Sustainable Cities in Egypt

Learning from Experience: Potentials and Preconditions for New Cities in Desert Areas

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SUMMARY

On its way to further development, the Arab Republic of Egypt faces enormous challenges with regards to human settlements and the improvement of living conditions for its people and future generations. Some of these challenges are shared by many other countries, but some of them are specific for Egypt. Like cities in many other countries which follow traditional policies, Egyptian cities are increasingly getting overwhelmed by social, economic, ecological, and cultural problems like rising unemployment, lack of water supply, shortage of available housing, inadequate mobility and chaotic traffic, air pollution, insufficient service infrastructure, etc. Many citizens in Egyptian cities and communities are living under this kind of deficient, unhealthy and unsustainable conditions.

Because of these and other challenges as well as upcoming problems, IDSC has started the project VISION EGYPT 2030. As part of this endeavor the project documented here deals with the potentials and opportunities to build new cities in desert areas. This goal expresses a long-standing desire of the Egyptian people to utilize the vast areas of its huge deserts.

There are several systemic and specific reasons for this underdevelopment; among them are high birth-rates, regionally uneven living conditions, land-city-migration, etc. These cumulating problems cannot be solved with old policies and traditional strategies; they are caused and accelerated by some old approaches and policies. Past experience with development policies in most countries on this planet has shown that they are not capable of dealing with the most important issues for the people and their future. Therefore a new basic approach has been created and has further evolved among experts and innovative decision makers during the last decade: SUSTAINABLE DEVELOPMENT. Since the Egyptian people deserve the best available and affordable policies, this project is based on that future-oriented approach, specifying it for city development in Egypt. In general, the principles of sustainability make it possible for Egypt to reconsider development, to withdraw from Western style models and to identify authentic visions and paths for a more adequate development – whereby circumventing many of the problems that western societies have to struggle with.

Countries are now trying to use this approach and realize real progress for people. Also in Egypt many examples of courageous decision-makers and citizens who started activities in that promising and necessary direction can be found. Many papers have been written too. Therefore this project intends to present some of the interesting cases, to focus on the "lessons learned" and to come up with a general orientation about that issue field and with a spectrum of helpful suggestions.

Egypt seems to have a special potential for another kind of solution, since only 4-6% of Egypt's area is inhabited and cultivated. Yet, over the past 50 years successive plans have failed to utilize vast desert areas. To deal with this multitude and quality of problems and circumstances, new realistic and comprehensive strategies have to be used in order to develop the existing cities and create new cities in the unexploited desert.
experiences show that new adequate management and policies (sustainable governance) are needed and that they are the only promising solution.

For the realization of the different strategies and options for Sustainable cities in desert areas, a huge amount of material and non-material resources and management can be utilized. Therefore, the development options have to be comprehensively and carefully studied with regards to the criteria for Sustainable Development, and the necessary preconditions have to be specified. Before allocating huge budgets for that purpose, these proposals have to be scrutinized in one comprehensive study, which would then serve as a save foundation for selecting and realizing the most appropriate development axis, and developing more and more sustainable cities in Egypt – in desert areas or in the traditional settlement areas.

The project aims at creating a criteria system for Egyptian Sustainable Cities in desert areas. This has been done mainly to assess preconditions, prerequisites and options for Egypt for introducing Sustainable Cities in desert areas. Due to the complexity of the issues involved, this report can only be another step to clarify the situation and define the possibilities.

“The environmental future of the planet is closely linked to the management of our cities, towns and villages. ... The relationship between the environment and human settlements is like the proverbial chicken and egg paradox. Good environmental governance requires good urban governance and vice versa.” Anna Kajumulo Tibaijuka, Director UN-Habitat

The main insights and results of this project are the following:

The challenges for human settlements and improved living conditions today and in the future are immensely big and complicated. After having analyzed many examples and projects in many countries, it is clear that the traditional styles of policy-making and governance are not able to cope with those challenges. Instead, what is needed is a more innovative and open process and development with an inter-departmental and participatory approach. Reality proves that such a new governance style is successful.

Sustainable Development is now becoming the basic concept for solving problems, meeting the acute and systemic challenges and improving the living conditions of people – without neglecting the needs and life chances of our children and future generations. Only such a holistic approach can achieve realistic solutions and substantial and equally distributed improvements. The many examples described in this study may give inspiration for concrete action.

With regards to human settlements in desert areas, all experiences show that there are usually many push-factors (motivating people to leave their old places), yet there seems to be no or very few pull-factors existing (motivating people to move into desert areas). Social sciences know that there are manifold reasons for people to move into desert areas, most of which are only shared by a little share of the whole population. In order to motivate huge numbers of people to move into desert areas, additional efforts have to be made and special incentives have to be created and offered. Incentives and other
activities have to carefully target specific groups of the society in order to become attractive enough.

Because of the still too high birth-rate in Egypt and the huge numbers of new citizens entering the society every day, there seems to be no possibility to resolve the demographic challenge with new cities in desert areas. The costs per person are too high, many social and cultural uncertainties are left open, and environmental effects could be enormously negative (especially concerning water supply). Most of the problems that people believe that desert areas will solve can not be solved by new cities in deserts.

From the perspective of cost-efficiency, it seems that investing money into reduction of birth-rate will be much more efficient than investing into the quantitatively and qualitatively growing demands of increasing population. To a certain degree, even today the demographic trends consume big parts of each new infrastructure investment in Egypt.

Based on the study of many cases and examples and based on the ambitious guiding principles of Sustainability, it seems clear that the only feasible and very special purpose for building new cities in desert areas is to create model cities for special reasons, for instance to prove that SD cities can be build even in such a challenging environment. Such cities could be planned with adequate participation of its potential future citizens, based on a broad spectrum of expertise – including cultural and social aspects. The potentials of people are much bigger then experts often think – if invited to an open and fair creation process.

OVERVIEW: MAIN ELEMENTS OF THE PROJECT

- SD DOCUMENTS (UN, World Bank etc.)
- INTERNATIONAL EXPERIENCES
- EGYPTIAN EXPERIENCES
- LITERATURE REVIEW (Articles, studies, etc.)
- EXPERT-INTERVIEWS

LESSONS LEARNED

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5.2.4 Chicago as a sustainable city

6 Criteria-Model for Sustainable Egyptian Cities

6.1 Definition set for Sustainable Cities

6.2 Sustainable Cities for Egypt - A Criteria Model

Attachment 1: References and selected literature

Attachment 2: Interviews were conducted with the following experts
1. Introduction

The project aimed at Creating a Criteria-Model for an Egyptian Sustainable City, especially for desert areas– based on the "Future Vision for Egypt 2030" and real experiences from national and foreign projects. The main focus is to analyze and assess the possibilities and the prerequisites for re-sketching the geo-economic map of Egypt in a way that would develop and cultivate new areas beyond the old valley. Potentials in such areas would have to be efficiently exploited and utilized in sustainable ways (i.e. water resources, raw materials, new sources and forms of energy).

These development zones – future sites for new cities – must be carefully selected on the basis of the principles of Sustainability, i.e. balancing economic development, environment, and community aspects, and taking into account the needs of future generations. This cautious and studied development is to create sustainable cities by taking steps to maintain their healthiness over the long term with fine living standards.

The project also aims at supporting the development of more adequate and effective governance on the local levels, to give impulses to various institutions and actors for a “Sustainable Governance”, orchestrating the improvement of imminent living conditions and policy-making. It is intended to support the ambitious project of a national sustainable development in Egypt, as acted upon by the Sustainable Development-Council of Egypt with its national strategy. The project has produced a criteria system and recommendations for Sustainable Development in Egyptian cities which could be used as a benchmark for development of Egyptian cities and communities in general.

According to several experts, there exists a golden opportunity nowadays to follow an innovative development approach like Sustainability. For instance, the World Bank senses a reform momentum in this regards based on the following observations:

- "For the first time in decades, the prohibition of urban expansion on any agricultural land is being questioned.
- Reform of the housing sector, particularly the introduction of market-oriented mortgage finance system, has also begun.
- A National Housing Program (NHP) for low-income groups announced in 2005, is a significant shift from former practices.
- Urban planning approaches are being modified (less top-down and more participatory).
- Ministry of Housing has introduced the concepts of core housing and sites and services to its mix of housing products.
- Upgrading of informal and squatter areas has begun to move away from simply providing lacking infrastructure to encompassing citizen participation, social development, and local economic development.
- Concept of cost recovery in major urban projects is beginning to be applied, as evidenced by the Alexandria Development Project (recouping the loan amount from land sale proceeds under the project)." (World Bank 2008)
This report starts with this introduction and continues with a chapter about some of the basic challenges with regards to human settlements in Egypt, namely demographic trends and development policies. In the third chapter, the concept of Sustainable Development is described as the best future-oriented solution for the challenges. Specifics of Sustainable Cities as well as desert areas as places for settlements are discussed. Chapter four is mainly based on experience with Sustainability activities on the local level from Egypt and several other countries, whereby focus is given to "lessons learned". The cases range from city development strategies to single approaches. In chapter five, additional examples with special attention to good examples of Sustainable Cities strategies are introduced and discussed. Here the main policy areas (like energy, transport, waste management) and model cities from other countries with their economic, ecological, social dimensions are explained. Based on this broad range of experiences chapter six offers definitions, a criteria model and success factors for Sustainable Cities in Egypt. This is meant to be used as an invitation for further consideration and adaption. 

Last but not least, the project team would like to thank all experts who contributed to the project and this report, especially through bilateral interviews (see attachment).
2 Status Quo and Trends – Crises and Challenges

2.1 Demographic and Migration to cities – Push Factors

A basic problem for human settlements in developing countries like Egypt is that the population growth rate is faster than the rate of developing infrastructure and services for the people, while the growth rate of productivity is lower. Many people believe that the major cities are the most attractive places to work and live in, they have expectations and hopes for themselves and their children regarding improvement and opportunities. Accordingly, the Egyptian urban system is suffering from the primacy problem of rural-urban population transfer that negatively affects the distribution of resources and investments, and hence, the national development policy.

The urban population in Egypt is not evenly distributed among the 219 cities, in which they live; Egypt’s two primary cities Cairo and Alexandria comprise 43 percent of the total urban population (17 percent of the total population of Egypt) while 77 cities comprise 4 percent of the urban population. Regional disparities and urban primacy are associated with social ills and economic problems, such as unemployment, poverty, environmental degradation, and denying marginalized sub-populations access to power and wealth. It is also often equated with poor utilization of national resources, rurralization of urban areas, and excessive growth rates of villages without provision of adequate infrastructures and social services.

An important base for thinking beyond traditional approaches for urban development in Egypt is the latest report entitled "The Strategic Urban Development Master Plan Study for Sustainable Development of the Greater Cairo Region in The Arab Republic of Egypt" (JICA 2008). Within this JICA-GOPP-project, a SWOT analysis was carried out based on the existing conditions to achieve the objectives such as favorable environment for living, economic activities, and natural resources needed to sustain an attractive city.

The main challenges and assets are the:

1.1. Over concentration on main agglomeration: rectifying population concentration on the main agglomeration by promoting growth of new urban communities and efficient land use of existing build-up areas.

1.2. Insufficient lands for business activities: encouraging provisions of competitive lands for new business activities so as to enhance economic activities. Reduce unemployment rate, and improve household income.

1.3. Better management of natural and cultural resources: effective management of existing resources by controlling urban growth and improving protection of existing natural and cultural assets.

1.4.  *Imperfect Living environment*: improving living environment by dissolving mismatched land uses, providing public transportation and offering affordable housing for various income groups." (JICA 2008)

An Egyptian expert expresses the following assessment, pointing at management and governance: "The main problem of managing the growth of Cairo Metropolitan Region in the era of global economy is not the lack of attention, expertise or resources, but the inability to translate widespread public frustration with existing conditions into the political pressure necessary to compel the state to manage the metropolis effectively. A state response to any pressure that does evolve, however, can not be based on past practices, for they have not been useful, and will only lead to a continuation of rising social and environmental costs." (El-Batran 2002, p.8)

During the last years, the urgency of some of these problems has increased and state institutions developed new approaches and strategies. Most important for the topic of this study is the new strategy formulated in the "Integrated Urban Development Strategy" as part of the *Greater Cairo Region 2050 Strategic Plan*. One of its basic strategies is "Opening new urban development paths and establishing new settlements on desert land".

In a similar direction, a World Bank report stated:

*"Egypt is facing a daunting urban challenge.*  In the next fifteen years, Egypt’s population is expected to increase by 27 million inhabitants to reach over 100 million. Most of this increase will occur within urban areas and in the “urban villages” within urban agglomerations. Accommodating this huge population increase in such a short period of time is a major challenge for the Government. Urban economies will need to generate a large share of the approximately 700,000 jobs needed for new entrants to the labor market each year, especially for limited income groups. New urban dwellers will also need access to affordable housing, and the GOE will need to deliver related urban infrastructure and public services. It is estimated that 300,000-400,000 housing units are needed annually for the coming 15 years, two-thirds of which are for limited income households. In addition, a majority of Egypt’s existing urban population is of limited income and suffers from a lack of appropriate urban services, high levels of unemployment, and inadequate and crowded housing. Over 16 million urban inhabitants live today in informal and squatter settlements." (World Bank 2008a, p.viii)
The 1996 census defined 57 percent of Egypt's population as rural (people living in agricultural areas in the Nile Valley and Delta, as well as persons living in desert areas). For all countries, the demographic changes including its social structure are essential: "Egypt's total population was 72.5 million at the time of the 2006 Census and is estimated to be growing by 2.03% per annum, which is substantial yet below that of some other countries in the MENA region. The rate of growth has slowed, especially from the 1960s and 1970s when it then peaked at 2.8% per year. Total fertility has also fallen from 7.2 child per female in the 1960s to 3.4 child per female in 1998. However, regional differences are significant, with total fertility in rural Upper Egypt estimated at above 4.5 child per female. What is certain is that even if overall fertility continues to fall – the momentum of higher birthrates from earlier decades will continue to work through the population pyramid, producing a large portion of females of childbearing age. This large proportion of women of childbearing age will in turn contribute to higher numbers of live births, even if total fertility continues to decline. For these reasons projections of Egypt’s future population can widely vary." (World Bank 2008a, p.3)

1 Quoted after World Bank 2008a, p.9
3 CAPMAS, 2006. The 72.5 million refers to the population resident in Egypt. CAPMAS estimates that there were an additional 3 million Egyptians residents abroad in 2006.
4 It is interesting to note that average annual population natural increase rates of the Arab Maghreb countries cluster is around 1.5%, whereas that for the Arab Mushraq cluster is around 2.8%.
5 The share of women within the age of fertility (age 15-49) was 23.1% of the total population in 1986 and increased to 25.7% in 1996. This number is expected to rise to 26.5% of the total by 2025. (Khalifa, 2000)
As was mentioned above from a World Bank report (2008a), it is estimated that an average of 300,000-400,000 housing units will need to be built annually for the coming 15 years, of which two-thirds are to be allocated for limited income households. Compared to the construction and buildings in new cities (see Table 1), this is only covering a little share of that need.

As the same World Bank report mentions, an important affirmation of Egypt’s desert development imperative was articulated by President Mubarak in an address given to both houses of Parliament in 1996. After announcing the start of the Toshka mega land reclamation project, the President declared: "Leaving the narrow (Nile) valley and fanning out, in a planned and organized manner, throughout the country, has become an unavoidable necessity. In view of these facts, the conquest of the desert is no longer a slogan or dream but a necessity dictated by the spiraling population growth. What is required is not a token exodus into the desert but a complete reconsideration of the distribution of population throughout the country." ¹

"Within a year of this presidential speech, MHUUD produced the National Spatial Strategy which received wide media coverage. It aimed to redraw the population map of Egypt by marshalling huge investment funds to develop land reclamation, manufacturing, and extractive industries in the desert and to create associated new settlements, along with accelerating the new towns program. The ultimate aim was to correct spatial/population imbalances and de-concentrate urban areas in the crowded Nile Valley. Over the 1997-2017 period, its stated goal was to increase the inhabited area of Egypt from 4% to 25% of Egypt’s total land mass." (World Bank 2008a, p.55)

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¹ Reported in Al Ahram Weekly, 14-20 November 1997, p. 2.
The same report comes to a rather skeptical assessment of the idea to develop and populate desert areas on a big scale: "Migration to the new desert urban communities has been practically insignificant. For example, the total population of all the new towns and settlements in Cairo's desert in 1996 did not exceed 150,000 persons, and 66,000 of this population was in the 15th May city; a public housing project which was grafted onto the Helwan suburb. For comparison, over the 1986-1996 period the population of Greater Cairo grew by over 2.1 million persons. In other words, by 1996 all the new towns and settlements around Cairo had not absorbed the equivalent of 6 months of Cairo's growth. And in 2006 the Census recorded only 602,000 people living in the new towns around Cairo, absorbing 451,000 persons or only 13.8% of the 3 million people added to all Greater Cairo over 10 years. At the national level, the new desert communities have even had a less demographic impact. In 2006 the population of all Egypt's new towns (20 towns as recorded by the Census) did not exceed 766,000 persons, or only 1.06% of Egypt's total population. And over the 1996-2006, period all new towns only absorbed 4.3% of the nation's population increase." (World Bank 2008a, p.12)

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1 Including 10th of Ramadan.
2 New Towns include New Cairo, Shorouk, 10th Ramadan, El Obour, El Badr, 15th May, 6th October, and Sheikh Zeid.
Furthermore, the World Bank points to the huge investments connected to the desert development idea: "Government’s overriding imperative to create new urban communities and populate the desert prevails and continues to consume huge public resources. Since the 1970s, the GOE has pursued a desert development strategy with the aim of correcting spatial/population imbalances and de-concentrating urban areas with the crowded Nile Valley. The focus of this policy has been on developing New Towns and settlements, and providing significant incentives to encourage economic activities to locate in uninhabited areas, with the aim of pulling the population out of the crowded Nile Valley and diverting migration away from existing cities. Several ambitious new urban communities, integrated regional development schemes and “development corridors” have been prepared with very ambitious population targets (5.00 million inhabitants by 2005 in the new towns); and more ideas are being generated to create new villages in the desert backyard of congested cities. Such well-intentioned desire to reshape settlement patterns, to promote desert development, and to create new modes of urbanization has relied upon the State as the main determinant and financier of development, and has been predicated upon State ownership over public (desert) lands. This meant that over the last 25 years the apparatus of the State and huge public resources have been oriented towards shifting urban populations and activities out into the desert. Indeed, the share of Egypt’s total infrastructure investment budget that was directed to the New Towns in the 1982-2002 period was approximately 22%, whereas today, only 1% of Egypt’s population lives in these desert New Towns. The share of national infrastructure investments devoted to New Towns is expected to continue increasing as the GOE proceeds with its recently announced initiative of creating new villages in the desert hinterland, and this is despite the many signals that show that people are reluctant to move to new desert settlements. Moreover, in addition to the 20 New Towns that have been launched by the GOE, additional 24 New Towns are planned with their sites designated. It is unclear whether public investments in these additional New Towns will (or should at all) start soon." (World Bank 2008a, p.75)

The "State of the African Cities Report 2008" by UN HABITAT and the United Nations Economic Commission for Africa clearly shows that the concentration process of the population in all the countries is a common feature (Figure 3). Nevertheless, the concentration process of the population in Egypt is the highest (see Figure 4 below). One consequence will be that the biggest cities of Egypt will grow even more (see Table 2 below).
Figure 3: Urban Settlements over 50,000 – Population in 2000

Table 2: Country City population estimates and projections (thousands)

<table>
<thead>
<tr>
<th>City Name</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Iskandariyah (Alexandria)</td>
<td>3,600</td>
<td>4,421</td>
<td>5,210</td>
<td>5,652</td>
</tr>
<tr>
<td>Al-Qahirah (Cairo)</td>
<td>10,534</td>
<td>12,503</td>
<td>14,451</td>
<td>15,561</td>
</tr>
</tbody>
</table>


(State of the African Cities Report 2008, S.238)
One type of consequences of this trend of concentration is described in a report about Egypt's progress towards achieving the Millennium Development Goals by UNICEF. With regards to Goal 7 (Ensuring Environmental sustainability) it states: "Due to rapid urbanization, industrialization and heavy population density along the limited and confined green valley of the River Nile, several environmental problems exist. This affects both urban and rural sectors at the macro as well as the micro levels. The lack of environmental awareness aggravates the problem of natural resources degradation and generates sanitation, hygiene and environmental problems at the community level. Use of improved water sources is almost universal, but the quality of potable water at times does not meet international standards, particularly in remote rural and urban slum areas. The Egypt Human Development Report 2005 cites sanitation as the “silent emergency” with serious consequences upon children's development when combined with poverty and poor child-care practices, and diarrheal diseases caused by poor sanitation facilities as well as practices that contribute to child mortality." (http://www.unicef.org/egypt/overview.html). Facts like this underline the importance and urgency of finding adequate solutions for the human settlement challenge in Egypt soon.
2.2 The New Concept of Development Corridors

The JICA-GOPP-project, mentioned above, formulated a planning framework and a future growth pattern; constituting a projection for the total population in the three governorates of Greater Cairo Region by the year 2027. Three alternatives of future growth pattern for this region were formulated based on existing urban form as well as different scenarios related to urban expansion and population growth and distribution. The planning framework for the study was formulated in terms of population, economy, and social development as follows:

1. Total population in the study area will be 24.2 million with average increase in population of 8.1 million for the period 2007-2027.
2. Gross Regional Domestic Project (GRDP) will increase with average annual growth rate of 8% and slow down to 6% as proposed so as to contribute to increasing the GRDP per capita with an average growth rate at 5% per year and improving the unemployment rate to 5% with 7 million job opportunities in 2027.
3. Education enrollment rates in 2027 will be at 100% for primary and secondary stages as proposed in the sixth five-year plan.
4. The enrollment rate for the universities (higher education) in 2027 will be 50%. The planning framework is summarized in table 3.

