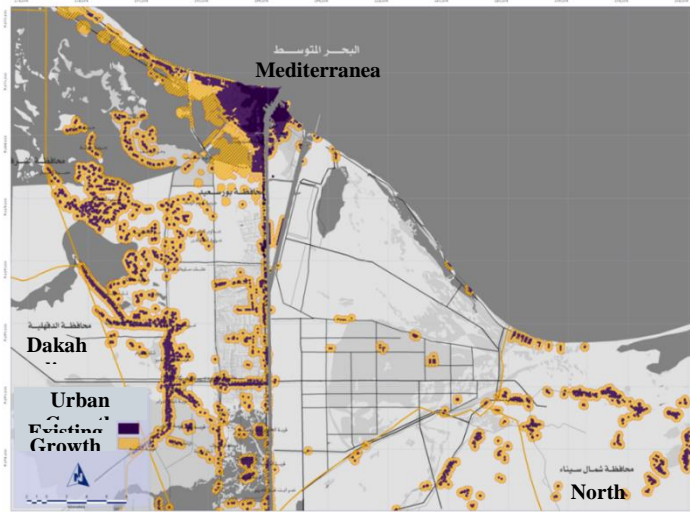
District	Total Area (Km ²)	Population (2022)	Scenario ‘A’		Scenario ‘B’		Scenario ‘C’	
			Area (Km ²)	Density (P/Km ²)	Area (Km ²)	Density (P/Km ²)	Area (Km ²)	Density (P/Km ²)
Sharq	4.2	38,261	4.2	9,109	4.2	9,109	4.2	9,109
Arab	2.7	61,153	2.7	22,649	2.7	22,649	2.7	22,649
Manakh	3.3	80,649	3.3	24,365	3.3	24,365	3.3	24,365
Port Fouad/ East Tafria	511.9	111,772	36.2	3,084	43.5	2,568	47.1	2,374
Dawahi	4.1	147,283	4.1	36,364	4.1	36,364	4.1	36,364
Ganoub	562.8	125,880	223.6	563	172.9	728	130.4	965
Zohour/W.Port Said	262.6	278,711	77.8	3,583	49.3	5,650	19.3	14,426
Total	1,351.5	843,710	351.9	2,397	280.0	3,013	211.0	3,997

Table 4: Evaluation of the urban and environmental characteristics of the three development scenarios.

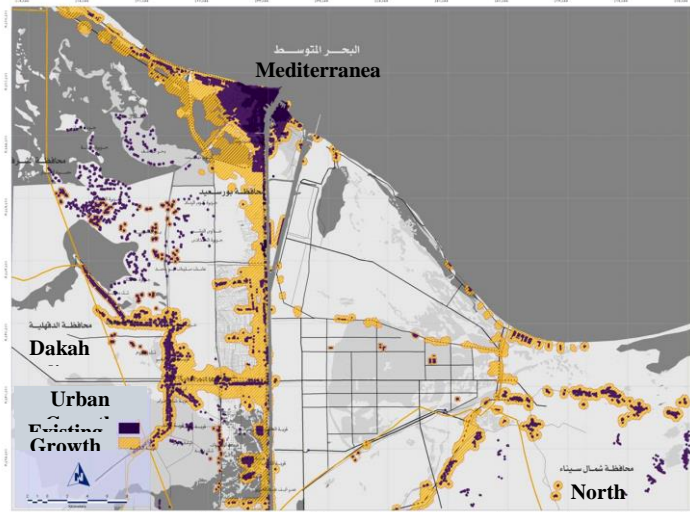
Characteristics	Scenario 'A'	Scenario 'B'	Scenario 'C'
Urban settlement			
densities	Small to medium densities in most agglomerations. High density in cities	Medium densities that increase around transportation corridors	High to medium densities in main urban/rural settlements
distribution	Dispersed decentralization	Connected linear growth	Concentrated decentralization
Transportation network			
Expansion in roads	Development of major and minor roads	Low Development	Large investment in Major roads
Transportation type	Mainly private	Private and Public	Mainly public
Cost of road network	Average	Low	High
Services			
Social services distribution	Dispersed	Average dispersion	Concentrated
Cost of accessibility	High	Medium	Low
Cost of infrastructure	High	Medium	Low
Environmental condition			
Urban densification	Vulnerable to informal growth	Organized dispersion	Organized concentration
Air pollution	High	Average	Limited
Water pollution	High	High	Limited

This paper suggests that the adoption of scenario 'C', as an urban growth and land use allocation solution, could open an opportunity to deal with the current rural and urban imbalances through the adoption of polycentrism and agropolitan approaches. Both approaches reflect the need for a good transport and communication network between centers in order to enhance their interdependency, as well as a managed distribution of services and economic activities.

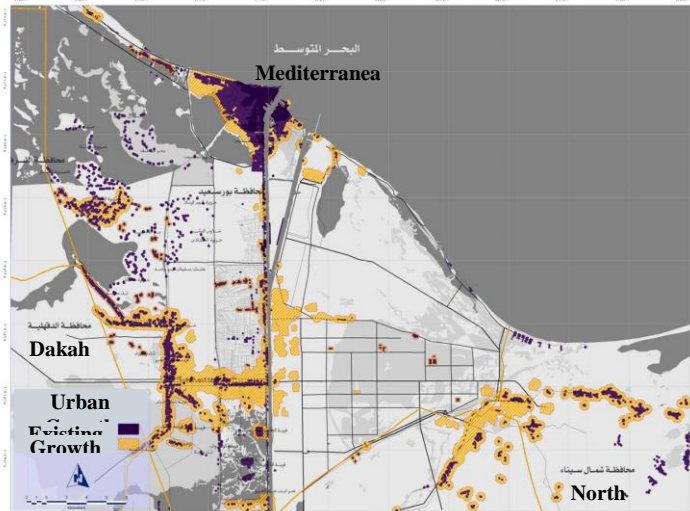
The polycentric distribution of urban agglomerations in Port Said governorate could be reflected in the chain of possible new sub-centers emerging east and west of the main city. As depicted in figure (6), this chain includes; (a) the western extensions and clusters of petro-chemical activities, (b) Port Said city and its multi-facets economic activities (southern industrial clusters, the port, tourism, trade, etc.), (c) Port Fouad center with its east of Tafia economic base and containers' port) and (d) eastern center based on tourism activities and beach facilities. This proposed distribution reflects a decentralization of economic activities and the need for increased mobility and a complex cross-commuting network, not only in the Port Said area but within the whole region. The proposed polycentric urban development has to be shaped both by the planning efforts of the government and by market forces. The governorates should assist in drafting and revising master/strategic plans, annexing districts, and establishing development zones. On the other hand the market forces guided by the investors and local community shall play an important role through the implementation of an urban land market that will guide the clustering of industries and control the inflow of migrant workers.



Scenario (A)



Scenario (B)



Scenario (C)

Figure 5: Proposed scenarios for land development in Port Said governorate.

The proposed agropolitan development in the south and east aims at relieving the population pressure on the urban areas and the spontaneous development of informal settlements on the urban peripheries. It also aims at

accelerating rural economic growth by providing agricultural services, farm-based industries and agro-businesses in specialized centers. Figure (6) proposes two main agri-centers in ElKab/Bahr ElBakar and in ElTina/Rommana/Balouza areas. New and existing villages will emerge as centers for agricultural production that are mainly based on the 56,700 hectares of arable and reclaimed land along Salam Canal.

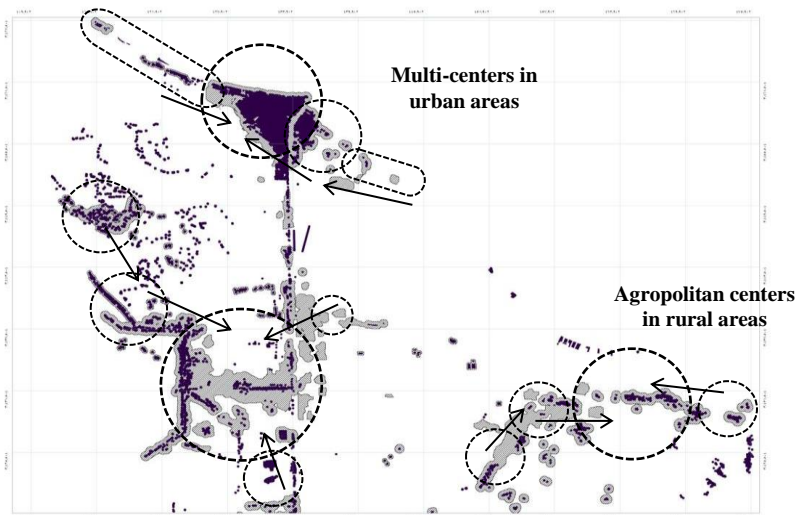


Figure 6: Distribution of economic centers in the proposed urban growth scenario in Port Said governorate.

CONCLUSION

Although Egypt's public sector has undergone some reform since the country abandoned its centrally planned economic system in 1991, governmental control over the public sector's finances remains highly centralized and concentrated. In an era when the urban population continues to increase due to natural population growth and rural-urban migration, the urban society and economy will have to absorb more and more people, many of them are the poor. The local governments will have to ensure that this growing population will find acceptable accommodation, gain access to essential infrastructure and services, and have adequate employment and income. This challenge cannot be tackled unless a more decentralized decision making process is achieved. The study of urban growth theories and types of favorable growth patterns in Egypt and elsewhere, leads us to some important findings that are summarized as follows:

- Each country and region is specific; there are no replicable models for all developing countries. Rather, solutions should be tailored to the area conditions, readiness, capacity and political/administrative structure.
- A balanced rural/urban development approach could be achieved through the combination of polycentric and agropolitan approaches, providing that a good and comprehensive network of transportation modes is achieved.
- Major cities in Egypt require a productive and well-structured hinterland community (could be classified as peri-urban or rural), in order to increase economic effectiveness of both the clusters in the city as well as in the hinterland centers.
- Egyptian governorates need an efficient urban management framework and a capable and transparent authority that could undertake development and upgrading tasks with an integrated approach. This management framework requires a backup from the private sector, NGOs and civil society. It also requires that the Government implements its decentralization policies and scheme properly and effectively.

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