<table>
<thead>
<tr>
<th>Table 3: Planning Framework of the Study Area until 2027</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
</tr>
<tr>
<td>Unit: Total Population (<code>1000</code>)</td>
</tr>
<tr>
<td>2006</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>16,101</td>
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<tr>
<td><strong>Annual Growth Rate</strong></td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>2.22</td>
</tr>
<tr>
<td>Profitable Age (0-5/15-14/15-44)</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>10/11/87</td>
</tr>
<tr>
<td><strong>Economy</strong></td>
</tr>
<tr>
<td>Unit: GRDP (milion LE)</td>
</tr>
<tr>
<td>2006</td>
</tr>
<tr>
<td>139,082</td>
</tr>
<tr>
<td><strong>Annual Growth Rate</strong></td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td><strong>GRDP per Capital</strong></td>
</tr>
<tr>
<td>LE</td>
</tr>
<tr>
<td>8,638</td>
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<tr>
<td><strong>Labor Force</strong></td>
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<tr>
<td>1,000</td>
</tr>
<tr>
<td>Unemployment</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td><strong>No. of Workers</strong></td>
</tr>
<tr>
<td>Primary</td>
</tr>
<tr>
<td>1,300</td>
</tr>
<tr>
<td>260</td>
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<tr>
<td>506</td>
</tr>
<tr>
<td>349</td>
</tr>
<tr>
<td>427</td>
</tr>
<tr>
<td><strong>Education</strong></td>
</tr>
<tr>
<td>Enrolment Rate (Pri/Prep/Sec/Univ)</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>100/50/58/57</td>
</tr>
<tr>
<td>1,257</td>
</tr>
<tr>
<td><strong>No. of Students</strong></td>
</tr>
<tr>
<td>Primary</td>
</tr>
<tr>
<td>1,000</td>
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<tr>
<td>1,000</td>
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<td>1,000</td>
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</table>

Source 1) Census, CAPMAS, 2006  
Source 2) JICA Study Team  
Source 3) Population projection, Cairo Demographic Center, 2001  

One of the recommendations of the JICA-GOPP-report 2008 is planning for development corridors. The project suggested three important development corridors...
where planning for development needs to be started immediately (see Figure 4), namely:

- Central development Corridor: Cairo – New Cairo
- Western Development Corridor: Northern Giza – 6th of October, and
- Eastern development Center: Cairo – 10th of Ramadan City.

**Figure 5: Proposed Development Corridors**

An additional idea, which was first proposed in 1990 by Farouk El-Baz, is the so-called "Desert Development Corridor". In a recent article, Mr. El-Baz repeated his proposal: "a superhighway west of the Nile from the Mediterranean Sea coastline to Lake Nasser". This idea suggests numerous opportunities for the development of new communities, agriculture, industry, trade and tourism around a 2,000 km strip of the Western Desert. "Because the country is presently facing insurmountable problems, the proposal is resubmitted for consideration by the private sector -- local, Arab and international investors." (El-Baz 2006) Major elements of the proposal are:

1- A superhighway to be built using the highest international standards, 1,200 km in length, from west of Alexandria to the southern border of Egypt,
2 - Twelve east-west branches, with the total length of approximately 800 km, to connect the highway to high-density population centers along the way,
3- A railroad for fast transport parallel to the superhighway,
4- A water pipeline from the Toshka Canal to supply freshwater, and
5- An electricity line to supply energy during the early phases of development.
(El Baz 2006)

There is no new information available about the further steps taken with regard to this idea or feasibility studies about this ambitious project. It seems that huge investments would be needed for such a major enterprise.

In an interview with the German magazine Der Spiegel about the modernization of Egyptian agriculture, Minister Mohieldin said that such activities as land reclamation will require a lot of money, which could be contributed by the state and the private sector. He explained: "The reclamation of one Feddan (0.42 hectare) of desert land costs at least 15,000 Egyptian Pounds (...). We are working to alleviate the farmer's financial burdens. That is why we are supporting agricultural credit institutions, which offer low-interest and long-term loans. We're using Pakistan as the model, where the system has proven itself. We're also bringing in experts from India." (Spiegel online 2008)

2.3 Centralization and Decentralization in Egypt

The system of governance plays a central role in managing the wellbeing of a society and dealing with its challenges. A basic feature in this system is the hierarchy. In a historical study about major civilizations, including Egypt, German scholar Karl August Wittfogel, formulated the "hydraulic society" thesis. The theory states that the scale of water control escalated in the ancient desert world, where large dams and elaborate canal networks were built, and political power came to rest in the hands of the elite, typically a ruling class of bureaucrats. Those were the "hydraulic societies," and in their most extreme forms they became despotic regimes in which one or a few supreme individuals wielded absolute control over the common people as they did over the rivers that coursed through their territory. Agreeing with that observation, the great Egyptian geologist Gamal Hemdan wrote about the Nile region saying: "The efficient running of the basin system entirely depended on a strong, centralized government, for every upstream basin could endanger the riparian rights of those downstream". Throughout most of its history, Egypt resembled one of its pyramids: there was a lofty pinnacle where the rulers sat and a broad base where an anonymous, voiceless peasantry toiled. Irrigation was the main factor, the means of production, creating that pyramid.

With such a long and strong history in the background, Egypt's current system of public administration has to deal with this kind of important tradition as well as with the above mentioned challenges. The local administration system faces several problems, according to Dr. Khaled Zakaria Amin (Faculty of Economics and Political Science, Cairo University), including the following:

- There are multiple control and regulatory bodies over local administration units from the executive authorities, the People’s Assembly and Judiciary at the central or local levels. This multiplicity of control and regulatory bodies reduces the local administration units’ autonomy in administering their affairs and using their resources in serving development.
- Relationships between Popular and Executive Councils are typically ambiguous. The role of EPCs is predominantly advisory and nonbinding to Executive
Councils that have the right to reject the resolutions and recommendations of the former. The abrogation of the right of interpellation and vote of confidence mechanisms have curtailed the control role of EPCs over the work of Executive Councils.

- Local administration performance is characterized by complicated and lengthy procedures, conflicting functions, widespread manifestations of corruption and low efficiency of local administration employees.
- Local citizen’s political and developmental participation is remarkably low. Levels of participation continue to regress and voluntary efforts exerted as a contribution to local development are, with few exceptions, decreasing.
- Evidence that local units have no deciding voice in the preparation of the investment and current budgets is represented in the fact that both budgets are centrally prepared and decided upon. The local units only suggest proposals of local needs according to previously prepared priorities. The roles do not serve in building local capacity neither ensuring that local priorities are met. The conception of a local plan is one-sided, as indicated by Article 118 of Law No. 43 for the year 1979 which states that: "The local unit is to determine its needs according to well prepared priorities. It is to accumulate those needs and coordinate them in a draft local plan to be approved by the concerned local Peoples' Council, and transmit them to the governorate Peoples Council."
- The current situation shows that the local division is ineffective due to disparities among local administration units and lack of socioeconomic integration within each unit.
- The current division of the regions and governorates is not based on a developmental rationale. An analysis of their potential suggests a regrouping of the governorates to form developmental regions. It also suggests modification of the boundaries and number of governorates. Changes such as these would require a thorough study of alternatives and a serious review of previous proposals.
- Local Units especially rural ones are overtaxed.
- Local Units fail short in administrative competence especially accounting, auditing and decision-making.

2.4 The Challenge of Climate Change
A rather new and potentially huge problem, – and an additional "push factor" – is Climate Change. Besides several other effects one of the most dangerous consequences for Egypt could be the continuous rise of the sea level (Shakweer / Youssef 2007). According to a recent report by the UN, the coasts of Egypt could be hard-hit by these effects, particularly the coastal regions on the Mediterranean, Alexandria and neighboring cities being the settlements with the biggest impact to be expected (see Figure 6 below).
Figure 6: African Cities at Risk due to Sea-Level-Rise

(Source: UNHABITAT 2008, p.21)
3. The Future-oriented Solution: Sustainable Development

The future qualities of our cities are dependent on the actions of today. In particular, creating cities that are sustainable is an imperative in our rapidly urbanizing world. In 1950, 30% of the world’s population lived in urban areas. By 2003, this proportion had risen to 48%, and it is very likely that the watershed of over half will be reached when this study is published. Predictions estimate that by 2030, 61% of the population will be urban. Envisioning such a future is not an easy matter. To create a sustainable urban form, the need increases for developing ‘new ways of conceiving the future built environment’. The aim of this chapter is to present examples of the latest researches into different urban forms and the ways in which they can be designed to be more sustainable.

3.1 Sustainable Development - Definitions and Background

The pursuit of sustainability has been placed on the agenda of governments and non-governmental organizations after the 1972 UN Conference on the Human Environment, and more recently by the World Commission on Environment and Development (1987) and the 1992 so-called Earth Summit in Rio de Janeiro. It has been stated by these and other bodies that cities must be economically viable, socially equitable and contribute to environmental protection of all species: adhering to the concept of Sustainable Development (United Nations, 2002 especially Chapter 28).

In many countries, policy has been adopted with long-term urban sustainability as its focus, and there are many examples of this that were translated into practice. This Study presents some of the diverse aspects that are inextricably bound up with, and strongly influence, the scope of sustainable urban planning and design. A great deal has been written about the influences that can be said to affect the urban form, such as the technological, social, economic, institutional, geographical and physical influences. These aspects are inter-related and interdependent as they all facilitate and influence sustainable urban planning and design in varying degrees and forms. The chapters that follow add to the debate, examining ideas drawn from research and practice at different scales of the built environment from the urban region to the neighborhood level in a number of different countries.

Sustainability, in general, is the ability to maintain balance of a certain process or state in any system. It is now most frequently used in connection with biological and human systems. In an ecological context, sustainability can be defined as the ability of an ecosystem to maintain ecological processes, functions, biodiversity and productivity into the future. Sustainability is a complex term and concept that can be applied to almost every system on earth, particularly the many different levels of biological organization, such as; wetlands, prairies and forests and is expressed in human

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2 ibid
organization concepts, such as eco-municipalities, sustainable cities, and human activities and disciplines, such as; sustainable agriculture, sustainable architecture and renewable energy, corporations and institutions.\(^1\)

For humans to live sustainably, earth's resources must be used at a rate at which they can be replenished. Now, there is clear scientific evidence that humanity is living unsustainably, and that an unprecedented collective effort is needed to return human use of natural resources to within sustainable limits.

Since the 1980s, the idea of sustainable human well-being has become increasingly associated with the integration of economic, social and environmental spheres. In 1989, the World Commission on Environment and Development (Brundtland Commission) articulated what has now become a widely accepted definition of sustainability: "[to meet] the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainable Development is based on or rather has connections to basic civilizational wisdoms and insights by major religions and philosophies. To mention just some parallels between Islam and Sustainability we can feature a recent study by the German scientist Sigrid Nökel.\(^2\) She points out that the recent ecological problems result from industrialization and Capitalism, and that Islamic sources contain such basic concepts like:

- *fitra* – the creation as natural order;
- *tawhid* – the oneness of the creation, all things in the world are related to each other and are a sign of Allah and are therefore all equally precious, valuable and have to be protected;
- *mizan* – the balance between all different systems;
- *Khilafa* – human beings in their role as advocates of creation, having the duty to preserve its order. They are allowed to consume the fruits of the Earth but not to exploit them in a wasteful way.

From a basic perspective, sustainable development can be viewed as the most advanced and comprehensive secular concept for the survival and advancement of humankind in the 21\(^{st}\) century, concentrating all basic knowledge and principles into one holistic strategy for all individuals and societies.

Sustainable Development is in its ecological dimension a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met equally not only in the present, but also for future generations. The term was used by the Brundtland Commission which coined what has become the most often-quoted

\(^{1}\) SD In Desert Area 11\(^{1}\) Sustainability - Wikipedia, the free encyclopedia.mht
Sustainable development ties together a concern for the carrying capacity of natural systems along with the social challenges facing humanity. As early as the 1970s "sustainability" was employed to describe an economy "in equilibrium with basic ecological support systems." Ecologists have pointed to the "limits of growth" and presented the alternative of a "steady state economy" in order to address environmental concerns.

The field of sustainable development can be conceptually broken into three constituent parts: environmental sustainability, economic sustainability and sociopolitical sustainability.

3.2 Sustainable development in the Arab countries

Since Rio de Janeiro Summit, some formal accomplishments have been made in the Arab region towards the achievement of sustainable development, particularly in the areas of education, health and improving standards of living.

Arab countries have several legal foundations for SD-initiatives:
- Declaration of the UN summit on Human Environment (1971).
- The Arab Declaration on Environment and Development (Tunisia, 1986).
- The Barbados Declaration on Sustainable Development of Small Island Developing States (1994).
- The Jeddah Declaration concerning the Islamic Perspective on the Environment (2000).
- The Tehran Declaration concerning Religions, Cultures and Environment (2001).

Building on the ministerial declaration of sustainable development issued in Cairo on 24th of October 2001, the Council of Arab Ministers for environment and other specialized ministerial councils within Arab league - with the cooperation of international, regional and Arab organizations - adopted a comprehensive regional
approach. This approach aims at developing a regional program for sustainable development.

The concept of "sustainable development" attracted the world's attention since the “Earth Summit” in Rio de Janeiro, 1992. From that time, the relationship between "development" and "environmental considerations" was changed. Decision makers and citizens do understand that the development process includes environmental, social, cultural and moral dimensions.

Thus, the results of the development process will be either unwanted, achieve few benefits or completely fail. From this point, unsustainable development creates environmental and other problems, therefore we have to realize the fact of limited resources and the limited capacities of ecosystems. It is a process of a change, where the exploitation of resources, channeling investments, adapting technical development and institutional development harmoniously enhance the potential that present and future could meet in order to fulfill people's aspirations.

### 3.3 Sustainable Cities

The term sustainable development goes beyond the boundaries of science and business development and trade to include human development, values, and specifics in cultures. In fact, many organizations refer to sustainable human development as opposed to sustainable development in order to emphasize issues such as the importance of gender equality, participation in decision-making processes, and access to education and health.

Cities have become the focal points of these components as major consumers and distributors of goods and services. At the same time, many cities tend to be large consumers of goods and services, while draining resources out of external regions that they depend on. As a result of increasing consumption of resources, and growing dependencies on trade, the ecological impact of cities extends beyond their geographic locations.

It has been recognized that the concept of sustainable development is an evolving, debatable term. This section gives an overview of how sustainable (urban) development was defined by different organizations in different geographical regions.

During the preparatory meetings for the URBAN21 Conference (Berlin, July 2000), the following definition was developed to define sustainable urban development:

"Improving the quality of life in a city, including ecological, cultural, political, institutional, social and economic components without leaving a burden on the future generations. A burden which is the result of a reduced natural capital and an excessive local debt. Our aim is that the flow principle, that is based on an equilibrium of material and energy and also financial input/output, plays a crucial role in all future decisions on the development of urban areas."

**Sustainable Community Development** is the ability to make development choices which respect the relationship between the three "E's"-economy, ecology, and equity of Sustainable Development:
Sustainable Cities in Egypt

- **Economy** - Economic activity should serve the common good, be self-renewing, and build local assets and self-reliance.
- **Ecology** - Humans are part of nature, nature has limits, and communities are responsible for protecting and building natural assets.
- **Equity** - The opportunity for full participation in all activities, benefits, and decision-making of a society.

"A sustainable community is one in which improvement in the quality of human life is achieved in harmony with improving and maintaining the health of ecological systems; and where a healthy economy's industrial base supports the quality of both human and ecological systems."\(^1\)

"A sustainable community uses its resources to meet current needs while ensuring that adequate resources are available for future generations. It seeks improved public health and a better quality of life for all its residents by limiting waste, preventing pollution, maximizing conservation and promoting efficiency, and developing local resources to revitalize the local economy."

It has to be mentioned here that the concept and term "Sustainability" has a very specific connotation, but that there are numerous definitions of it and that often other terms are in use which more or less express similar qualities of development. One such term is being used by UN HABITAT in its latest report "State of the World’s Cities 2008/2009": Harmonious Cities" (see www.unhabitat.org). In its definition it makes a clear statement about the high standards and qualities of such a city:

"Cities are not just bricks and mortar: they symbolize the dreams, aspirations and hopes of societies. The management of a city’s human, social, cultural and intellectual assets is, therefore, as important for harmonious urban development as the management of a city’s physical assets is. Urban planning has to go beyond being just a technical exercise to one that is cognizant of a city’s various tangible and intangible assets. Innovative approaches to urban planning have to also respond to the following emerging priorities and concerns: regional disparities; urban inequalities; and metropolitan expansion or the growth of “city regions”. (UN HABITAT 2008, p.17)

By promoting sustainable urban form and function, cities become healthy and viable communities for citizens. Efficient urban form also helps protect the hinterland of ecosystems that cities depend on. In many ways, the advantages of sustainable communities are underlined in the characteristics and definitions of urban sustainability. A good quality of life, natural open spaces, reduced waste, equality, access, lower crime, sense of community, clean air and water quality, and environmental diversity are just a few beneficial characteristics previously mentioned. The most important advantage of a sustainable city is that it follows such a development path that allows for

\(^1\) Indigo development: http://www.indigodev.com/Sustain.html
an integral and long-term development without compromising future generations. At the same time this includes intra and intergenerational equality.

3.4 The Desert and Its Potentials

The desert is a landscape or region that receives very little precipitation. Deserts are defined as areas with an average annual precipitation of less than 50cm/yr (10 in),[1][2] or as areas where more water is lost by evapotranspiration than falls as precipitation.[3] In the Köppen climate classification system, deserts are classed as $BWh$ (hot desert) or $BWk$ (temperate desert). In the Thornthwaite climate classification system, deserts would be classified as arid megathermal climates.

Desert Geography
Deserts take up about one Quarter (33 percent) of the Earth's land surface.[1] Hot deserts usually have a seasonal temperature range, with high daytime temperatures, and low nighttime temperatures (due to extremely low humidity). In hot deserts, the temperature in the daytime can reach 45 °C/113 ° F or higher in the summer, and dip to 4 °C/87 °F or lower in the winter. Water traps infrared radiation from both the sun and the ground, and dry desert air is incapable of blocking sunlight during the day or trapping heat during the night. Thus, during daylight most of the sun's heat reaches the ground, and as soon as the sun sets the desert dries quickly.

Many deserts are formed by rain shadows; mountains blocking the path of precipitation to the desert (on the lee side of the mountain). Deserts are often composed of sand and rocky surfaces. Sand dunes called ergs and stony surfaces called hamada surfaces compose a minority of desert surfaces. Exposures of rocky terrain are typical, and reflect minimal soil development and sparseness of vegetation. The soil is rocky because of the low chemical weathering.

3.4.1 The Hot Deserts

Deserts sometimes contain non-valuable mineral deposits that were formed in the wet environment or that were exposed by sun. Due to mild and consistent wetness, some deserts are ideal places for artificial preservation of artifacts and food.[2]

There are different forms of deserts. Cold deserts can be covered in snow or ice; frozen water unavailable to plant life. These are more commonly referred to as tundra if a short season of above-freezing temperatures is experienced, or as an ice cap if the temperature remains below freezing year-round, rendering the land almost completely lifeless.

Most non-polar deserts are hot in the day and chilly at night (for the latitude) because of the lack of the moderating effect of water. In some parts of the world, deserts are created by a rain shadow effect in which air masses lose much of their moisture as they

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1 SD In Desert Area 11\Sustainable development - Wikipedia, the free encyclopedia.mht
2 SD In Desert Area 11\Sustainable development - Wikipedia, the free encyclopedia.mht
move over a mountain range; other areas are arid by virtue of being very far from the nearest available sources of moisture. Deserts are also classified by their geographical location and dominant weather pattern as trade wind, mid-latitude, rain shadow, coastal, monsoon, or polar deserts. Former desert areas presently in non-arid environments are paleo-deserts.

3.4.2 Resources in Desert Areas
Deserts may contain great amount of mineral resources over their entire surface. This occurrence in minerals also determines the color. For example, the red color of many sand-deserts is a result of the occurrence of laterite.

Some mineral deposits too are formed, improved, or preserved by geologic processes that occur in arid lands as a consequence of climate. Ground water leaches ore minerals and redeposits them in zones near the water table. This leaching process concentrates these minerals as ore that can be mined.

Evaporation in arid lands enriches mineral accumulation in their lakes. Lake beds known as playas may be sources of mineral deposits formed by evaporation. Water evaporating in closed basins precipitates minerals such as gypsum, salts (including sodium nitrate and sodium chloride), and borates. The minerals formed in these evaporite deposits depend on the composition and temperature of saline waters at the time of deposition.

Some of the more productive petroleum areas on Earth are found in arid and semiarid regions of Africa and the Mideast, although the oil fields were originally formed in shallow marine environments. Recent climate change has placed these reservoirs in an arid environment. It's noteworthy that Ghawar, the world's largest and most productive oilfield is mostly under the Empty Quarter and Al-Dahna deserts.¹

Solar Energy Resources
Deserts are increasingly seen as sources for solar energy. The Negev Desert and the surrounding area, including the Arava Valley, are the sunniest parts of Israel and little of this land is arable, which is why it has become the center of the Israeli solar industry. David Faiman, a world expert on solar energy, believes that the energy needs of a country like Israel could be met by building solar energy plants in the Negev. Faiman also believes the technology now exists to supply all of the world's electricity needs with 10 percent of the Sahara Desert. Solel has nine fields of solar collectors in the Mojave Desert of California. It recently signed a contract to build the Mojave Solar Park, which will be the world's largest solar generating plant.

For several years there has been a discourse between the EU and its member states and countries in the MENA-region, among them in a leading role was Egypt. Recently a consortium of leading corporations (Deserterc) announced its intention to build a super-grit between the two regions and export solar energy to European countries after the

¹ SD In Desert Area 11\Sustainable development - Wikipedia, the free encyclopedia.mht
year 2020, after 2050 in this way around 15% of the EU demand could be met. Other African countries are also planned to consume this clean energy.¹

3.4.3 Human Life in Deserts in Egypt

A desert is a hostile, potentially deadly environment for unprepared humans. In hot deserts, high temperatures cause rapid loss of water due to sweating, and the absence of water sources can result in dehydration and death within a few days. In addition, unprotected humans are also at risk of heatstroke.² This is the main reason why desert areas are only inhabited by small numbers of people, and this is the case in any country. For instance, despite the density of population, the strong government activities and high unemployment, only 8% of Israel's population lives in the Negev desert area. (Katz 2000, F 9)

Humans may also have to adapt to sandstorms in some deserts; not just to their adverse effects on respiratory systems and eyes, but also to their potentially harmful effects on equipment such as filters, vehicles and communication equipments. Sandstorms can last for hours, sometimes even days. This makes surviving in the desert quite difficult for humans.

Despite this, some cultures have made hot deserts their home for thousands of years, including the Bedouin, Tuareg tribe and Pueblo people. Modern technology including advanced irrigation systems, desalination and air conditioning have made deserts much more hospitable. In the United States and Israel for example, desert farming has found extensive use. Most traditional human life in deserts is nomadic. It depends in hot deserts on finding water, and on following infrequent rains to obtain grazing for livestock. In cold deserts, it depends on finding good hunting and fishing grounds, on sheltering from blizzards and winter extremes, and on storing enough food for winter. Permanent settlement in both kinds of deserts requires permanent water and food sources and adequate shelter, or the technology and energy sources to provide it.

Nevertheless, best practice project like the Sekem initiative in the Belbeis area north-east of Cairo prove that human settlements can be established in desert areas, and can also meet highest standards of Sustainability - be it with regards to the ecological, economic, social or cultural dimensions (see Abouleish 2005). In 2008 Sekem published its first Sustainability report. Analyzing this interesting case carefully, it becomes obvious that it was only possible because very specific conditions were given and resources were available: a vision, a leader, committed and highly motivated people and experts, support from various institutions, and last but not least huge passion and patience – the project started 30 years ago.

¹ As with any such huge project there are many doubts about the prognoses, the costs, the underlying expectations etc. - articulated by EuroSolar, for instance. See: , Energie aus der Wüste / Energy from the desert (June 17, 2009, 15:27, NZZ Online, in German) http://www.nzz.ch/nachrichten/wirtschaft/aktuell/solarstrom_sahara_1.2758948.html?printview=true
² SD In Desert Area 11\Sustainable development - Wikipedia, the free encyclopedia.mht
3.5. Insights from Australian Desert Development Efforts

The Desert Knowledge Cooperative Research Centre (2008) in Australia formulated a special definition with regards to Sustainability in desert areas: "Sustainable desert settlements which are ones that meet the diverse needs of current and future residents, are sensitive to their environment, and contribute to high quality of life. Residents of sustainable desert settlements monitor their external and internal drivers and resource constraints and can appropriately adapt to these factors when they need to manage challenging times or take advantage of new opportunities." In another publication of that institution; it reads: "The distinguishing feature of desert settlement is its spatially dynamic nature, and the importance of inter-settlement human and resource flows. As I have argued, desert economy is generated through the co-development of Indigenous and non-Indigenous patterns of movement and residence, across a landscape of unevenly distributed resource values and livelihood activities. In pursuing a ‘systems model’ of desert settlement viability, Desert Knowledge CRC Core Project 4 leaves broader considerations of integrated regional systems to Core Project 6 (see Desert Knowledge CRC 2005). Across Working Paper 1 and Working Paper 2, my argument is that it is necessary to see the viability of any given settlement as (i) relative to other population centres; and that (ii) these relationships are intrinsic to its viability at the local scale." (Pleshet 2006, p.16)

The Australian government is confronted with the challenge, whether and how to integrate or support otherwise the indigenous people, the Aborigines. There are ideas to build villages for them in the desert, but this seems to be a very peculiar and sensitive enterprise as experts point out: "Given the direct and indirect costs of transport, the conditions of this regional transport geography impinge on the capacity of Indigenous communities to remain in dispersed remote settlements. It seems evident that desert settlement viability could be positively affected by interventions that (i) improve Indigenous access to transport as consumers, and (ii) generate opportunities for Indigenous involvement in transport service and infrastructure activities, as employees and producers. Considering the evidence, the former seems a greater opportunity than the latter. The economies of scale required to undertake profitable roadwork are unlikely to be reached by small scale Indigenous community council operations, even given successful regional cooperation. The opportunities may be modest within existing arrangements for roads infrastructure and transport, yet such transport activities may still be desirable targets for employment generation. The degree of unevenness, and regional centralisation of work opportunities may make the development of regular transport services to larger desert centres, such as Alice Springs, essential in the medium-term. In light of this, an affordable fee-for-service remote transport system is necessary not only now, but will become increasingly important as increased vehicle complexity and fuel prices continue to undermine the overall affordability of privately owned transport." (Pleshet 2006a, p.18)

1 For the case of Egypt, especially the Western Desert see ethnological studies like those by Frank Bliss 1989.
There is the idea and the expectation that tourism could be a supportive source for developing desert settlements in Australia. But again, experts call for thorough analyses before starting action. Since the interests, motivations and expectations of tourists are of major importance for development of tourism, studies have been conducted to find this out. For a particular kind of tourism into the desert areas, a study published the following results:

"One significant finding is that there appears to be four major groups of motives for respondents visiting the desert. These are:
• Experiencing the freedom of being away from the city factor.
• Social and learning factor. This included ‘meeting new people’, ‘meeting the locals’, ‘strengthening the existing relationships’, ‘spending time with like-minded people’, ‘experiencing nature’, ‘visiting Indigenous communities’, ‘developing a greater sense of self’ and ‘experiencing new and different things you would not otherwise see’.
• Exploration factor including ‘gaining access to remote places only accessible via 4WD’, ‘visiting new places’, ‘experiencing different landscapes’, ‘experiencing new and different things you would not otherwise see’ and ‘experiencing nature’.
• Learning and introspection motives. These included developing a greater sense of self, and experiencing difficult landscapes, experiencing new different things you would not otherwise see and experiencing nature.

These motives were reflected in the itineraries constructed for club members and in the activities they undertook. After conducting a factor analysis of the activities undertaken by respondents, three factors were found to be closely related to the motivation factors outlined previously. The main activity factors were:
• Social. These included meeting the locals and new people, spending time with like-minded people, and strengthening existing relationships.
• Visiting attractions and activities. These paralleled the motivation factor termed heritage and included activities such as visiting Aboriginal cultural sites, communities and performances; visiting local galleries; experiencing nature, heritage, and historical sites; and visiting places of interest.
• Escape/exploration. This factor included activities such as experiencing the freedom of being out of the city, visiting new places, gaining access to remote places only accessible via 4WD, going camping, and going fishing." (Coghlan / Prideaux 2009, p.20f)

It can be expected that in some parts of Egyptian deserts, these and additional findings could be helpful. In any case, what it underlines is that the inhabitants of the desert areas have to be taken seriously when development is concerned. They have to be considered as stakeholders.

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1 "The outcomes of the project were mixed. The expectation had been that the project would help stakeholders in the tourism industry, and in the region generally, to develop the industry and deal with change. A systems-thinking approach would enable stakeholders to see which options and strategies for development would be of greatest benefit to the industry and to the region as a whole. Tools and techniques would be devised to assist this process." (Friedel / Chewings 2008, p.23)
"While there is no simple or easy solution to this issue of the sustainability of remote settlements, there is no doubt that it is intimately tied to government policy, both historically and currently. The current policy framing Aboriginal people as disadvantaged individuals, rather than as members of a marginalized group that have unique interests and capacities, actively denies the scope for developing a complex notion of sustainability that goes beyond economics. Looking beyond mainstream economics to hybrid economies and alternative livelihoods enables us to see success and to value the unique contributions that remote settlements can make. Yet, we cannot selectively pick and choose aspects of Aboriginal culture that are acceptable or maintain that colonisation and government policy was/is the only culprit to 'Indigenous disadvantage'. It seems to me that government investment in participatory development programs leading to social and in some cases necessary cultural change, that may well include interventions and a realistic understanding of Aboriginal life worlds, is crucial.

Much of the research that the Desert Knowledge CRC is undertaking – particularly in this field of sustainable settlements and alternative livelihoods – will utilise participatory and collaborative methodologies with a focus on research leading to change. If collaboration in research is the way of the future, surely this also needs to be applied to policy making." (Holcombe 2006. p.8)

3.6 Egyptian Deserts As a new Location for Sustainable Cities

After thirty years of development efforts in desert areas, Egypt is still trying to reclaim the desert, to provide work and living space for its expanding population and their expanding settlements. However, certain economists and environmentalists fear that the country's efforts to green the desert could be ill-advised.

About 96 percent of Egypt is covered by the Sahara desert, with the remaining, more fertile land concentrated along the Nile River that snakes through the eastern half of the country. Although the Nile Valley accounts for just 4 percent of Egypt's surface area, yet it is home to virtually all of the 79 million residents; and, the overcrowding in the valley looks set to become worse, given that Egypt's population is expected to double by 2050. ¹ Official estimates put unemployment at 9.3 percent. Many other problems, like ecological ones, lead people to the idea to develop desert areas.

As mentioned above, this has prompted authorities in Egypt to develop plans – among other things – for large-scale resettlement under the auspices of the Toshka project. We hope that over the next decade, around six million Egyptians will have moved from the Nile Valley to reclaim land in south-western Egypt, where they will produce wheat, cotton and other products - and find jobs in light manufacturing. "Egypt needs to use the desert to take care of the tremendous increase in population. We also have to use the desert to produce food, which we are now importing most of," says Adly Bishai, founder of the Desert Development Centre.²

¹ http://ipsnews.net/news.asp?idnews=38721
² http://ipsnews.net/news.asp?idnews=38723
However, critics believe that the target of 1.4 million hectares is unrealistic\(^1\), and estimate that only half this amount of land can be reclaimed if water levels in the Nile remain constant\(^2\). There are also some critical doubts about the long term sustainability of this use of the desert.\(^3\)

Nonetheless, according to independent estimates, it takes 100 reclaimed hectares of land to equal the output of one hectare of existing Nile soil.\(^4\) Ironically; urban sprawl and industry have now taken over much of the Nile Valley.

With the agriculture sector contributing with less than 25 percent of Egypt's national income while accounting for 88 percent of the country’s water consumption\(^5\), there are also concerns about the economic rationale of establishing fields in the desert. Golf courses and the luxurious lawns of upscale gated communities in Egypt's cities are further examples of questionable water management in this desert country.\(^6\)

Desert ecologists believe that authorities should focus more on eco-tourism in their efforts to ensure a future for Egyptians by utilizing desert areas.

"The value of an oasis as an attraction can bring in more money than 4,000 acres of rice fields...and it's certainly more sustainable," he says. "Rather than produce something that you can obtain for one hundredth of the cost elsewhere, we should use this water, which is a very valuable commodity, to maximize the revenue for the people of Egypt," adds Saleh, who has conducted feasibility studies for Egypt’s Tourism Authority on the value of land reclamation schemes compared to that of eco-tourism projects.\(^7\)

One of Egypt's handful of eco-lodges (i.e. "White Mountain" in the Berber language, Apco) in the western desert oasis of Siwa, has won international recognition for its sustainable practices.\(^8\) The lodge is the brainchild of Mounir Neamatalla - president of an Egyptian consulting firm, Environmental Quality International - who labels efforts to reclaim the desert a "huge transgression" in resource management.

### 3.6.1 Western Desert

The Western Desert covers about 700,000 square kilometers and accounts for about two-thirds of Egypt's land area. This immense desert to the west of the Nile spans the area from the Mediterranean Sea to the Sudanese border. The desert's Jilf al Kabir

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2. As Previous Reference
3. As Previous Reference
4. As Previous Reference
Plateau is of an altitude of about 1,000 meters, an exception to the uninterrupted territory of basement rocks covered by layers of horizontally bedded sediments forming a massive plain or low plateau. The Great Sand Sea lies within the desert's plain and extends from the Siwa Oasis to Jilf al Kabir. Escarpments (ridges) and deep depressions (basins) exist in several parts of the Western Desert, and no rivers or streams drain into or out of the area.

The government has considered the Western Desert a frontier region and has divided it into two governorates at about the twenty-eighth parallel south or north: Matruh to the north and New Valley (Al Wadi al Jadid) to the south. There are seven important depressions in the Western Desert, and all are considered oases except the largest, Qattara, the water of which is salty. The Qattara Depression is approximately 15,000 square kilometers (about the size of) and is largely below sea level (its lowest point is 133 meters below sea level). Badlands, salt marshes, and salt lakes cover the sparsely inhabited Qattara Depression.1

Limited agricultural production, the presence of some natural resources, and permanent settlements are found in the other six depressions, all of which have fresh water provided by the Nile or by local groundwater. The Siwah Oasis, close to the Libyan border and west of Qattara, is isolated from the rest of Egypt but has sustained life since ancient times. The Siwa's cliff-hung Temple of Amun was renowned for its oracles for more than 1,000 years. For centuries fresh water artesian wells in the Fayyum Oasis have permitted extensive cultivation in an irrigated area that extends over 1,800 square kilometers (694 square miles).

3.6.2 Eastern Desert

The topographic features of the region east of the Nile are very different from those of the Western Desert. The relatively mountainous Eastern Desert rises abruptly from the Nile and extends over an area of approximately 220,000 square kilometers (roughly equivalent in size to the US State of Utah). The upward-sloping plateau of sand gives way within 100 kilometers to arid, defoliated, rocky hills running north and south between the Sudan border and the Delta. The hills reach elevations of more than 1,900 meters. The region's most prominent feature is the easterly chain of rugged mountains, the Red Sea Hills, which extend from the Nile Valley eastward to the Gulf of Suez and the Red Sea. This elevated region has a natural drainage pattern that rarely functions because of insufficient rainfall. It also has a complex of irregular, sharply cut wadis that extend westward toward the Nile.2

The Eastern Desert is generally isolated from the rest of the country. There is no oasis cultivation in the region because of the difficulty in sustaining any form of agriculture. Except for a few villages overlooking the Red Sea coast, there are no permanent settlements. The importance of the Eastern Desert lies in its natural resources, especially

1 http://ipsnews.net/news.asp?idnews=38721
2 http://ipsnews.net/news.asp?idnews=38721
oil. A single governorate, the capital of which is at Hurghada, administers the entire region.

3.6.3 Sinai Peninsula

This triangular area covers about 61,100 square kilometers (slightly smaller than USA). Similar to the desert, the peninsula contains mountains in its southern sector that are a geological extension of the Red Sea Hills, the low range along the Red Sea coast that includes Mount Catherine (Jabal Katrinah), the country's highest point--2,642 meters. The Red Sea may have been named after these mountains, which are red.

The southern side of the peninsula has a sharp escarpment that subsides after a narrow coastal shelf that slopes into the Red Sea and the Gulf of Aqaba. The elevation of Sinai's southern rim is about 1,000 meters. Moving northward, the elevation of this limestone plateau decreases. The northern side of Sinai is a flat, sandy coastal plain, which extends from the Suez Canal into the Gaza Strip and Israel.¹

Finally we can conclude that the western desert seems to be the best available place in the Egyptian deserts which can be utilized for locating new sustainable cities. However, the precise locations have to be decided upon by rigorous and systematic analysis (environmental impact analysis, cost analysis etc.). A good source for such decision support is available at the National Authority for Remote Sensing (NARSS). They have developed ranking criteria (Multi- Criteria evaluation) to identify the most suitable areas for development. Using their data, the changing priorities and patterns can easily be visualized and the complex situation made transparent.

3.7 Situation and Experience of New Communities in Egyptian Deserts

This part introduces an analysis and evaluation to the Egyptian experience in constructing new urban cities and communities in the desert. For this purpose, the report monitors and analyses the evolution of the experience aiming to identify most important positive and negative aspects. It attempts to understand and extract most important outcomes and learnt experiences.

3.7.1 Types of new cities in Egypt

The State adopted a policy to expand into the desert creating new foundations for urbanization outside the inhabited area and breaking the conventional patterns of urban development such as extensions of informal cities. In this regard, it aimed to reproduce the populace map and geographic distribution in Egypt on one hand and create new urban environments that are more organized and attractive on the other. It was hoped for that new urban environment would absorb part of the overpopulation in existing cities, and protect agricultural land. New cities in Egypt, are divided in terms of locations and functions into three types: satellite, twin and independent cities as follows: ²

¹ http://ipsnews.net/news.asp?idnews=38721
² Presidency, report of the National Council of Social Services and Development, 14th cycle 1993-1994
Sustainable Cities in Egypt

Satellite cities
This type of cities is located around and close to Cairo. The short and middle term objective of constructing those cities is to overcome the population density in Cairo, use available basic services and labor in attracting residents, activities, creating job opportunities and economic factors that are linked to the mother city. Satellite cities include 15th of May, 6th of October, Bader, and Al Obour which are developed without an economic base and instead they totally depend on Cairo. In this context, they are both a burden and an urban plus to the mother cities.

Twin cities
It is an urban expansion into desert lands situated close to the existing urban cities. In some cases, they are just a natural extension to the existing cities. Examples of this type include: New Damietta, New Beni Suef, New Minia, New Asuit, New Akhmim, and New Aswan. Unlike satellite cities, twin cities have their own economic and service base but they are still closely linked to the existing cities.

Independent cities
This type of cities is characterized with relative capacity and stand alone economic base. On the long term, the objective is to create economic growth poles comprising independent economic entities. In such case, cities become qualified to group socio-economic activities around a certain point to make optimal benefit from the clustering advantages. They are located far from the existing cities sufficient to support its independent position with some of them penetrating into the desert farther from the valley. Examples include: 10th of Ramadan, Sadat, New Borgel Arab and Salheya cities.1

3.7.2 Migration Motives – Example Toshka Project

As mentioned above, a major task for sound urban planning is to learn about the interests, needs and expectations of potential inhabitants of new settlements. For that and similar reasons, a study was conducted in 2003 under the title "Propensity to Migrate to Toshka: Fine-tuning Toshka Project". The project summary explains, that the purpose of that research project was to assist in sketching the future vision of Toshka by providing valid information regarding the likely social impact of the project, and how the project could be fine-tuned for effectiveness and efficiency in its march toward its social aims.2 The research intended to recognize the central importance of involving future beneficiaries in planning, as success in achieving the project’s objectives is contingent on the views of the current and potential migrants, how they

2 A short description of the project, quoted here, is available at www.neareast.org/main/pub/docs/CDS research_and_evaluation_examples_2003.doc The projects full title was: "Propensity to Migrate to Toshka: Fine-tuning Toshka Project" (February – June 2003). Unfortunately, the full report and the results of this study have not been published.
define the factors that will encourage them to settle in Toshka. Questions such as the following were posed: What material improvement in their lives would they consider sufficient to migrate? In what ways is life in Toshka perceived as different from the life they leave behind and why? The answers to these questions, among others, were planned to provide means to incorporate local knowledge and resources into the project plans and assure that people’s reality could fit with the socio-economic dynamics that drive the Toshka project. This distinguishing feature of that research project is to bring information from selected sites throughout Egypt where the potential to migrate is regarded higher than in other areas. Selected sites where the research will be conducted include Menufiya, Beheira, Toshka, Aswan, Suhag and Kafr El-Sheikh. The research team looked at general trends in Egypt’s economy that might influence the future of a mega-project such as Toshka: communication technology, transport, infrastructure, industrial cities particularly those connected to major cities in Upper Egypt, various laws and regulations in place that influence the job market in Egypt, and experiences of migrants to other reclaimed lands in Egypt.

3.7.3 Analyzing the Egyptian experience of constructing new urban cities in the desert

Positive aspects:
In the area of urban expansion and protecting agricultural lands:
Informal settlements are still illegitimately growing along urban boundaries of Egyptian cities. However, if we consider total area implemented in the new cities, it comes to around 16500 feddan. This area might have been taken from the currently cultivated land in the valley and Delta for urban expansion purposes if those cities were not constructed.

In the area of industrial expansion:
Total activities area in new cities was 7690 feddan broken down into 914 industrial productive projects and 241 projects are underway. This brings the total number of industrial projects into 1155 projects. Actually, this number exceeds what has been planned as a result to facilitations offered to investors including providing areas equipped with the necessary utilities, services, and a number of tax and customs exemptions.

New cities experienced large influx of private sector investments contributing an additional industrial national product to Egypt's industrial map. If we would compare total State expenditure allocated for implementing infrastructure networks and services projects, we would find that each pound of State expenditure corresponds to 5.7 of annual production revenue of the industrial projects operating in new cities.

In the housing area:
Total land dedicated to housing in new cities comes to 8809 feddan. Till mid 1996, the number of completed housing unites reached around 47845 units.
Passive aspects:
Unused housing capacities:
Studies indicate that the percentage of population attraction into this type of cities failed to fulfill the target. For instance, 40% of the housing units remained vacant due to multiple reasons including, inter alia; rejecting governmental housing for increased amount of rent or ownership installments that are incompatible with the income. Moreover, 25% of commercial areas are not used because commercial and public services can not be performed efficiently.

Continued housing crisis and issues of the existing cities:
Although the objective pronounced in all studies of new cities indicate that the construction purpose is to mitigate population pressue off the existing cities especially in Cairo and Alexandria regions, however, the housing problem is growing more complex. Number of Egyptian households is rising with around 100,000 per year without a corresponding increase of housing units. On the other hand, existing cities are still suffering unemployment. It was further proved that most of the industrial projects established in such cities failed to make a tangible change in the labor market mechanism. Moreover, most of the working manpower is recruited from other places (not residents).

Fragmented urban growth:
It is quite evident how growth of housing areas and service centers is fragmented. In this context, there is a large number of incomplete public and private housing projects in many neighborhoods. Regardless of the unplanned distribution of service facilities on the three levels, namely; neighborhood, district and city, imbalance between the implementation levels in the industry, housing and services sectors is another issue.

Slow population growth:
The overall achievements image of the past years indicate that population growth slowed down in new cities. Such slow down is the result of some causes, mainly lack of funding sources. However, the slowdown reveals failure of new cities to achieve the desired objectives. There is a difference from one city to another in terms of residents' percentage to the target in the first phase. For example, it is 100% in 15th of May, 7% in Sadat, only 3% in New Borg el Arab, and 20% in both 10th of Ramadan and 6th of October cities.

The following reasons explain the slowdown of human settlement in new urban cities and communities:

- It is very hard to construct new cities in the Egyptian desert and it requires wearing effort to create an attractive community that offers better conditions and encourages people to immigrate in. The core difficulty is the absence of population base.
- Insufficient factors of population attraction such as diversified activities, i.e administrative centers of ministries, agencies, educational and medical centers. These facilities automatically create large number of people who are either
employees or users. All new cities depended on the industrial activity only which, until now, was unable to attract except a small percentage of total employees for permanent residence in the new cities. Although the new cities offered residents appropriate living opportunities, however, permanent residence becomes a risk due to shortcomings and negative aspects. Owing to this, others are discouraged to move in.

- In the beginning, very low priced land sale was unrestricted in some cities ending with selling complete neighborhoods to individuals who speculated an increase of land prices. Construction density shows low activities in such neighborhoods. The situation required formulating well planned sale and allocation policies.

**Lack of funding:**

Achieving economic development was a main goal of constructing new cities to allow an expansion of industrial and agricultural sectors aiming to create job opportunities and an increase in both production and national income. It was necessary to provide funding sources to cover the projects of infrastructure, social services and housing. However, the situation can be explained as such, an increased number of spacious cities and lack of self funding. This mix created a funding problem hindering the sustainability of developing new communities.

In the early phases of constructing new cities, self funding was insufficient because of land sale policies, of some neighborhood, which failed to observe sound economic basis. Thus, the sale price was much less than the development cost. To address this problem, the agency had to borrow from the Investment Bank to finance the infrastructure and services and borrow from Construction and Housing Bank to finance housing projects.

**Shortcoming of implementation:**

Implementation problems of the infrastructure, housing, industrial and services facilities can be summed up in poor construction capacities affecting the development programs of new cities. The State consecutive 5-year plans involved multifold construction capacities; nevertheless, an evident failure to achieve the target is largely due to poor building capacities. This can be explained in detail as: lack of financial resources, skilled labor, and equipments.

**Shortcoming of management:**

The overall deficient picture of new urban cities and communities in Egypt clearly shows, in addition to poor financial resources and building capacities, a shortcoming of administrative processes in the relevant bodies. This problem negatively affects the optimal use of available resources and capacities even if they were limited. This problem comes as a result to the function of those bodies. They are in charge of implementing centrally formulated policies by the Authority of New Urban

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1 Presidency, report of the National Council of Social Services and Development, 14th cycle 1993-1994
Communities. The authority is responsible for formulating policies, allocating land and issuing licensing decrees. Thus, decisions of planning, budgeting and organization are not part of the jurisdiction of new cities bodies.

*Lack of integrated development approach:*
The problems of the Egyptian experience of desert development, in its early phases, stemmed from lack of comprehensive development approach. In this context, the development process adopted a unilateral dimension (conventional agricultural development). The second phase (satellite, twin and independent cities) experienced many obstacles as a result to the imbalance between an accelerated growth of physical structures via governmental investment and creating new communities. The last period is not but an extension to the approach of the second phase involving huge physical development rather than applying an integrated developmental approach working to restore the imbalanced population distribution and reordering the national structure of land use.

*Random selection of locations:*
This problem can be clearly spotted because determinants, capacities, environmental and construction opportunities, and overall features of the sites were not clear. In this regard, points like topography of site, earth characteristics, and flood flushes were not considered. As a result, it ended up choosing inadequate sites for creating construction clusters either because of earth characteristics such as the case of Al Safa city which was supposed to be established west of Asiu, its land ownership overlapped to more than one governmental entity, or the difficulty of constructing economic cost roads.

### 3.7.4 Lessons learnt from the Egyptian experience

Constructing new urban cities and communities in the desert certainly entailed hard efforts; however, those efforts were in vain. They failed to accomplish the desired goal and address the challenge formula of population growth and limited inhabited area. In the following, we are going to list a number of learnt lessons derived from the Egyptian experience:

- It is essential to develop a holistic understanding of the desert nature, and socio-economic system before getting into constructing new urban cities and communities in the desert. In this regard, mechanisms of development and construction would need a motivating State. Desert development and construction process will not be feasible in absence of collaborative efforts and expertise.
- Plans of constructing new cities in the desert must particularly adopt a regional development approach. In this context, this approach will encompass setting developmental objectives that are compatible with the various patterns of desert development which must be comprehensive. When we talk about comprehensive development here, we refer to planning levels (national, regional and local) as well as comprehensive economic activities (agriculture, industry, tourism, services, mining etc.).
- Expanding into the desert is an inevitable alternative agreed upon by those who are concerned with planning. However, the penetration method is still undecided. Also there is a number of considerations that must be observed while setting the development priorities of existing new desert cities: potential benefit on the short and middle terms, learning from the magnified problems in the existing cities, socio-economic and political return, potential success in moving people to the new sites taking into consideration the social and cultural dimensions and the functional role of desert cities within the development strategy on the national level.

- It is essential to review the organization of the administrative body of the New Urban Communities' Authority to ensure effective management of new cities. This will require an increased level of decentralization to institute an effective performance and accelerated implementation, economize on time and cost and provide stability to senior management of the authority as well as bodies of affiliated cities. It is recommended in this regard to take the following steps:
  - Setting a development plan and settling authority separate from the body of the city. It must have its own fund receiving resources from city residents who must represent various professional categories, investors, youth and heads of household. This authority will be in charge of proposing projects as required for the development of the city voicing residents' needs. Through its fund, it will contribute to implementing those projects, funding the operation and maintenance of facilities, and cost of basic social services. The board of trustees of new cities can serve as basis to this proposed authority.
  - It is necessary to involve permanent representatives of the concerned ministries in the development body of each city. This will allow the required cooperation and coordination between the authority and plans of such ministries as well as operating their services after completing the needed facilities.
  - Creating a marketing body in each city comprising an information center covering the housing, populace, investment situations and available land and all other related basic data. The body develops an awareness media plan-on the local and regional levels- regarding the benefits, investment and work opportunities. The plan must cover potential incentives, exemptions and services introduced in the given city.
  - It is possible to seek services of specialized companies in managing new cities and communities. This might motivate the continual of adopting this management approach allowing full opportunity to investment and private sector companies for engaging in the area of constructing and developing districts that would be annexed to old cities and even complete new cities and communities.
  - Setting a more liberalized administrative system, enabling the cities an increased level of independence. This will achieve the following:
    - The local authority of the city will be in full control of planning and implementing civil life requirements.
    - The community of the city will be empowered for an effective participation in management instituting the democracy principles.
It is expected to accomplish an increased level of decentralization. As such, the relation between the city and higher administrative levels will be restricted to regional and national affairs requiring State sovereignty.

3.8 Lessons learned

Egyptian deserts represent a national wealth which should be utilized to guarantee the right of next generations to get the benefits of these capabilities. The western desert - which have energy sources (solar energy), underground water, huge spaces – might be the hidden wealth for Egypt, so the development of this desert should be directed to benefit national sustainable development plans on the long run by utilizing the capabilities of these deserts.

The establishment of new communities especially in desert areas like 6th of October city and New Cairo represent an experiment that might be beneficial for urbanization, and this leads to getting the direct benefits of the investments put in them because of their closeness to the cities and the capital which facilitate the transportation means, infrastructure, and citizens transport.

A new World Bank report (2008) thoroughly and critically analyzed the experiences with new cities in Egypt and came to conclusions and recommendations which we quote here in full length:

"An analysis of the new towns shows that there are fundamental problems which have never been recognized and which bring into doubt that idea that the new towns will ever generate the huge population shifts for which they were intended. This revolves around three main axes:

1. In the GOE’s attempt to create a modern society in the new towns, high urban planning standards have been imposed which precluded the kinds of housing typically generated in existing cities and have proscribed the kinds of informal businesses which generate most employment opportunities in urban Egypt and which poorer urban Egyptians rely on.
2. Distances to new towns from existing agglomerations are enormous and most new towns are not connected to existing urban fabrics through functioning mass transit systems.
3. Land distribution policies within the new towns have been wholesale and mechanistic, as if location does not count. There are huge distances within new towns, and there appears to be no sense of logical horizontal expansion from mature cores. In addition there are only few attempts at capturing the un-earned increment due to land value increases. There also has been poor build-out of lands allocated to the private sector, particularly plots in subdivisions allocated to individuals.

In effect, the new towns have been created by and burdened with spatial supply-driven policies and wholesale land distribution attitudes which, in spite of the best of
intentions, simply do not begin to fit with or stimulate the urban processes and markets that have dominated the dynamics of urbanization in Egypt and which continue to replicate themselves in existing agglomerations.

Although some of the new towns, yet those around Greater Cairo, are attracting large amounts of private capital, but, as revealed in the discussion of 6th of October below, such capital has mostly gone into speculative housing and commercial investments which are mostly vacant, idle, or stalled. This in turn reflects the immaturity of capital investment markets in Egypt and the instinct of both corporations and individuals to invest in land and real estate, where eventual returns through resale will (hopefully) eclipse those in industry, equity markets, or savings bonds.

Recommendations

In general terms, there is a wholesale need for reform of the development philosophy for new towns, particularly in terms of land management. This means that systemic reform is needed in the following areas:

- Reconsider what is the economic rationale behind each new town, especially in light of the increasing liberalization of Egypt’s economy.
- Take a thorough look at the location advantages and disadvantages of each new town, including proximity to forward and backward linkages and supply chains.
- Formulate strategies for new towns to take advantage of Egypt’s real estate boom which is largely generated by the huge accumulation of capital in Middle Eastern countries and the resulting liquidity.
- Formulate strategies for better linkages and integration with existing nearby urban agglomerations. New towns cannot be treated as isolated geographic entities.
- Combat the speculative intent in land disposal; in particular, reclaim and recycle previous land allocations, densifying the city cores and re-establishing logical land development sequences.
- Address public transport problems, with solutions tailored to each town and its geographical context.
- Avoid or at least rationalize subsidies (which implies identifying them first, especially those that are indirect or hidden).
- Avoid wishful thinking and non-transparent planning.

Implied in these recommendations is the need for an economic feasibility review of all existing new towns, and a thorough look at whether or not any further new towns should be established. In fact, until Egypt's new towns policy is redirected towards economic realities and justified in terms of locational rationales, a moratorium should be put on the creation of any more new towns." (World Bank 2008, p.8ff.)
As the Egyptian experience shows, the establishment of new communities based on the complete movement of the citizens is not feasible without ensuring adequate infrastructure, services, transportation means, daily life tools, cultural attractions, and even special incentives (i.e. tax cuts, subsidies). Otherwise the old approach of creating new cities will very likely lead to deserting these cities and defusing the investments put in them like the examples of 10th of Ramadan, Sadat, and Badr cities clearly prove. Movement to the desert is not an impossible matter, but it needs good urban management for the development projects directed to these regions, and also these new communities which have plenty of life and environmental constituents, and need managerial flexibility to get the mutual benefits.

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1 At the same time citizens (often tribes) who already live in some of the desert areas should be taken care of. Their sensitive balance between social, economic and ecological dimensions is based on long experience and should be taken seriously. See ethnological studies for instance by Frank Bliss 1989.
4-City Development Strategies

4.1 City Development Strategies in Egypt

These parts of the study try to outline the Government of Egypt's (GOE) efforts for the presentation of City Development Strategies at the United Nations General Assembly at its June 2004 special session (Istanbul+5). Its focus is on two sub-themes and key items of the HABITAT Agenda, namely: Shelter and City Development Strategies. It is understood that this session has two objectives. The first objective is to review and to assess the implementation of the HABITAT Agenda (Istanbul 1996). The second objective is to exchange information and to learn lessons derived from the implementation in various countries.1

Since 1996, GOE efforts (the beginning of new development long run plan). The project of regarding shelter for all can be illustrated using two cases of projects, namely: “Mubarak Youth Housing Project” and “The Future Housing Project”, each of which is aiming at constructing 70,000 dwelling units.

Reform Program "Shelter For All in EGYPT", 1996 – 2001

Government of Egypt integrated the rights of low-income/disadvantaged groups to appropriate shelter and affordable housing in its economic reform program, which began in the early 1990s. This integration has been made on the basis of an indigenous cultural value of “Eltakaful El-Egtemaie” or social solidarity. This value means the responsibility of capable/wealthy groups towards disadvantaged/poor ones, the result of which is social solidarity. This value can be achieved either through direct donations or cross-subsidy mechanisms.

Mubarak Youth Housing Project

“Mubarak Youth Housing Project” had started in 1996. Its aim was to provide 70,000 affordable dwelling units, in a healthy and productive residential environment. The beneficiaries were the youth who belong to the disadvantaged/low-income groups. The project was completed in December 2000, and its units were distributed in 15 new cities.

The project was formulated to offer a wide range of floor spaces (100-70-63 sq. m.) in order to satisfy the needs of different household sizes. The designs of both dwellings and layouts had been chosen through national architectural competitions. The chosen designs fulfill the targeted requirements of gross residential density (120 persons/acre) and a maximum height (5 floors) to allow for ample green areas, parking spaces, and various social services.

The project costs about L.E. 2.75 billion. Of this amount, the state cross-subsidized nearly 40% from the sales of high-income residential areas and dwellings in both new

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1 Thematic Committee- 6 - 8 June 2001- Shelter programmes and City Development Strategies in Egypt.
cities and resorts. This is in exclusion of price of serviced land, which is also financed from these revenues. In addition, the State offered L.E. 1 billion in subsidized credit in the form of soft loans of L.E. 15,000 per unit, payable over 40 years at 5% interest rate. The dwelling units were allocated according to objective criteria, which had been investigated to ensure the legibility of beneficiaries.

After the successful completion of the project, the State is now developing new mechanisms to replicate the project in a larger scale during the next five years. The objective of these developments is to mobilize more resources from capable/wealthy groups to support the youth of disadvantaged groups, e.g. participation of businessmen, contractors real estate companies and financial institutions (especially private ones).

GOE efforts are not confined to securing houses for disadvantaged households but are extended to improving their living environments/services/standards to be healthy and productive. This can be illustrated by presenting two cases of urban development projects, namely: “The Comprehensive Development for the City of Luxor”, and “Sustainable Ismailia Governorate Project”.

**The Future Housing Project**
In February 1998, her Excellency Mrs. Susan Mubarak called for a new social contract between the capable/wealthy and disadvantaged/poor groups of the society as regards housing. In March 1998, a non-governmental organization named “Gameyet el Mostaqbal” (Society of the Future) was especially established to supervise implementation of the project. The board of this NGO is composed of businessmen in real estate, manufacturing and construction. Thus, “The Future Housing Project” has been launched in an innovative way that builds up social solidarity and partnership.

The project is designed to construct 70,000 dwelling units with an area of 63 sq. m./unit, at an estimated total cost of L.E 2.1 billion, without the cost of land. This number of units will be implemented on three phases over a period of 6 years (15,000 in the first phase, 25,000 in the second phase, and 20,000 units in the third phase). The private sector responded quickly, as investors/wealthy people pledged to raise L.E. 1 billion over 6 years, thus covering 50% of the total cost. The state is to cover the other half of this cost, in addition to the supply of land with infrastructure and basic services. The project offers a subsidized credit in the form of soft loans of L.E. 14,000 per unit, payable over 40 years at 5% interest rate.

**4.2 City Development Strategies**

**4.2.1 The Comprehensive Development for the City of Luxor Project**

Luxor, is one of the world’s most treasured antiquities sites and it is on the exclusive UNESCO World Heritage Site List, listing 560 natural and cultural sites worldwide.

In 1989, the city of Luxor was given a special status by a Presidential decree creating the Higher Council for Luxor City (HCLC), modifying its boundaries, granting jurisdictional authority given to a Governorate. Luxor area had a population of 360,000
in 1996. Luxor city is the major population center in this antiquities area with about 175,000 residents at that time. It is located 635 km. South of Cairo, stretched approximately 5 km. north – south and 1.5 km. east–west. Tourism and related services employ about 42% of the total labor force. Agriculture is the second employer (29%). Industrial production is insignificant (6.3%) and focuses on tourism–related products (e.g. rugs, carpets, papyrus, alabaster).1

City of Luxor is facing many problems. Urban sprawl threatens historical sites as well as agricultural land. Many parts of the city are lacking infrastructure. Cairo–Aswan railway track generates vibrations that threaten the safety of temples. Raising underground water table poses a similar threat. Uncontrolled cruise traffic gave raise to serious environmental problems, such as sewerage and other discharges from the vessels. Rapid and uncontrolled growth of cruise travel has brought serious traffic and environmental troubles. Luxor needs to maintain its viability as a desired tourist destination, and accommodate the rapid expansion of tourism and agriculture.

Ministry of Housing, Utilities and Urban Communities has extended technical assistance (together with UNDP and HABITAT) to the Higher Council for Luxor City to formulate and implement a strategic development plan for sustainable development of Luxor. The project will create an efficient framework for guiding development, attracting investment from the private sector and international institutions for priority projects; establish a realistic program to deal with the deterioration of the monuments and upgrade the surrounding sites; produce physical plans and feasibility studies for two new settlements (one of them is a residential city and the other is a hotel zone) in order to attract urban growth away from the existing resources and to facilitate future developments of tourism and related industries; involve the local community in the development process and encourage the involvement of private associations in linked activities; create a diversified employment base in greater Luxor to increase the stability and sustainability of its economy; improve the standard of living especially the disadvantaged groups through the implementation of Sustainable Livelihood Approach (SLA).

SLA in Luxor entails activities directed to link macro with micro levels of both investment and administration in order to enhance governance and stimulate economic development. It is intended to benefit youth/women/disadvantaged groups in specific issues of job creation and poverty eradication. In order to achieve its intentions, SLA program came out with five projects, namely:

1) incubation center for small industries in Luxor;
2) Technical Access Community Center (TACC);
3) the implementation of five community action plans through NGOs;
4) Initiation of a Micro Start Credit Program (MSCP); and
5) start up of skills building programs for disadvantaged groups.

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1Thematic Committee- 6 - 8 June 2001- Shelter programmer and City Development Strategies in Egypt.
Consultant Developer and Council of Luxor city CDCL project is using urban planning and management techniques developed by the Sustainable Cities Programme (SCP), particularly consultations and working groups as a participatory interface between the international consulting consortium preparing the development plan and the interested parties. The working groups have assessed the current situation, highlighting major issues, problems, development needs and deficiencies. Furthermore, the working groups provide inputs to the consortium and participate in the decision–making process regarding proposals.1

The CDCL had an executive unit, which guided the project through the major activities. The CDCL Project proposed that the structure will take the form of a board of directors. This board will be sponsored by the first lady, Mrs. Suzan Mubarak and headed by the Prime Minister as its chairperson and with representatives of concerned parties as well as the Governor of Luxor. This board of directors maintained a clear vision for the development of Luxor, and made sure that implementation of all the individual investment project is done in accordance with the vision as stated by the CDCL. This board did not supersede the role of the City Council of Luxor, but guided the activities in a manner that enables inter-ministerial coordination.

Through the participatory approaches used, including city consultations and Thematic working groups, the project has been able to ensure involvement of various parties in the comprehensive development planning process. The project was organized by a donor round table to fund the plan.

It has to be mentioned that the project proposal presented in 1989 was not executed as intended. Therefore, the big efforts of the most senior and best planning professors in Egypt were lost to transform this huge area in Egypt into residential regions. The main reason behind this neglect was that the irrelevant decision makers were directing the focus of development toward the north of the country, at the same time ignoring the south. Today, after twenty years, we can observe that development efforts now are directed eventually toward the same region (Luxor) and with projects similar to what previous reports aimed but according to new political ways.

4.2.2 Sustainable Ismailia Governorate Project” (SIGP)

Ismailia Governorate area is approximately 4480 sq. km. approximately. It is located along the west and east bank of the Suez Canal. It comprises five cities (Markaz). According to 1996 census, total population is about 700,000 persons. Ismailia city is the capital of the Governorate with a population of about 221,000 persons.

Ismailia Governorate has a diversified economic base. Its climate and soil conditions promote the Governorate as Egypt’s significant fruits and vegetables producer. Its potentials for hosting recreational and tourist establishments are evident along the waterfront of Lake Timsah and Greater Bitter Lakes. Ismailia’s location as the hub–city

1 Thematic Committee- 6 - 8 June 2001- Shelter programmes and City Development Strategies in Egypt.
for the canal region puts it at cross roads to Cairo, Suez, Port–Said and Sinai. This location grants an attractive position for clean industries and exporting outlet for Egypt agricultural products. Also, the construction of El–Ferdan Bridge over the Suez Canal, the establishment of The Valley of Technology as well as El–Salam irrigation canal for land reclamation project will greatly contribute to the development of Ismailia Governorate.

The Governorate has common environmental economic problems, namely: the limited and low quality water resources, limited access of most human settlements to adequate waste water collection and treatment services, the small employment constrains inhibiting micro enterprises, entrepreneurs suffering from limited access to business management knowledge (mainly marketing and technology) and the failure to attract large scale private business and capital. Lake Timsah and Great Bitter Lakes are subject to acute pollution threatening the tourism industry and fishing activities. There are conflicts between urban expansion and agricultural activities. Also, land reclamation projects are putting more demands on water resources and cause environmental problems, particularly the increasing volume of drainage.1

Following the success of “Sustainable Ismailia Project” (SIP-1) – which only dealt with Ismailia City - the United Nations Centre for Human Settlements (HABITAT), the United Nations Development Programme (UNDP), the Danish International Development Agency (DANIDA), Social Fund for Development (SFD), and the Governorate of Ismailia had agreed to replicate and to finance similar projects to cover the entire Governorate. The project document of SIGP (or SIP-II) was signed in May 1997 and its activities have started in August 1997, and are being executed by the Ismailia Governorate, with UNCHS (HABITAT) as the cooperating agency.

The main objectives of the SIGP project were:

- Strengthening the local capacity to plan, coordinate, and manage environmental development through applying the Environmental Planning and Management Approach (EPM).
- Preparing long strategic development plans.
- Preparing public investment project proposals to mobilize funds, which in turn create job opportunities.
- Capacity building for different sectors of the society, including leaders, members of NGOs and CBOs, where women and youth has been given special attention.
- Because one of the priorities raised by the city consultations was slum upgrading in which many disadvantaged groups are living, an application was submitted to the joint World Bank / UNCHS, Cities Alliance for additional funding to prepare feasibility studies for upgrading two pilot areas (El-Hallous and El-Bahtini).2

Results can be summarized as follows: The environmental profiles of Ismailia Governorate and the four cities have been completed and training center rehabilitated,

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1 Thematic Committee– 6 - 8 June 2001- Shelter programmes and City Development Strategies in Egypt.
2 http://ipsnews.net/news.asp?idnews=38721
where project training activities are taking place. The training center, managed by an NGO, serves various sustainable development-training requirements within the Governorate. The environmental planning and management approach has been institutionalized as the Governorate has established a sustainable development council (chaired by the Governor of Ismailia) at the Governorate level, and other five committees for Sustainable Development at the city level. The Governorate has commenced working on activities of Cities-Alliance-Funded project aiming at producing feasibility studies for slum upgrading (social and physical surveys already completed). The project is also developing a framework for replication at the national level with the Ministry of Local Development, as the main focal point, together with other partners at the national level. Several projects were identified for each “Markaz” with a priority for two of them.1

Other projects have benefited from the Ismailia experience, “The national Environmental Action Plan Project” (NEAP), in cooperation with Ministry of Environmental Affairs; SIGP arranged a training workshop for heads of departments of environment in all Governorates of Egypt. The workshop was held at the sustainable development center for training and capacity building where the trainees were trained on different leadership skills that were acquired through SIGP project, particularly EPM process.

The Canadian Egyptian International Fund selected the Association of Development and Environment to be the implementing partner in Ismailia. So far the Canadian Egyptian International Fund has financed four projects.

4.3 City Development Strategies around the World - Examples

4.3.1 Example of Eco-City of Yazd in Iran

The theme of this part of the study is the green dimension of urban and architecture design in Yazd as an oasis in the middle of deserts in the centre of Iran where people were able to adapt to very hard climate condition throughout millenniums. Studying the residential tissues in this shows that the architectural characteristics of the ancient and traditional parts of habitation complex - before being modernized- are according to the new paradigms of eco-architecture, sustainability and ecological city theories at a time when the global environment appears increasingly fragile.

Timeless Way of Sustainable Building

Sustainability in any urban development is non-damaging to the environment and also contributes to the city’s ability to sustain its social and economic structures. The objectives of an agenda of urban design in a regime of sustainable development would emphasize the conservation of both the natural and built environments. Principals of sustainable urban design would place priority on the adaptation and re-use of existing building, infrastructure and roads, together with the re-use of recycled building

1 Thematic Committee- 6 - 8 June 2001- Shelter programmes and City Development Strategies in Egypt.
materials and components. Where new development is necessary, the pattern of such development and its structures should minimize the use of energy consumed in traveling between essential activities and also in the operation of the buildings. Sustainable development places a premium on the conservation of natural resources, wildlife and habitat protection. It also assumes high degrees of self-sufficiency at all levels of settlement structure.¹

**The Urban Structure of Yazd**

Yazd province is located in the central part of Iran; the neighboring deserts, as well as a scanty rainfall give the province a dry climate. There is a variety of climates in this province with altitudes of 850m to 4,055m (Shirkooh, whose summit is snow-covered all the year around). The average annual rainfall is 60mm. The temperature variation is so high in winter and summer, even at day and night, between +45 to -20°C, with the average being 11.9 up to 20.7°C. Most of the Yazd province is of a desert nature. The city has a 3000 year long history, dating back to the time of the Median empire, an ancient settler of Iran. In the course of history, due to its distance from important capitals and its harsh natural surrounding, Yazd remained immune to major troops' movements and destruction from wars, therefore it kept many of its traditions, city forms and architecture until recent times. There are common structural and physical features in the layout of cities in most of the desert cities. The complicated and interrelated factors that have shaped the historic architecture and urban form in desert regions are mostly affected by climatic characteristics. The urban form of traditional city of Yazd is highly centralized or inward looking.

Certainly, the orientation and relation to the environment has been of high importance in the planning of the city. The particular climatic problems caused the people of the hot, arid zone to find solutions through their settlements architecture. The high radiation and temperature in the summer, variation of temperature, seasonal variations from dry, hot summer to cold, dry winter, low humidity, limited water supplies and the dusty winds are the most important factors in forming the urban structure of Yazd.

In this “compact city”, high-density urban structures of mixed land use are thought to promote walking and cycling as the main modes of movement for short distances. While on an urban scale, the street appears as if carved out of a mass, yet in reality the wall defining it is a thin membrane at the building scale.

Concentrated urban texture diminishes the penetration of dusty wind into complex as far as heat-influence on the building surfaces. Covered passageways and narrow alleys with long walls in clay make the shade and thermal comfort conditions in the hot summers. In addition, their direction is made in a way to avoid hot summer sun rays and stormy

¹ Case study1: Yazd AREZOU MONSHIZADE, CRESSON Laboratory, National School of Architecture- Grenoble Pierre Mendès-France University
winds. The organic network of ways (passage, alley, cul-de-sac) has been made according to ground slope and underground water canals.\footnote{Case study1: Yazd AREZOU MONSHIZADE, CRESSON Laboratory National School of Architecture- Grenoble Pierre Mendès-France University}

The skyline has been dominated by fantastic mud brick towers, giving the city an incredible urban aestheticism. These wind towers serve three fundamental functions: to ventilate basements, to provide convective cooling and to cool the interior mass of the house. “These wind towers are rectangular with facing openings to catch favorable wind and the slightest movement of air and direct it downward into underground spaces. This model has become a part of the identity of this city in coping with natural forces for many centuries, yet now it has been abandoned in modern architecture.

The form of developed part of Yazd has entirely changed. In the new city set out in the form of a grid, the streets and alleys are not similar to the past with the protection role that provides the shadow for passenger in hot summer.

The Residential Building Design in Yazd

The form of the residential building is also inward looking and is centralized by a deep courtyard. The built spaces around this court have been designed to maximize its passive potential to warm the house in winter when sun angles have the maximum penetration into the winter room.

Architects have used the massive form of the building, with rubble filled spaces in walls and roofs, hypercausts made of partially filled cavities, and shade walls and roofs not only to ensure that the sun never fell on, for instance, a thinner part of the roof, or inside rooms in summer with angled walls, but also they used the curve of the domes and vaults to minimize solar gain into the room below and speed up heat loss from the room through ventilated cupolas.\footnote{Case study1: Yazd AREZOU MONSHIZADE, CRESSON Laboratory National School of Architecture- Grenoble Pierre Mendès-France University}

The habitants, according to the space functions and their climatic conditions in the different seasons, choose how to spend their time: in the canicular hot and dry summer’s days. Almost the Underground spaces and the space in the shadow (north-east, south-east) are being used for running away from this heat. These underground spaces have the more low temperature compared to the up spaces. In the winter days, the living rooms face south toward the low winter sun; provide the conditions for the reduction in need of fossil energy.

The principles of Sustainable Architecture Gleaned from Vernacular Architecture.

In the urban scale, the model of this compact city of Yazd is designed according to principles of the sustainable urban design. “Certainly the compact city and densification of development” can reduce the use of fossil fuels for transport and town heating, as well as reduce the use of land and the cost of urban infrastructure. The organic model
for the city is most in tune with the concept of sustainable development as, in particular, it takes on the attributes of nature’s ecosystem.”

According to the urban task force, the sustainable city –or more accurately speaking, a city that approximates to a sustainable form—is a compact and flexible structure in which the parts are connected to each other and to the whole, with a clearly articulated public space. At the smaller scale, there are a number of design principles of buildings which are going to be studied and analyzed here, resulting from this vernacular architecture.

**Social Dim- (Compatibility with Regional Context)**

The vernacular tradition has much to teach in the art of relating the building to its site. This common-sense approach to the location of a building on its site and the organization of the building elements to mitigate the adverse effects of a hot summer has valuable lessons for the greening of building design. In this case study, buildings are designed to match with local climate and the environment, the living rooms in the southern parts and bedrooms with the main windows maximizing the benefit of any sun for the cold winter. The summer spaces, in the northern side and wind catcher show the solutions for compatibility with the climate and local conditions.

**The Life Styles**

The last subject, which also needs more consideration, is the different ways and styles of living for maximizing the use of environment. It seems that the cultural particularities according to people's view to the world and their environment characteristics help to adapt and respect the laws of nature. The most important requirement for life in desert is to have personal particularities in compatibility with natural environment as much as of which are social. We can find them clearly in peoples everyday life in this region. The first is having the working mentality for defeating the hard conditions and transforming environmental limits into potentials. The second is to be sufficient to what the nature gives to the inhabitant though little. The third is thinking ahead, a characteristic imposed by limits of hard nature for earning one’s living that sustain him/her and future generations without fear of the future. These three characteristics help the person to sustain the life at least in good conditions. Attempts must continue generation after generation. This approach helps people to better know their needs and environmental potentials. Citizen participation in development and the political structures, which sustain it, is clearly an essential requirement of local and regional government in a sustainable world.1

**Economic Dim- (Using The Local Materials)**

The second principle gleaned from this study is using local regional building materials for construction work where possible; it is preferable to use materials requiring low inputs of non-renewable energy in fabrication, transportation to the site and in the construction process itself. Those materials, which are labour-intensive rather than energy-intensive in their extraction, covering and construction being more

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1 Case study 1: Yazd AREZOU MONSHIZADE, CRESSON Laboratory, National School of Architecture- Grenoble Pierre Mendès-France University .
environmentally friendly and equitable in terms of the distribution of resources, are more acceptable for purposes of sustainability. The used materials such as clay and mud in this region require people’s efforts only to build a structure from them. It should be mentioned here, that most people on this planet live in buildings made from earth. Building from earth does the least damage to the environment: It is close to the building site and does not involve transport energy costs. Until the later stages of the industrial revolution in the nineteenth-century, settlements were constructed largely from building materials obtained close to the site. Moreover, when no longer required, the building decomposes naturally and without pollution, return to the earth from where it came before. In OECD-countries there are more and more people asking for such buildings due to their natural and healthy qualities.

**Re-Using and Re-Cycling**
The forth principle features the priority given to
- Conservation.
- Re-use of buildings.
- Infrastructure.
- Materials.

These are buildings designed for flexibility so that a mix of uses can be accommodated under the same roof and so that floor plans are “robust”, in the sense that they can be adapted for different uses during the lifetime of the building. A building, which can be used for many different purposes and is easily adapted to serve many different activities during its lifetime, has a flexibility that reduces the need for demolition and rebuilding to serve changing needs. Re-using and recycling of building materials and components in the construction of new building and infrastructure was the main feature of this regional building. Nowadays, the flexibility of ancient buildings has allowed them to be re-used with the different functions such as schools, offices, restaurants, and hotels in the traditional architecture.  

**Environmental Dim – Reducing the Environmental Damage**
Another principle is to mitigate the effects of any environmental damage and to avoid the materials that cause environmental damage. Today, all new buildings cause environmental damage, no matter how carefully they are designed. Much of the atmospheric pollution is caused by the burning of fossil fuels in the creation of energy to support city life. This energy is used in the building of city structures (energy capital); during the lifetime of the structure; and in the transportation of people and goods between and within cities (energy revenue). It is considered that two types of energy are used in building: energy used to construct the building and energy used to service, operate and maintain the building.

The pollution causing environmental damage can be directly attributed to the construction process. “For example, 50 percent of the world’s fossil fuel is directly

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related to serving and using building materials, transporting them to the site, and erecting them as part of the building.”

Moreover, using the local materials, not wasting the materials by reusing them, reducing the transport between the site and the resource, making the restoration possibility of building help to reduce the environmental pollutions.1

4.3.2 Sustainable Development in a Desert Climate in Phoenix- Arizona

The Downtown Phoenix Plan provides an assessment of the conditions affecting the thermal comfort of pedestrians and the Urban Heat Island Effect in Downtown Phoenix Arizona. It also provides a set of principles, that may be implemented in the form of zoning standards and building code regulations that, when adopted, will create a more comfortable and sustainable downtown environment. It is based on an extensive year-long research project by Arizona State University (ASU) and the architectural firm Studio Ma.

Thermal comfort is a key to the success of Downtown Phoenix. Extreme summer heat has resulted in stressful street level conditions in the Downtown area, to the extent that is has a negative impact on the development of a pedestrian-friendly, civic environment.2

Acceptable levels of thermal comfort can be achieved in Downtown through an approach integrated to the design of the urban environment that includes street and building proportions, open space, urban forestry, building design and appropriate building materials.

Urban Dim – of Heat Island

Urban Heat Island is the temperature difference between densely populated urban areas and the surrounding countryside. This effect is most pronounced during evening hours and is due in large part to the increased thermal storage created by urban materials which, like concrete paving, tend to be dense and impervious to water. By replacing native vegetation with pavement, less moisture is absorbed by the ground and by plants resulting in the loss of evapotranspiration.3 Building materials are often darker than natural materials and have a lower ability to reflect solar radiation back to the sky resulting in further increases in surface temperature.

Examining the Phoenix region over the 20th century, average annual temperature has increased 5.53°F but a rapid threefold increase has occurred in urban areas of the region. The 0.86°F/decade warming rate for Phoenix is one of the highest in the world

1 Case study1: Yazd AREZOU MONSHIZADE, CRESSON Laboratory, National School of Architecture- Grenoble Pierre Mendès-France University
3 Evapotranspiration is a term used to describe the sum of evaporation and plant transpiration from the Earth's land surface to atmosphere. Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and waterbodies. (Wikipedia)
for a population of its size and can be compared to other cities to highlight the effects of rapid urbanization in the region.

The US Climate Assessment conservatively projects that the Southwest will see a 5.4°F increase in mean annual temperatures by 2100. This increase is much higher than the 3.1 °F increase in the last 70 years. Urban heat island increases are likely to be much higher in the coming decades than in the past. ¹

**Environmental Dim - Pollution Street Canyons**

Airborne pollutants accumulate in the urban canopy layer and rely upon an effective airflow to be “flushed out” and removed. Products of internal combustion engines, Carbon Monoxide and Nitrous Oxide accumulate in dense urban canyons. Along with dust and diesel emissions, this forms the background pollution found in most dense urban streets. Studies conducted in Europe (Mazzeo 2006) indicate that pollution levels increase in a 1:1 street canyon when wind speed falls below five miles an hour due to the lack of sufficient vertical circulation in the street canyon.

Narrow streets and large buildings perpendicular to the direction of airflow restrict the movement of air, directing it up and over the built up urban area known as the “urban canopy layer.” Studies indicate that a 1:1 street canyon proportion is at the lower end of the threshold for effective wind ventilation with the ideal width to height proportion being 0.65 (Oke 1988). In addition, streets arranged as long channels perpendicular to the wind, while allowing effective flow, do not produce sufficient turbulence to flush out particulates from the street canyon.

**Social Dim – Urban Impact (Form Massing Standards)**

Given the assumptions and simulations noted above, the Urban Form Project is proposing the following building massing, street wall and open space guidelines for high rise commercial and residential districts which should be considered when developing urban form standards:

- Maximum lot coverage of 80-90% (or 10-20% open space) not including alleys.
- Building base not to exceed 8 stories.
- Building projections of 10m permitted in the right way (creates effective street canyon proportion of 1:1.5).
- Maximum lot coverage of 50% above 8 stories base.
- Towers to be located in diagonally opposite corners.
- The average street canyon proportion is not to exceed 1:2 – measured over the entire block (average of base and tower).
- Minimize building sections to encourage natural ventilation.²

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Following these guidelines will result in the minimum required street level shading while also allowing for appropriate levels of sky view and air circulation. Limiting lot coverage, as discussed, will reduce the overall proportion of building mass to open space to 50% which enhances air movement in the street canyon. The checkerboard tower placement and open space erosion of the base block creates passages for wind movement in the east-west direction as well as creating turbulence within the urban canopy layer which enhances heat exchange and the removal of air pollution. The distribution of the open space through the block also enhances air movement through natural, cross ventilation; thereby reducing the need for air-conditioning spaces with operable windows and providing air movement for pedestrian comfort. Distributed open space creates spatial variety in the urban environment and can be enhanced through the development of porticoes, pocket parks, courtyards and through-block connectors. A number of large Downtown developments such as Renaissance Center and the Wells Fargo Center have used these features to create a pleasant pedestrian network linking City Hall to the Convention Center. The proposed urban form guidances are designed to continue and enhance this type of development, connecting the core to other parts of Downtown.

Economic Dim -Policies – Building Form and Shade in the Phonix Climate
Standards related to thermal comfort and heat gain are described below. Research is presented, and standards based on the research are then included as policies.
- Adopt thermal comfort and sustainability standards for building form in Downtown to optimize thermal comfort, minimize heat gain, and enhance air flow.
- Encourage the location of buildings and shade structures to maximize shade over road intersections and mid-block pedestrian crossings over major streets.
- Construct shading materials for trellises and canopies of low mass, non conductive materials.
- Prepare a development standard requiring 50 percent of habitable roof areas, including parking decks, to be shaded with trees, trellis vines, photovoltaic panels, or a combination thereof.
- Prepare development standards for roofing materials to reduce heat gain using the Standard Reflectivity Index (SRI).
- Consider establishing standards for the use of permeable paving materials for public and private development.
- Prepare development standards requiring construction using wall materials with high levels of reflectivity and emissivity with smooth surfaces and the ability to emit heat to the surrounding environment.
- Provide development standards that require a minimum of 50 percent shade in publicly accessible plazas, courtyards, and other public spaces (publicly or privately owned).  

4.4 Lessons Learned for Egypt

4.4.1 Lessons from Luxor & Ismailia

A central lesson derived from the two housing projects is that city development efforts should be based on culturally relative values. This cultural relativism ensures a full support and participation of all citizens. It also magnifies its effects through a general tendency for replication in other locations in the country or in the society.

- International cooperation facilitates the adoption and the implementation of objectives and the approaches of the HABITAT Agenda. Consequently, this cooperation ought to be enhanced through increasing technical assistance and financial support. The effectiveness of this cooperation can be ensured through a deep understanding of the development needs and other cultural considerations of each country, especially developing ones.

- City development projects illustrate the importance of building trust and maintaining support from the relevant political authorities in a SCP project. For the SCP / EPM process to succeed and to spread, the governmental partners need to adopt it – and commit to their own resources.

- The public sector agencies saw that the actions and projects developed in a participatory way through the SCP / EPM process offered an opportunity for more effective and sustainable development interventions than some of the more traditional centrally-planned projects. As a result, various Government bodies “picked up” proposals (many government officers were on the working group) and contributed to the majority of funds to the actions which have been implemented to date, although funds have continued to come from a variety (including private and public) of sources.

- City development projects should perhaps put greater emphasis on awareness raising, training, and capacity building in the very early stages of project implementation, to go in parallel direction with issue identification and clarification. This awareness is needed, not only during the implementation phase but also, thereafter to attain sustainability.

- To raise awareness in city development projects, both of the general environmental situation and specific local environment issues, requires the use of professionally organized and systematic public information tools and methods. In particular, reaching different target audiences requires different approaches – and requires specialist expert and the budget lines necessary to properly finance public information activities.

- Perhaps, some stakeholders may not be willing to cooperate or share information and some of them may not always be able to attend the group meetings. Therefore, careful selection of stakeholders, the complete explanation of the EPM process to and orientation of those on their expected roles and inputs, should be given considerable attention.

- Project management, which provides consistent leadership, based on a sensitive understanding of the local area, an ability to build consensus and mobilize partners, and skills in negotiating cooperation and agreement has been a factor mentioned by nearly
all persons with knowledge of the indicated projects. Equally important, in the SIP case what appears as the most important factor has been the ability of project management to maintain a low profile, letting other organizations and actors take a lead - and take “ownership”.

- One of the lessons is the need to get potential funding sources involved at an early stage in developing solutions to problems, and projects to implement those solutions.

- It is worthy to indicate that three active, inspired, and highly qualified women direct the three city development projects presented above. It is evident that Egypt is fully aware of and genuinely practices gender equity.

**4.4.2 Lessons from Yazd and Phoenix**

In spite of harsh climatic conditions, urban spaces and architecture in the arid and hot region that have been dealt with in this paper identify a continuous, evolution throughout ages.

- In an overview, the compact form of city, wind towers, orientation of buildings to sun and wind, arrangement of the summer and winter spaces, using local materials and clean energies as the environmental potentials, the narrow and covered passageways, the underground spaces, deep courtyards, thick walls, using the water and plants, reusing the materials, are some considerable solutions in urban and architectural design of this region for having the green city even in the actual theme.

- It is useful for us to learn from history that settlements, at best, are manifestations of human creativity. From their very origins people have planned their settlements and there is much that we can learn from the ideas and design concepts, skills and even rules that have been adopted throughout history with conscience.

- The principles of sustainable architecture gleaned from vernacular architecture of Yazd showed that old cities can be manifestations of a culture of sustainability, passing on the baton of urban stewardship from generation to generation in a friendly relation with nature.

- Future cities can learn a great deal from this model, even if we can not simply import traditional practices into the 21st century unchanged. Such examples like Yazd show that there are limits to the growth of cities, in the past, as well as today.

**4.5 Arab Experience of Sustainable Cities Activities**

**4.5.1 Constraints for sustainable development in the Arab Countries**

Efforts to achieve sustainable development in the Arab Countries are facing major constraints, which include:

1. Instability resulting from the lack of peace and security in the region and the inability of the world community to resolve the occupation of the Palestinian
and other Arab territories on just and equitable bases and in accordance with the relevant UN resolutions.

2. Escalating poverty, illiteracy, high population growth rates, unemployment and the debt burden and increased debt servicing, as well as the continued unsustainable pattern of natural resources management.

3. Continued population increase and the unbalanced distribution between rural and urban areas, spreading of slums around major cities, increased pressure on the natural resource base, as well as on the public utilities and services, air pollution, and solid waste accumulation.

4. The severe arid nature of the region, with little and sparse rainfall, very high temperatures in the summer months with high evaporation and evapotranspiration leading to frequent droughts and spread of desertification.

5. Limited areas available for agriculture, water scarcity and shortage of non-renewable sources of energy.

6. The limited capacity of academic and research institutions and the inability to keep up with the advances in providing technologies for sustainable development.

7. The relatively limited experience of the civil society in participating in the process of development and implementation of sustainable development programmes and activities.

8. The adoption of technologies and approaches which are not suitable for the social, economic and environmental conditions of the region.

9. The embargo inflicted upon some Arab countries.

4.5.2 Challenges and opportunities:

There are also challenges and opportunities that could be utilized to achieve sustainable development in Arab countries:

1. Combating poverty which represent a basic challenge to the efforts of achieving sustainable development in the Arab Region. This requires judicious utilization of available resources and the establishment of an environment for conducive investment at the national and regional levels, a mechanism for achieving social security at the national level, in addition to establishing an integrated mechanism between the Arab countries, giving priority for employment of Arab labor force.

2. Addressing the rapid increase in population in the Arab countries, which in spite of the observed reduction over the last 10 years still remains high. Giving greater emphasis to the education of women, strengthening of religion and social programmes, which will raise the level of awareness of the importance of family planning, childcare and the uncontrolled population increase.

3. Dealing with the increase in the percentage of youth in the population as a positive indicator of human resource, raising the challenge of providing the suitable environment for their education, training and employment.
4. Curbing the increased immigration from rural to urban areas which should be given priority in development planning such as planning for development in the areas of infrastructures, health and education services to meet the needs of the rural areas and thus discourage immigration.

5. Sound management of the use of natural resources, especially water resources and energy that requires promoting of sustainable production and consumption, cooperation and integration between Arab countries towards the rational use of these resources and achieving Sustainable Development.

6. To set the foundations of the Arab common market and work towards the integration of national economies, which would create a Pan Arab market and provide strong support for the negotiations with other economic groupings, including the WTO.

7. Transfer, integration and ownership of modern technologies suitable for the economic, social and environmental conditions in member states. This also means the assessment of new technologies before importing them while ensuring that any negative impact is mitigated before adopting it in the region.

8. Maintenance and investing in the cultural and religions heritage that is unique to the Arab region towards achieving SD.

9. Dealing wisely with globalization and the impacts that may constraint achieving sustainable development in the Arab Region. The countries of the region are to adjust their economic and institutional arrangements to deal with globalization and to establish a regional economic block on the bases of the cultural and economic background to utilize the advantages that may be associated with globalization.

### 4.5.3 Lessons Learned

Based on that situation and experience, effective local development planning, designed as a project, must be based on:

- A strategy which enhances local resources and establishes linkages between economic, social, environmental, and cultural processes;
- A pragmatic program based on the local realities and capacities;
- An efficient institutional framework which is capable of implementing and enforcing the local development program.

**Target Audience:**
Prominence will be given to mayors, local planning officers, NGO representatives and local participants who will comprise at least 50% of participants; central government representatives will be allocated 25% of places; and bilateral/International organizations, individual experts will be given the remaining 25%. The target number of participants shall be approximately 80 participants.

a) Mayors/municipal and local planning officers/NGOs:
Mayors and local planning officers: Representatives from municipalities and local participants working with GTZ, Jordan (PAMD project, three pilot municipalities), Palestine, Yemen, Syria and Egypt; others: Lebanon (ARAL), Egypt (Alexandria), Iran; working with EU, Jordan and Lebanon. One or two mayors and/or planning officers from the ‘north’ (Spain, Germany or France)

Private Sector:
Environmental Quality International (EQI), Egypt (The Siwa Sustainable Development Initiative)

b) Ministries/ governmental agencies:
Egypt: Ministry of Planning and Local Development
Jordan: Ministry of Planning and International Cooperation, Ministry of Municipal Affairs.
Lebanon: Office of the Minister of State of Administrative Reform (OMSAR), Ministry of Interior and Municipalities
Palestine: Ministry of Planning, Ministry of Local Government
Yemen: Ministry of Planning and Development, Ministry of Local Administration

c) Bilateral, International Organizations, Experts, Academics:
- GTZ Jordan, Germany.
- World Bank Institute (KNA-MENA + WBI Washington)
- EU Jordan.
- United States Agency for International Development (USAID) Jordan
- United Nations Office for Project Services (UNOPS), Jordan / Iraq.
- United Nations Human Settlement Programme (UNHABITAT), Iraq Program
- UNDP Iraq
- International Labour Organization (ILO) Iraq
- Glocal Forum
- United Cities and Local Governments (UCLG)

Results:
Although these experiences were not the primary motive for the comprehensive strategic development plan, they succeeded in incorporating the environmental dimension in all components, programmes, projects and activities. Social and economic achievements are clearly visible in upgrading slum areas (Ex: in Alexandria). Participants’ councils have been formed for each slum community, and they took part in managing the upgrading process. It is clear that, when residents fully participate in the process which relates to their livelihoods, sustainability is possible.

Options for action:
- Support and leadership from the Governorate were essential elements.
- The cooperation of both the Governor and Secretary- General has been a key factor in achieving a highly significant improvement in the quality of life for citizens.
- The municipality recognized the importance of coordination, participant's contribution, and having a realistic approach towards implementation as integral part of the planning process.

Therefore, these experiences offer an excellent opportunity for citizens and urban managers to incorporate environmental issues into an overall city development framework. However, each city has its own unique needs, and it is necessary to understand the local community culture in order to tailor the CDS process which is concerned with environmental issues. It is also important to have a CDS team with developed communication skills to ensure that participants, regardless of their background or affiliations, actively participate in the process. Environmental issues are clearly important to urban participants, who are likely to support the integration of environmental issues within the CDS process in other cities in Arab countries.

4.6 Decision-making process in Egypt and Degrees of Local Autonomy

The CFS-Project will focus its major efforts on the local level. Therefore it has to be understood how the local administration and the local activities are linked with other policy levels and areas and how the local level is embedded within the Egyptian system of governance. An overview is given in this chapter.

Introduction

Government in Egypt has a long history of being highly centralized. Nonetheless, considerable attention has been placed on decentralization and devolution in recent years, much of it prompted by the international community, but much of it is based on indigenous, strongly held views.

As a result, over the past three decades, a variety of local government related laws have been passed and amended in favor of empowering local authorities. Yet, the traditional government structure remains firmly in place. Local governments are administrative units of the national governments and its ministries, with little authority having been delegated to the field in this de-concentrated structure. There are, however, some promising, though slowly, evolving signs of change. A local political structure has been established parallel to the administrative structure. Some fiscal devolution has taken place, albeit, outside the traditional budget structure.

In much of Egypt’s history, the hegemony of the state has constrained local development and resulted in a highly centralized approach to development. This checked local participation, local initiatives and prioritizing of local needs. A greater allocation of resources was given to the decision making centers, the urban areas and the capital, resulting in disparate and inequitable development across the various regions of the country.

Problems of the Current System

The local administration system has experienced several consecutive reforms on both the institutional and legislative levels. Nevertheless, there still exists a gap between
aspiration and reality, to revitalize developmental contributions by local administration units and to bring about comprehensive and sustainable development. In this context, the local administration system faces several problems, including the following:

⇒ There are multiple control and regulatory bodies over local administration units from the executive authorities, the People’s Assembly and Judiciary at the central or local levels. This multiplicity of control and regulatory bodies reduces the local administration units’ autonomy in administering their affairs and using their resources in serving development.

⇒ Relationships between Popular and Executive Councils are typically ambiguous. The role of EPCs is predominantly advisory and nonbinding to Executive Councils that have the right to reject the resolutions and recommendations of the former. The abrogation of the right of interpellation and vote of confidence mechanisms has curtailed the control role of EPCs over the work of Executive Councils.

⇒ Local administration performance is characterized by complicated and lengthy procedures, conflicting functions, widespread manifestations of corruption and low efficiency of local administration employees.

⇒ Local citizen’s political and developmental participation is remarkably low. Levels of participation continue to regress and voluntary efforts exerted as a contribution to local development are, with few exceptions, decreasing.

⇒ Evidence that local units have no deciding voice in the preparation of the investment and current budgets is manifested in the fact that both budgets are centrally prepared and decided upon. The local units only suggest proposals of local needs according to previously prepared priorities. The roles do not serve to build local capacity or to ensure that local priorities are met. The conception of a local plan is one-sided, as indicated by Article 118 of Law No. 43 for the year 1979 which states: "The local unit is to determine its needs according to well prepared priorities. It is to accumulate these needs and co-ordinate them in a draft local plan to be approved by the concerned local Peoples' Council, and transmit them to the governorate Peoples Council."

⇒ The current situation shows that local division is ineffective due to disparities among local administration units and lack of socioeconomic integration within each unit.

⇒ The current division of the regions and governorates is not based on any developmental rationale. An analysis of their potential suggests a regrouping of the governorates to form developmental regions. It also suggests modification of the boundaries and the number of governorates. Changes such as these would require a thorough study of alternatives and a serious review of previous proposals.

⇒ Local Units especially rural ones are overtaxed

⇒ Local Units fall short in administrative competence especially accounting, auditing and decision-making.

Empowering Local Entities - Success Stories and Lessons Learnt

• A development-driven framework requires that local government entities would be given the power to:
⇒ formulate strategic plans,
⇒ formulate projects and set their priorities,
⇒ take development initiatives,
⇒ implement programs/projects,
⇒ be accountable for results and effective utilization of resources to local communities and stakeholders.

- The outstanding successes achieved through the local initiatives taken in Alexandria and Qena governorates, as well as other governorates such as Fayoum are indicative of the great potentials that local entities have if these are related to a developmental vision, guided by innovative leadership and channeled and directed to developmental ends. Empowerment should not stop at the governorates’ level, but should penetrate down into the levels of city, district and village.

- Over the last seven years, the central government has increasingly allowed and encouraged local initiatives to take place. Experiments in the governorates of Alexandria, Qena, Damietta, Fayoum and others provide models of this growing decentralized alternative. Although the leaderships of these governorates all operate under the same legislative, administrative and financial frameworks of all local administration units, they were able to work round constraints and achieve a measure of distinction.

1. Alexandria: The governor of the Alexandria Governorate enlisted businessmen as anchor partners for development goals.

2. Qena: The governor of the Qena Governorate relied on citizens and the administrative machinery to tap resources for development.

3. Damietta: In Damietta, the governor supported an experiment that took a Sectoral dimension with a focus on the furniture industry, this being the governorate’s mother industry, and with NGOs as anchor partners.

4. Fayoum: In Fayoum, the governor negotiated with local citizens and donors to overcome serious forces of dissent rooted in problems from the lake’s pollution and the consequent loss of income in impoverished pockets of the fishing community.

- The four experiments relied on an applied value system associated with good governance, including citizen participation, accountability, transparency and integrity. Taking Qena as an example, the following is noted:
  ⇒ the resource mobilization strategy in Qena rested on Law 50 for the year 1981 giving governorates the right to impose services duties, subject to approval by the Cabinet. (Laws 52 for the year 1975 and 43 for the year 1979 also give governorates the right to levy taxes and duties, without having to obtain the Cabinet's approval).
  ⇒ Qena Governorate also mobilized other available resources to secure the necessary funding to push forward development plans within the governorate, including rural and urban fund resources, rural contingency plan appropriations, governorate budget appropriations and financial appropriation for the governorate administrative machinery and services directorates.
In the Qena experiment, discipline and commitment to law enforcement, as well as services improvement resulted in the creation of an investment-supportive climate. The governor's role was to promote the principle of equitable leadership, encourage clear communications with the citizenry, use open meetings as means of follow-up, and encourage accountability, as well as responsiveness from his staff to local needs. The governor also relied on expert advice from research centers and universities.

In Qena governorate, a renovation program was launched seven years ago. The governor mobilized local civic participation and geared it to generate additional resources. The governorate took a systematic approach to renewal by using surveys and needs assessment studies to identify local developmental priorities. The local community was persuaded to finance the supply of local public goods in areas such as education, health, employment and recreation. Additional public resources, based on results of the needs assessment, were further generated from the private sector and from the central government.

- **Alexandria** also had a successful experience that started in the 1990s, whereby the city began a revitalizing trajectory that totally transformed it. The governor relied initially on the contribution from and support of the local business community, and the executive branch of the governorate established a highly successful working partnership with business to implement various renovation projects in the city. The projects’ visible successes widened the scope of the partnership and increased the governorate’s negotiating power vis-à-vis the central government. The governor was selected as the most effective visionary Arab manager by the Dubai Program for Performance Distinction.

- Similar processes and initiatives are taking place in other governorates such as Fayoum, Assiut, Menoufia, and Sharkia, and are indicative of a significant degree of support from the national government.

- A number of lessons and conclusions can be drawn from the success stories, both internally and on the international level:
  1. Decentralization, if taking place within a local developmental vision and relying on local community participation, has a high pay off. Decentralization can be effectively introduced and implemented using a hybrid of bottom-up and top-down approaches, driven by local initiatives rather than countrywide norms.
  2. Leadership makes a substantial difference in the success of local development and initiative.
  3. The embedded social capital in the local communities represents a key ingredient for the success of local projects and initiatives.
  4. With some innovative approaches, local administrative entities establish coalitions and partnerships with local stakeholders geared for responding to local needs and priorities.

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1 Example in Alexandria:  
5. Investing in knowledge and information about local needs, preferences and priorities is essential for the proper direction of local programs and projects.

6. It is important to resolve the dilemma of the relationship between ‘old’ local administration units and ‘new’ urban communities in such a way as to maintain the level of development in new urban communities and realize the consistency between both ‘old’ and ‘new’ local communities.

7. International experiences suggest that there is an increasing body of applied knowledge and experience of new approaches to local development. This focuses on regional competitiveness, economic clusters and competences. They, in turn, apply non-traditional strategic analysis of region-wide activities and sectors to integrate SWOT analysis across activities and to identify the competitiveness of infrastructure across regions. This approach has been applied internationally to regions, metropolitan areas and centers and industrial districts. Cluster analysis of the furniture industry in Damietta, the textile and garment industry in Shubra El Khema and integrative linkage potentials among firms in the new industrial cities, are examples of useful potential applications.

8. Currently, no local entity in Egypt runs its affairs on the basis of a strategic plan. It might therefore seem useful to tie the devolved powers and central government support to a strategic plan using the applied body of knowledge at the levels of developmental regions and governorates. This implies that the regions and governorates should be empowered to plan and achieve developmental goals. This also requires that they would be held accountable for their results. The role of the central government, through the Ministry of Planning and the Ministry of Finance would be to align local planning with the national strategic plan and to provide the financial aid, support and incentives that harmonize and integrate the development of various regions and governorates. A great deal of this harmonization and integration among governorates would take place within each region through its region’s development plan.

9. An international experience indicates that economically successful regions or local communities typically are those which have methodically set about building a platform for change and a planning framework. Developing such a program in turn entails the involvement of regional or community leaders to harness change, through a range of media, as well as community and organizational support groups. By educating the community and members of organizations about the benefits of managed change, the process minimizes defensive strategies that may come in response to change. Once a platform for change has been established, a steering committee comprising business community, government and other stakeholder interests, could be held responsible for developing an economic development strategy and plan.
<table>
<thead>
<tr>
<th>City</th>
<th>Sustainable Development Dimensions</th>
<th>Economic</th>
<th>Ecological</th>
<th>Managerial (Governance)</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yazd Iran</td>
<td>All Financial Dimensions by Government</td>
<td>using local regional building materials for construction work where possible</td>
<td>By Reduction of Environmental Damage</td>
<td>Re-Using and Re-cycling The forth principle features the priority given to: - Conservation. - Re-use of buildings. - Infrastructure. - Materials.</td>
<td>The vernacular tradition has much to teach in the art of relating the building to its site.</td>
</tr>
<tr>
<td>Phoenix Arizona/USA</td>
<td>All Financial Dimensions by Government</td>
<td>Prepare a development standard requiring 50 percent of habitable roof areas, including parking decks, to be shaded with trees, trellis vines, photovoltaic panels, or a combination thereof.</td>
<td>Narrow streets and large buildings perpendicular to the direction of airflow restrict the movement of air, directing it up and over the built up urban area known as the “urban canopy layer.”</td>
<td>Prepare development standards requiring construction using wall materials with high levels of reflectivity and emissivity with smooth surfaces and the ability to emit heat to the surrounding environment.</td>
<td>- Maximum lot coverage of 80-90% (or 10-20% open space) not including alleys. - Building base not to exceed 8 stories. - Maximum lot coverage of 50% above 8 stories base. - Towers to be located at diagonally opposite corners. - The average street canyon proportion is not to exceed 1:2 – measured over the entire block (average of base and tower).</td>
</tr>
<tr>
<td>Masdar Abu Dhabi</td>
<td>World's First 'Zero-Carbon' City will cost five billion US dollar plan</td>
<td>Abu Dhabi also plans to invest 350 million US dollars in a 100 megawatt solar power</td>
<td>The ‘Green City’ will house the Masdar Institute of Science and Technology.</td>
<td>This self-sustaining city is expected to provide up to 1,500 companies</td>
<td>The city would be walled on all sides, and house 50,000 people and 1,500 businesses.</td>
</tr>
<tr>
<td>Dongtan Shanghai</td>
<td>The estimated planning for the city and phases in the future will cost around 2.5 billion US.</td>
<td>It will have a diverse population, affordable housing, at least 30,000 jobs on the spot, schools and a hospital, to ensure it is not dependent on</td>
<td>The most original feature of Dongtan is its eco-friendly design. It will have an ecological footprint of two hectares per person, three times</td>
<td>The Government offers some project to save the life in Dongtan like: - None of the buildings is more than 8 stories high.</td>
<td>Dongtan, which will be built nearby, will have a population of 50,000 to 80,000 by 2010, rising to 500,000 by 2040.</td>
</tr>
<tr>
<td><strong>Austin</strong>&lt;br&gt;Texas/USA</td>
<td>Vision: “We want Austin to be the most livable community in the country.”</td>
<td>Austin Energy is funded through the inclusion of costs in customer rates. However, any increased costs due to efficiency measures or renewable initiatives are being offset by the decreased rates associated with not having to build new power plants.</td>
<td>Green Building The City of Austin started the first Green Building Program in the U.S. in 1991.</td>
<td>Income Qualified Programs Free programs are available to income qualified homeowners and to renters who have been in a home, mobile home, or duplex for a year.</td>
<td>More than 40,000 apartment units throughout Austin have received rebates for energy investments through the Multi-Family Program totaling over five million dollars.</td>
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<tr>
<td><strong>Chicago</strong>&lt;br&gt;Illinois/USA</td>
<td><strong>Funding</strong> Initial funding was greatly helped by a 1999 settlement agreement with Coming for $100 million.</td>
<td>Most of the multi-family EE activity in Chicago has been aimed at either city-owned or managed properties. 63 multifamily buildings - or 1,447 units - have been rehabilitated since 1988. Seven new multi-family buildings - 570 units – have been built so as to maximize energy efficiency.</td>
<td>Green Building because city buildings are expected to have a 100-year life, the city has made a huge commitment to designing and building superior new structures.</td>
<td>1. Conserving, protecting, and restoring natural resources. 2. Encouraging healthy environmental practices.</td>
<td>Mayor Daley has suggested that “encouraging environmental innovation will be beneficial for the health of both our citizens and our economy. Conserving natural resources, and encouraging environmentally efficient behavior from citizens and businesses, not only ensures the sustained health of the City but it also makes plain common sense.”</td>
</tr>
</tbody>
</table>


4.7 Local Sustainable Development Activities – European Examples

In European and other countries the number of interesting cases for Sustainable Development on the local level is impossible to oversee. Following is a selection of interesting examples which are described in order to show the broad variety of success stories abroad.

4.7.1 Managing Urban Europe-25

The European project “Managing Urban Europe-25 (MUE-25)” worked with 25 European local and regional authorities to improve their environmental quality and sustainability performance. The project ran from 2006 to 2008 and delivered a framework for better implementation of already existing environmental management systems like EMAS, ISO 14001 and ecoBUDGET. It provides a method for how cities and regions can practically work with integrated management, an approach recommended in many EU policies and strategies of today.

The main outcome of the project is a framework model of an integrated management system, an umbrella that enables the implementation of integrated management systems for the whole urban area (see www.localmanagement.eu). By applying the system, the cities are in a better position to improve the implementation of environmental legislation, urban management, municipal compliance with existing legislation and voluntary agreements as well as environmental assessment and reporting and communication with local stakeholders, and to integrate the different municipal policies into one coherent strategy.

4.7.2 Renewable energies: “fifty-fifty-concept”

The fifty/fifty project was the first energy-saving project in Germany to be based on a system of financial incentives. It enables the schools to get a share in the saved energy, water and waste costs. 50% of the money saved is returned to the school, where it can be reinvested into new energy-saving devices, equipments, materials and extra-curricular activities. For instance, several schools bought solar panels with the money earned.

The project started in the city of Hamburg. It was intended that the trial project would last for three years in different types of schools, with 24 schools taking part initially. By July 1995, 40 schools were involved and by autumn 1996, 60 more schools had joined in. Since January 1997, fifty/fifty has become a standing project and has been extended to other German cities, e.g. Berlin.

2 See http://www.display-campaign.org/rubrique477.html
Since then, this concept has also been applied to municipal buildings other than schools.

**Costs & Benefits**

**Costs & funding** The initial costs incurred for this project by the City Council of Hamburg were considerable but were balanced out by the great savings in energy and water made by the schools. The cost of the project is now around 5% of the savings. That’s why the schools get a reduced reward: not 50% anymore, but only 45% of the saved money. **Benefit** After 12 years the 470 schools have saved 21.8 Million EURO (=10%), 100,000 tons of CO2, 355 GWh of heating energy, 49 GWh of electricity and 391,000 m³ of water.

**Recommendations**

**Achievements** The fifty/fifty project is now being carried out in all schools in Hamburg (about 470 in total) Berlin (around 220 schools participating), Bremen and other German cities and is also being established at schools in Japan, Greece and Spain. A school’s savings can amount to an average of 2,400 Euro per year being put back into each school. Since 1997, the project has been extended to other environmental areas such as waste disposal.

By saving energy, carbon dioxide emissions are reduced and the environment is protected. The results in the trial period show that by the end of 2005, the fifty/fifty schools of Hamburg had reduced their emissions of carbon dioxide by 10 – 11%.

**Lessons Learnt** The first year was the hardest. Everyone needed to be organised, determined and committed to the project. Results were not immediately obvious but once the project had been up and running properly, results soon began to show. The credit goes largely to the commitment of the teaching staff who contributed to the project’s success and to the city administration, who ensured that this project became well established and that the schools received their money continuously.

Also, the success of the scheme depended very much on the exchange of knowledge and experiences in implementing the project and on the teamwork of the various user groups. Many more schools throughout the whole of Germany enquired about participating in the project.

**4.7.3 Citizens’ Solar Facility**

There are two kinds of solar facilities:

- A thermal facility that heats water. This kind of facility has a relatively small collector surface and can therefore be installed at low cost on a private roof.
- A photo-voltaic facility that produces electricity. This kind of facility requires a certain amount of surface to be economically feasible, that is, they are often too large and expensive for a private individual.
Then comes the idea of a "citizen's solar facility". Environmentally conscious citizens get together, invest in one or more shares of a community solar facility according to their financial capacities and start a community company (GbR). Their participation in a "citizens’ solar facility" helps them afford their personal contribution to a sustainable energy system.

So far, the Solar Group Berlin e.V. has overseen four citizens’ solar facilities in Berlin and three in Brandenburg.

Example of a citizens’ solar facility in Berlin:

- **size**: 30 kWp
- **expected electricity production**: ca. 25,500 to 30,000 kWh per year
- **expected return**: ca. € 14,500 to € 17,200 per year
- **on-line inception date**: 6 Dec 2004
- **managing group**: „Bürger-Solar Berlin 3 GbR“ (Community Company Citizens’ Solar Berlin 3)
- **investment**: € 80,000 from 46 share holders, minimum investment € 500, maximum allowable investment € 10,000.
- **financing**: € 80,000 in shares, € 60,000 loan from the Umweltbank.

The advantage of partial loan financing for the share holders is a higher return on investment because revenues are distributed among fewer participants.

The advantage of partial loan financing for the Solar Group Berlin is the construction of more solar facilities in a given time. The portion of electricity from renewable resources in Berlin can increase more quickly.

- **land lord**: Berlin Senate Administration for Youth, Education and Culture.

It’s possible to make money running a photo-voltaic facility in Germany because of the Renewable Energy Law – EEG. It became law on 1st of April 2000. Since then, it has promoted the production of energy from renewable sources: hydro-electric power, wind power, bio-mass, thermal power, solar power and geo-thermal power. The EEG requires power companies to give preferential treatment to and to pay a fixed minimum price for electricity from renewable energy sources. This price depends on the kind of energy, the size of the facility and, for wind energy, on the location. The EEG fixes the period of return at 20 years maximum and thus creates secure conditions for investment in the energy sector. It has helped cause a boom, especially in wind energy.

An important and probably even necessary feature – a precondition – for having such successful activities on the local and regional levels is a reasonable incentive structure, in order to attract investors to change to renewable energy production. For that purpose the former "red-green" German government established Feed-in Tariffs. This means that electricity from renewable sources can and has to be bought by the big energy corporations in Germany to a higher price than they pay for electricity from non-renewable energy sources. This incentive structure has been a big success; in Germany many new renewable energy sources have been built and put on the grid. Its success is so positive, that many other countries followed that example, and that – for instance, very recently the "International Solar Energy Society" called for Feed-in Tariffs in all other countries (May 7, 2008): "During the Spring 2008 meeting of the International Solar Energy Society (ISES), its board of directors voted to endorse feed-
in tariffs. The action was noted on ISES' website on May 5th, 2008. The International Solar Energy Society concurs that feed-in tariffs are currently the most successful and effective renewable energy policy tool for supporting the development of RE in any country. For more information about feed-in tariffs and examples of other good policy options for supporting renewable energy please see the ISES White Papers."

“This White Paper demonstrates that the renewable energy transition is not just a fantasy, but rather a real vision, which can be implemented by industrial nations with available technologies, in a reasonable time, and at reasonable costs. It is apparent that leadership arising from people and their governments, combined with the adaptability of utilities and societal institutions, will determine which countries succeed and which fail. The renewable energy transition must start now, or it will be too late. Governments, cities, companies, and people must cooperate in moving it beyond the first difficult steps, knowing that great societal, environmental and personal rewards will come. Solar energy, the source of all life on Earth, will be the underpinning of a sustainable, safe and sane future energy policy.” ¹

4.7.4 Participatory Budget or Citizens Budget

The municipal level is the place where “problems as well as solutions come together”. A concrete and especially innovative application of the Cooperative State in Western Europe lies in the Participatory Budget or Citizens Budget.²

**Participatory budgeting** is a process of democratic deliberation and decision-making, in which ordinary city residents decide how to allocate part of a municipal or public budget. Participatory budgeting is usually characterized by several basic design features: identification of spending priorities by community members, election of budget delegates to represent different communities, facilitation and technical assistance by public employees, local and higher level assemblies to deliberate and vote on spending priorities, and the implementation of local direct-impact community projects. Various studies have suggested that participatory budgeting results in more equitable public spending, higher quality of life, increased satisfaction of basic needs, greater government transparency and accountability, increased levels of public participation (especially by marginalized residents), and democratic and citizenship learning.

In recent years, a growing number of citizen participation devices concerning the municipal budget have been experimented in Europe. Until today there has neither been a transnational exchange of experiences nor a scientific analysis of the models which would allow a process of mutual understanding.

² See [http://en.wikipedia.org/wiki/Participatory_budgeting](http://en.wikipedia.org/wiki/Participatory_budgeting) and [http://www.buergerhaushalt-europa.de/zusammenfassung_en.htm](http://www.buergerhaushalt-europa.de/zusammenfassung_en.htm)
The Andalusian city of Sevilla, with more than 700,000 inhabitants, is the biggest city with a participatory budget in Europe. Although Sevilla is known for its cultural heritage, the city has important social problems. The process of participatory budget started in 2004. It focused on investments and programmes of three municipal areas: civic engagement, sport and urbanism. The procedure is very similar to the Brazilian city Porto Alegre: it is a decentralized process and is based on the participation of individuals. The procedure distinguishes between the three geographical levels of neighborhood, district and city. A “motor group” of active citizens organizes, in cooperation with technical staff of the participation offices, the meetings.

Following a bottom-up dynamic the process starts in March with meetings on the neighborhood level. Proposals are made and delegates for the district and city levels are elected. It is the responsibility of the district delegates to prioritize the proposals of the neighborhoods. The city delegates only discuss the proposals that concern the entire city, such as important investments like the construction of new swimming centers or soccer stadiums. On district as on city level, a hierarchy is set up by a complex system of criteria, which takes into account social justice values. The idea is to minimize the inequalities between the districts and between neighborhoods. Priority is given when the existing infrastructure is weak or when the project benefits a marginal social group. In the first year of participatory budget, 265 proposals, whose global amount was 12 millions Euros were integrated in the city budget. The methodology of the process itself was elaborated by a commission of delegates of every neighborhood and is published as a procedural motion. Another commission follows the realization of the projects. The
organization of the entire process is delegated to an external agency contracted by the local government.

4.7.5 Local Agenda 21 Berlin

Many communities in Europe and in other continents are actively working on SD. One example is the German capital city Berlin (3.6 Mio. inhabitants). It has a relatively strong welfare system along with a high level of environmental standards and a rich history of progressive policies. Beginning in the mid-nineties and supported by local social and environmental initiatives, a number of LA 21 processes started and gained momentum. The city districts Koepenick and Lichtenberg in former East Berlin for example started in 1993, and by 1999 every District in Berlin had its own LA-21-process going. Still, only a small percentage of Berlin’s population is involved, and a wide majority of citizens still does not know about Sustainable Development. A Sustainable Development Agenda Forum for the Berlin region created by NGOs has attained some symbolic and political power after ten years of work. But it is still struggling with a notorious lack of resources, inefficiency, and little influence. Many City Departments have LA 21 representatives which meet monthly in a working group. The administration spends $250,000 p.a. for LA21 projects and activities. While the struggle continues against short-term thinking and vested interests, hyper-consumerism and certain neo-liberal policies, politicians and decision-makers are intensifying their search for new development strategies as traditional solutions are no longer viable or often found to be part of the problem. Sustainable alternatives are being found and shared through coalitions at all levels.¹

4.7.6 Indicators for Sustainable Cities

A major challenge for a smart and effective process for Sustainable Development is measuring the status quo and measuring changes. For several years now, various concepts are tested in reality in many countries. Following is a list with websites about examples of practical use of different types of indicator systems on the local level. These should be taken into consideration within the project, but they have to be decided upon by all involved participants. It has to be considered, whether for the special features of this project a specific set of indicators should be developed.

SEATTLE 1998
http://www.sustainableseattle.org/Programs/RegionalIndicators/

Local Government Guide to the Internet -- Chapter 15: Community Indicator Projects

¹ State, national and supranational institutions can promote Sustainable Development in many legislative, financial, political and symbolic ways, as empirical evidence has shown (Lafferty/Meadowcroft 2000).
http://www.rural.org/igg/Ch15_CommIndic.html
[list with examples]

**Urban Sustainability Indicators**
[Chapters B and C]

**Urban sustainability and Cultural heritage Projects Library**
http://ec.europa.eu/research/environment/projects.cfm?p=3&l=3&sc=13&id=x3-13-6&pmenu=off
http://crisp.cstb.fr/database.asp
[list with examples]

**Center for Sustainable Cities (University of Kentucky)**
**The Sustainable Area Budget: Beyond Sustainability Indicators**
http://www.centerforsustainablecities.com/r_beyondsusind.html
5 Sustainable Cities – International Experiences

Humanity's total environment is a synthesis of man-made and natural systems. If we are to consciously shape our future, we must learn to manage our entire environment -- to reconcile the conflicts and contradictions between man-made and natural systems. It is a false and tragic dichotomy to put economic prosperity against environmental resource conservation.

All of human's wealth, all of industrial society, would not be possible without abundant natural resources. Industrial development in the United States occurred in a vast and tremendously resource rich land. Every resource needed for agricultural and industrial development was available in superabundance. Rich agricultural land, vast forests, energy resources, clean water, and mineral resources - all were here in great abundance.

Today our natural wealth is being slowly wasted away. There is less and less prime agricultural land, and much of that, which is being farmed, is undergoing some degree of short or long-term damage. Domestic energy sources and mineral deposits are being depleted, and the limits of water supply have already become visible.¹

5.1 Main Issues Should be Considered in Sustainable Cities

5.1.1 Energy for the Sustainable City

Most of the world's energy is used in cities. Local transport, electricity supply, home living, services provision and manufacturing crucially depend on fossil fuels. In the last 50 years, fossil fuel combustion has increased nearly five times (Girardet 2008). Most of the world’s energy is used in cities. Without routine use of coal, oil and gas, the growth of Megacities would have never occurred, all the internal activities – local transport, electricity supply, home living, services provision and manufacturing – crucially depend on fossil fuels.²

In a world in which climate change is becoming an ever-growing concern and in which oil and other fossil fuels are becoming scarce resources, we need to find other ways to provide our cities with power. The European Union target is for 20% of energy production to come from renewable energy sources by 2020 (European Energy Council). As it has been up to now, renewable energy has been competing with fossil fuel technologies that have reached their economies of scale and have benefited by extensive government subsidies over many years.

The question is: How do we make cities run on renewable energy? We are exploring the possibility for renewable energy in cities by presenting case material on cities that had taken action towards this question.

² Garbage, Cambodia, 29 sept 2007, By jparachute, Flickr
Egypt and the Great Energy Debate

Egypt is at energy cross-roads; it faces choices about what energy sources it will use in the future. Conventional fuels are becoming increasingly expensive and there is recognition that these fuel resources are finite. Some estimates indicate that indigenous natural gas and oil reserves, on which Egypt's electricity generation currently relies, will run out in 30 or 40 years, making the transition to alternative energy sources a pressing need to avoid stagnant economic development. The same applies to nuclear energy: it is also a non-renewable energy source and its amount is also limited to several decades. In addition to its overall costs, which are very high, its risks are unlimited (deposits for the radio-active and toxic nuclear waste, security for the power plants and logistics, costs for the dismantling of the factories and power station etc.) – that is why several advanced OECD-countries stopped planning and constructing nuclear power plants.

Renewable – Clean, Safe, Cheap and Available Energy

Renewable energy technologies are real, mature and economically viable today and are ready to be deployed on a large scale. Together with energy efficiency and decentralized energy systems, 50% of global energy can be supplied by renewable resources.1

Decades of technological progress have seen renewable energy technologies such as wind turbines, solar photovoltaic panels, biomass power plants and solar thermal collectors move steadily into the mainstream, making them competitive with conventional power sources. In addition the global market for renewable energy is growing dramatically; in 2006 its turnover was US$ 38 billion, 26% higher than the previous year. As an investment proposition the renewable energy industry is comparable with computers and mobile technology. This will only be enhanced by continued increases in price of fossil fuels and as the saving of carbon dioxide is given an increasing monetary value.2

In conjunction with energy efficiency programmes and decentralized energy supply systems renewable energy technologies could deliver up to 50 percent of global primary energy by 2050 as long as governments implement appropriate policies and action plans.3

Renewable resources are available in Egypt - In Egypt there is over 80 times more energy readily available from renewable sources than is needed for current electricity production.

The amount of electricity produced in Egypt per year (2004 figures) is 91.72 billion KWh and the amount consumed is 84.49 billion KWh. However, the amount of solar radiation available in Egypt is between 1900 KWh/sq meter/year in the north and 2600 KWh/sq meter/year in the south. If the average for the country is taken as 2300 KWh/sq

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1 www.cia.gov/cia/publications/factbook/geos/eg.html#Govt
2 New and Renewable Energy Authority Ynet, 28/10.06, 11Mubarak to ask China for help with nuclear program
3 www.cia.gov/cia/publications/factbook/geos/eg.html#Govt
meter/year then there is at least 230 billion KWh of solar radiation – over two and a half times the amount of electricity produced for the whole country.\(^1\)

**Figure 9: Desertec – Clean Power From Deserts**


But it is not only solar technologies that can provide for the needs of Egypt. In combination, the total economically available renewable energy resources in Egypt is 7,573 billion KWh per year. This is over 80 times the amount of electricity produced per year. This is actually half the technically available renewable resources, thus as renewable energy collection technologies improve, twice this amount will become available i.e. 15,086 billion KWh.\(^2\)

**Renewable resources are Cheaper - Renewable technologies are cheaper to build, with lower operation and maintenance costs, than nuclear power.**

The construction cost of the new CSP ((Cheaper Sustainable power)) project being built by the Egypt government is estimated at US$140 million for 140 MW – roughly US$ 1.5 million per MW.

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\(^1\) [www.cia.gov/cia/publications/factbook/geos/eg.html#Govt](http://www.cia.gov/cia/publications/factbook/geos/eg.html#Govt)

In comparison, the cost of building the proposed nuclear power plant is estimated at US$ 1.5 billion for 1000 MW – roughly US$ 1.5 million per MW; in other words, it is one and a half times the costs of concentrated solar thermal power.

It is also important to note that US estimates for the development of a nuclear power plant are much higher, averaging US$ 4.0 billion for a 1200 MW which is over US$ 3 million per MW which means that the construction costs for nuclear power could be as much as three times the cost of CSP.¹

These are just the building costs; they do not include the costs of decommissioning, costs of dealing with nuclear waste, nor costs of the fuel – problems which do not exist with renewable energy.

Current Capacity - The Government of Egypt has a target of only 3% of energy from renewable resources by 2010, greatly under-utilizing their potential.

Total installed hydro capacity is currently 2794 MW. This includes 270 MW each from Aswan Dam and 2100 MW from the High Dam; 90 MW from the Isna Dam; and 64 MW from the Naga Hamady Dam.²

Total installed Wind Power is 315 MW - 95 MW from Hurghada and 220 MW from Al-Zafarana facilities. The Egyptian government has a renewable energy target of 3 percent by 2010; yet the available resources could provide a much larger contribution if the right direction, encouragement and framework were provided.³

Waste in the Sustainable City

From 1950 to 2000, the world’s economic activities increased fifteen folds. The growth of consumer societies all over the world has seen a large increase in solid waste produced per head, and the waste mix has also become even more complex. For more than 50 years, we have taken for granted that our waste could be deposited in holes in the ground or incinerated. In the urbanized world, cities use the bulk of the world’s resources and discharge most waste.

Today, cities are running out of landfills. Even when they incinerate, they cannot keep up with the piles of waste created everyday. Conventional linear waste disposal is not a sustainable option. New circular systems have emerged all around the world, in which waste is seen as a resource to be reused. Many new jobs have been created in this recycling industry. Would it be possible to imagine a world were the concept of waste is eliminated?

² Congressional Research Services Nuclear Power: Prospects for new commercial reactors 2001
³ Concentrating Solar Power for the Mediterranean Region. German Aerospace Center (DLR) Institute of Technical Thermodynamics Section Systems Analysis and Technology Assessment 2005 http://www.dlr.de/tt/med-esp
Will we see a future were we demand products which are either of such a good quality of material that they can be truly recycled (not loosing quality under the recycling process like paper does) or biological nutrient that will easily reenter the water or soil without depositing synthetic materials or toxins? As the world appears today, there is still some way to go before we have created sustainable waste systems.

The question is: How do we create cities with a more circular view on waste? We are exploring the possibility for sustainable waste management in cities by presenting case material on cities that had taken action towards this question.  

**Description of current situation of solid waste management in Egypt.**

**Municipal solid waste (MSW) management**
((this is just a list - it needs further introduction and explanation for the reader))
- Privatization of SWM program (2001).
- No national program for SWM minimization or prevention.
- Two main laws concerning SWM in Egypt.
- 30 000-40 000 tons per day (10-15 million tons per year).
- Efficiency percentage of MSW collection is 15%-65%.
- Limited public participation and awareness, Lack of skilled staff.
- Collection of MSW (Municipalities and "Zabbaleen", informal garbage collectors) in big cities.
- Cost recovery does not exist.
- Fees of MSW service (2% of rental value of households and commercial activities)
- Mixed MSW, no national program for source separation.
- Inadequate collection scheme of MSW, limited No. of transfer stations.
- Composting (50 facilities in 2003, receive around 1000-1500 tons of mixed MSW per day).
- Recycling activities by "Zabbaleen" system (plastics, metals, glass), no national strategy for recycling.
- Disposal of MSW in uncontrolled dumpsites, no regulation for landfilling sites, just guidelines by EEAA.

**C&D waste management in Egypt**
- Lack of policy or strategy for C&D waste management
- Lack of accurate estimation of quantities or generation rate
- Illegal dumping is the most common practice.

So it must be taken into consideration for Egypt that National Government should improve communications and regional MSW strategies, and undergo national training program for MSW staff and Regional governorates.
- Regional strategy of MSW.
- Multi-cities cooperation.

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1 Garbage, Cambodia, 29 sept 2007, By jparachute, Flickr
Sustainable Development and Water Resources in Egypt

For Living Organisms

Water is the source of life on Earth for all living organisms, as God Almighty says in the Holy Quran "And, We made from water every living thing." (The Prophets: 30). Water is the second most important of all natural resources on Earth next to air as its quantities are fixed, whether it is fresh water, salty water, surface water or underground water.

It covers 80% of the Earth's surface. Oceans and seas contain 317 million cubic miles, glacier ice 7.3 million cubic miles, salt lakes 25,000 cubic miles, rivers 411,000 cubic miles, fresh water lakes 30,000 cubic miles, under groundwater one million cubic miles, non-saturated soil 16,000 cubic miles, and water vapor 3,100 cubic miles.

Water constitutes 75% of the human body weight and 80% of the total composition of most vegetables. At the same time, water causes an estimated 80% of diseases in the world. This is either due to water contamination or to water shortage.1 Thus, water needs and the development process are inseparable, as human civilization and progress are measured by the quantity of water used per day.

Water Resources in Egypt

Water is the fundamental element for sustainable and integrated development in Egypt. Horizontal expansion in agriculture is connected to the country's ability to provide the water required for that expansion. Moreover, the economics of water use and its future on the long run require searching for alternatives and determining the water resources available at present and additional resources that we can obtain in the future.2

Water resources available for use and quantities obtained at present and in the future in Egypt are Nile water, ground water, rain water and drainage water.

Nile Water

River Nile is the longest river on Earth, flowing for nearly 6,700 kilometers from its source to its mouth. The river water yield is about 1,630 billion cubic meters (BCM) per annum, of which only 10 percent are exploited. The length of River Nile in Egypt is 1,530 km and the area of the River Nile Basin is 1.3 million square meters. The Basin spreads over ten countries: Rwanda, Burundi, the Democratic Republic of Congo, Tanzania, Kenya, Uganda, Ethiopia, Eritrea, Sudan and Egypt. The volume of water resources in Egypt amounts to approximately 69.7 (BCM) per annum, used for all purposes. River Nile constitutes more than 95% of Egypt's total water resources. Egypt's share of Nile water is 55.5 (BCM). Due to the establishment of the High Dam in 1964 and the use of its large capacity in continuous water storage, Egypt secured obtaining a fixed annual water yield.

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1 http://www.sis.gov.eg/En/Pub/waterinegypt/110900000000000001.htm
2 Berlin children playing in an open space in the city, 4 Dec. 2007, By Henning Thomsen
Reservoir and Barrage Projects on the River Nile
There are 11 main barrages on the River Nile and its two branches, 17 mouth barrages, that convey water directly from the Nile, and 37 stone barrages built across Rayahs and main canals. The length of waterways that supply Egypt with water is about 35,000 km.

Strategy to Develop Irrigation Programme
Egypt set out an important strategy to develop irrigation programmes as follows: 1
1- Water resources development Programme.
2- Preservation of water resources and River Nile protection Programme.
3- Replacement and renovation of lifting stations Programme.
4- Preservation of the integrity and efficiency of the High Dam and the Aswan Reservoir Programme.
5- Agricultural land drainage Programme.
6- Studies and research Programme.
7- Protection of Egyptian coastal areas Programme.
8- Updating cadastral maps Programme.

Preservation of River Nile and Water Resources
Egypt has achieved the following:
- Projects of water quality improvement in Lake Manzala as well as the Damietta and Rosetta branches of the Nile.
- Installation of five sanitary disposal stations for Nile cruises along the river's course in Cairo, Minya, Assiut and Sohag.
- Conducting a study on empirical contamination abatement project in Bahr el Baqar drain in Manzala Lagoon.
- The establishment of a center for combating marine pollution in Sharm el-Sheikh at a cost of LE 4 million.
- Conducting a comprehensive survey on the Egyptian coasts to locate 84 sites prone to the dangers of pollution, including 45 sites on the Mediterranean, 29 sites on the Red Sea and Suez and Aqaba Gulfs to implement a periodical programme for monitoring the quality of coastal water so as to follow up on the source of pollution and provide monitoring institutes with the required machines and equipments.

Underground Water
Underground water is an important source of fresh water in Egypt; its importance is augmented by the fact that it is the sole and essential source of water in the Egyptian desert that constitutes 95% of Egypt's total area. Underground water can be directly used without treatment as it is not exposed to pollution, in addition to its constant temperature over the year. Thus, it is a safe source for potable water.

1 http://www.sis.gov.eg/En/Pub/waterinegypt/1109000000000001.htm
Within the framework of developing water resources plan that Egypt is carrying out (ending in 2017), the quantity of underground water aimed to be saved is estimated at 5.9 (BCM), of which 2.7 (BCM) is underground water and 3.2 (BCM) is deep underground water.

**Rain Water**
Rain falls on Egypt rarely; its rate ranges between 20 mm and 150 mm annually on the northwest coast of Egypt and decreases gradually in other parts. Southern Egypt receives only a trace of rain each year. Thus, rain remains a limited and unreliable source in agricultural development, but can continue to play a role in pasture cultivation in desert areas and irrigation in the North Coast.

**Drainage Water**
Since the 1950's, Egypt has started to reuse the agricultural drainage water which is treated and mixed with Nile water to be used in irrigation. Around 4.7 (BCM) of agricultural drainage water is used annually, and is targeted to be about 10 (BCM) over the next 10 years.
Stations were established on some of the Nile Delta drains to lift and push water into canals for land irrigation. The quantity of drainage water used is estimated at 9 (BCM).

**Green and the Sustainable City**
The world is in the midst of a disturbing period of population growth, growing consumption and environmental degradation. From global warming to biodiversity loss to patterns of sprawling land consumption, the environmental trends are dire.

Cities will by necessity play an increasingly important role in addressing these issues. In contrast to the traditional view of opposition of things, urban and natural things, cities are fundamentally embedded in a natural environment. Urban green is not only essential to the physical and mental wellbeing of urban residents. Urban green – parks, trees, green infrastructure etc. – cleanse the air, provide shade, cool the city, hold water and support biodiversity. Urban green is the lungs of a city that provide a healthy environment.

**Egypt Plan to Green Sahara Desert Stirs Controversy**
While climate change and land over-use help many deserts across the world advance, Egypt is slowly greening the sand that covers almost all of its territory as it seeks to create more space for its growing population. "All of this used to be just sand,". "Now we can grow anything."

With only five percent of the country habitable, almost all of Egypt's 79 million people live along the Nile River and the Mediterranean Sea. Already crowded living conditions -- Cairo is one of the most densely populated cities on earth -- will likely get worse as Egypt's population is expected to double by 2050.

So the government is keen to encourage people to move to the desert by pressing ahead with an estimated $70 billion plan to reclaim 3.4 million acres of desert over the next 10 years. Among the incentives is (selling/giving) cheap desert lands to college graduates.

But to make these areas habitable and capable of cultivation, the government will need to tap into scarce water resources of the Nile River as rainfall is almost non-existent in Egypt.

The plan has raised controversy among some conservationists who say that turning the desert green is neither practical nor sustainable and might ultimately backfire.

"A desert is not the best place to grow food," he said. "From a political perspective, it makes sense in terms of giving more people jobs even though it is not very rational from a water perspective," he added.

**Regional Tension**
The scope of the reclamations could also add to regional tension over Nile water sharing arrangements as in order to green its desert Egypt might need to take more than its share of Nile water determined by international treaties.

Egypt's project to reclaim deserts in the south, called "Toshka", would expand Egypt's farmland by about 40 percent by 2017, using about five billion cubic meters of water a year.
This worries Egypt's southern neighbors who are already unhappy about Nile water sharing arrangements. Under the 1959 treaty between Egypt and Sudan, Egypt won rights to 55.5 billion cubic meters per year, more than half of the Nile's total flow. Ethiopia, where the Blue Nile begins, receives no formal allocation of Nile water, but it is heavily dependent on the water for its own agricultural development in this often famine-ravaged country.

"The Toshka project will complicate the challenge of achieving a more equitable allocation of the water of Nile River with Ethiopia and the other Nile basin countries," said Sandra Postal, director of the US-based Global Water Policy Project.

"Egypt may be setting the stage for a scenario that's ultimately detrimental to itself." But other experts suggest that in the delicate arena of water politics, it may be more of an imperative for Egypt's government to mollify its own population rather than heed

**Transport in the Sustainable City**

“Cities are shaped by transport and hence sustainable transport – good transit, walkability and cycling facilities – should help shape sustainable cities” (Peter Newman).

During the past fifty years, there has been an exponential growth in transport of both people and goods. The number of motorized road vehicles has surpassed more than 800 million vehicles world-wide and are, in many places, still growing at higher rates than both human population and GDP. This growth has several unintended consequences – and is now increasingly eroding some of the very benefits transport has brought about. It is evident that current trends pose severe challenges for societies aiming to move towards sustainable city development.

**The Egyptian transport sector**

The demand for energy in the transport sector has been growing in tandem with the population, economic growth and the increasing pace of urbanization. The Transport Sector Development Plan, which covers the years to 2017, includes measures to promote public passenger transport and encourage a modal shift of cargo transport from road to railways and inland waterways; it envisages government investments of hundreds of millions of dollars. In addition, the government has for many years pursued a policy of gradual liberalization and privatization of the transport sector (EEC, 2005).

Road traffic is the dominant mode of internal transport in both passenger and freight operations. In 2003–2004, the number of people transported by road had reached nearly 115.6 billion passenger/km, while freight transport amounted to nearly 43.1 billion ton/km (State Information Service, 2006).

For railways, the policy goal is a revitalization of the sector and the development of better service quality by Egyptian National Railways (ENR), which is state-owned and highly subsidized. While railways have a relatively high share of the domestic passenger market, its share of the freight market is very low (only 8 percent of the total tones/km capacity). The railways system delivered 76.1 billion passenger/km in 2003–

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1 http://www.islamonline.net/servlet/Satellite?c=Article_C&pagename=Zone-English-HealthScience%2FHSELayout&cid=1190886213776
2 http://en.wikipedia.org/wiki/Green_roof
2004; while freight was only 4.7 billion ton/km. ENR is presently undertaking significant investments in order to modernize and upgrade the railways and extend its network (Table 4).

Egypt's inland waterways, the River Nile and canals, are severely underutilized for transport. Primarily designed as an irrigation system in 1995, the inland waterways carried approximately 3.6 million tons of freight, which represented only 3.3 percent of the total tones/km transported (EEC, 2005).

The energy consumption of freight transportation is another area with rapid growth. What characterizes Egypt's freight system is that it is dominated by road transport, with a 90 percent share of all freight, while the opportunities for more energy-efficient railways and inland waterway transport are clearly underutilized; the transport demand is concentrated on a few transport corridors starting from or ending in Cairo; and the transport patterns are influenced by the imbalance between exports and imports (the value of imports being about twice the value of exports in 2002).

Table 4: Egypt's main transport indicators

<table>
<thead>
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<tbody>
<tr>
<td><strong>Railways</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger/km (million)</td>
<td>46,185</td>
<td>76,090</td>
</tr>
<tr>
<td>Ton/km (million)</td>
<td>38,444 (Sic!)</td>
<td>4,758</td>
</tr>
<tr>
<td>Railway length (km)</td>
<td>9,432</td>
<td>9,467</td>
</tr>
<tr>
<td><strong>Roads</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger/km (million)</td>
<td>113,570</td>
<td>115,845</td>
</tr>
<tr>
<td>Ton/km (million)</td>
<td>41,450</td>
<td>43,110</td>
</tr>
<tr>
<td><strong>River transport</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ton/km (million)</td>
<td>309</td>
<td>2,375</td>
</tr>
<tr>
<td><strong>Pipeline transport</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Million tons</td>
<td>6,489</td>
<td>6,680</td>
</tr>
</tbody>
</table>

(Source: State Information Service 2006)

**Urban transport**

Currently mobile emissions are one of the major sources of air pollution in the country, producing about 25 percent of Egypt's energy-related CO₂ emissions. This is particularly acute in Cairo, a megacity of 17 million people and the country's major urban, industrial and financial agglomeration. Demand for mobility in Cairo has greatly outpaced the capacity of the public transportation system. The gap has been primarily filled with privately owned and operated shared taxis (so-called informal transport) and the use of private cars. As the Cairo Regional Area Transportation Study (UNDP, 2005)

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1 [http://the2050project.com/index.php?option=com_content&task=view&id=119&Itemid].
pointed out, congestion has become a major problem and the air quality has deteriorated to an alarming level.

The number of vehicles registered in Egypt increased from nearly 3.6 million vehicles in 1992 to almost 6.6 million vehicles in 2005 (Egypt Information Portal, 2007). About 50 percent of the total vehicles were registered in the Cairo metropolitan area. Significant features of the Cairo vehicle fleet include:

- The average vehicle age is relatively old.
- Passenger cars are expected to constitute the fastest-growing category over the next few years due to economic growth, gradual decreases of tariff duties on imported cars and increased numbers of locally assembled ones.
- Almost all trucks and buses use diesel fuel and have old-generation diesel engines.
- There are essentially no diesel-powered passenger cars because these have been prohibited by law.

The number of public buses has not been expanding at a significant rate due to capital constraints and the growth of the underground metro system. Public transport in Cairo consists of two generic groupings: formal and informal services. Formal urban public transport services are provided by the state-owned Cairo Transient Authority (CTA), the Greater Cairo Bus Company (GCBC) and the Cairo Metro Organization, which runs the urban heavy-rail service. The informal sector predominately consists of route-specific shared taxis, operated by the private sector using microbuses with typical capacities of 11–14 seats.\(^1\)

In 2001, public transport services carried a total of 12.44 million trips every weekday, or 68 percent of the total (public and private) motorized trips generated within the metropolitan region. Shared taxis (microbuses) carried some 6.5 million passengers daily, or roughly half of daily motorized public transport trips. CTA buses accounted for a further 3.5 million daily trips, and the metro for slightly more than 2 million trips per day – most of these riders had previously traveled by buses, microbuses and taxis. Other modes of transport contribute about 0.4 million trips per day. Formal buses services are constrained by government control on the route structures they offer and the fares they may charge. Concurrently, the ageing fleet (the average bus age is now in excess of 12 years) must serve ever-expanding urban centers. As a result, service frequencies are declining throughout the system. Although the network has increased from 6,100 to 10,100 kilometers over the past decade, fleet size has only increased from 3,700 to 4,400 buses (Three-quarters of which are considered operational). Thus, crowding on buses sometimes reaches intolerable levels (Thompson and Nagayama, 2005).\(^2\)

Road safety and the high number of car accidents, traffic fatalities and injuries in Egypt (see table below) should be a sign that public transportation needs a big push. The

\(^{1}\) http://the2050project.com/index.php?option=com_content&task=view&id=119&Itemid.

Western style of individual motor-based mobility and transport is not sustainable at all. The overall costs in production, resource consumption and waste, infrastructure, insurance, maintenance, health, environment (air pollution, noise, traffic density etc.) are much too high for a modern society which cares about its citizens, future generations and their well-being. Many examples in others countries and cities prove that smart projects can improve the situation and trends.

Table 5: Traffic and Road Safety in Egypt

<table>
<thead>
<tr>
<th>DATA</th>
<th></th>
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<tbody>
<tr>
<td>Reported road traffic fatalities (2007)</td>
<td>12 295(^5) (70% males; 30% females)</td>
</tr>
<tr>
<td>Reported non-fatal road traffic injuries (2007)</td>
<td>154 000(^6)</td>
</tr>
<tr>
<td>Costing study available</td>
<td>No</td>
</tr>
</tbody>
</table>

\(^5\) Health data, defined as died at the crash scene. 
\(^6\) 2007, Health data.

(Source: WHO 2009 "Global Status Report on Road Safety", p.106)

Air quality in Cairo has been partially monitored since the early 1970s. In 2004, measurements revealed that the average annual concentration of SO\(_2\) exceeded the limits set by Egyptian air quality standards and the average annual concentration of NO\(_2\) exceeded the WHO limits in the most congested areas of the city. Due to traffic congestion, Cairo city centre had the nation's highest concentrations of CO\(_2\) (6.8 mg/m\(^3\)) (Egyptian Environmental Affairs Agency, 2004).\(^1\)

Food and the Sustainable City
Today modern western populations expect to be able to eat large varieties of different foods from all over the world all year round. In the U.S., the average grocery store product travels nearly 1,500 miles between the farm where it is grown and the consumer’s refrigerator.

A tremendous amount of fossil fuel is used to transport food for long distances. Aside from the environmental harm that can result from processing, packaging and transporting long-distance foods, the industrial farms on which these foods are often produced are major sources of air and water pollution.

Urban and pier-urban farming was the norm before long-distance food transport became an option.

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\(^1\) New York bus, 2004, By Malene Freudendal-Pedersen
Responsibility of Consumers and Production
The most dangerous aspect of food safety is the unaware consumer, given that consumer awareness is important to the advancement of the domestic trade sector and will play a major role in the development of the Food Safety Agency. Similarly, we are all consumers, in this capacity, we look to the government to ensure that food is up to safety standards. However, the fact is that the biggest culprit in terms of unsafe food practices is private families in their own kitchens. Food can be produced safely from farm to market, but all the efforts that went into that will be to no avail if the proper precautions are not taken at home. A Food Safety Agency is needed to raise public awareness on food safety.

Infrastructure and Sustainable Cities
Infrastructure creates and defines cities and cities create and define infrastructure. When talking about sustainable cities, we have to deal with infrastructure simultaneously. These things can not be separated. Traffic determines access to city spaces and how they can be used. This applies to all types of infrastructure projects. Most obvious are probably roads, which are filled by a growing number of cars on a daily basis inhibiting the movement of vulnerable traffic users. It also applies to railway projects. The Copenhagen metro line to the airport is a good example. Here residents of the area are divided in two groups - those with direct access to the beach and those without.

Traffic is a prerequisite for the life we know. It creates opportunities and creates conceptions of opportunities. During the last 50 years, many cities are designed with the needs of cars as a prerequisite. This has created a wide range of unintended consequences in relation to city life.

The big task for future cities is to create a balance between the environmental, social and economical aspects before addressing being sustainable. Regarding the environmental aspect, it is prevalent that the large and growing CO2 emissions from transport have become an issue we can no longer ignore. Regarding the social aspect, it is prevalent that the life we want in the city – the spaces we want to live in, move and dwell in – is currently defined by transport flows. Finally, regarding economics there lays a major challenge in decoupling the direct link that increased mobility equals increased growth, which has been the underlying rationale for many infrastructure decisions.

The direct correlation between growth and mobility is still prevalent in countries where infrastructure is not highly developed. This is, however, not the case for Denmark. If sustainability is to be a reality, if climate change is to be taken seriously, the economy must be sustainable and thus recognize the unintended consequences and externalities (costs from air pollution, congestion, noise, accidents, lifestyle diseases, etc.) which economic calculations today are happily independent of. Changing our taken for granted knowledge about the world is a huge challenge to us all. Such a challenge Odense Municipality in Denmark has faced in their traffic master plan when they talked about 'more mobility - Less traffic'.
Infrastructure in Egypt

Egypt possesses a vibrant construction industry, which is forecast to log an average growth of 6.87% during 2007-2011. The industry value stood at L.E. 21.41bn (US$4.48bn) in 2006. The government is likely to continue with its Programme of economic reform with major privatization and investment activity expected in the nation's infrastructure industry during 2007-2008 period. Recently-launched state initiatives for the infrastructure sector primarily revolve around ports, airports, railways, and oil and gas-related sectors, among others.

Major ongoing projects in the country include the development of the Cairo Festival City at New Cairo City, a fertilizer complex in Damietta and a proposed industrial chemicals plant at El-Fayom. Moreover, the government recently announced plans to implement eight new oil and natural gas projects in five governorates. The government is also concentrating on developing its tourism infrastructure, given the fact that 8.3mn tourists visited the country in 2006 – up 5.1% year-on-year (y-o-y). Some of the major companies that have a presence in the Egyptian infrastructure industry are Egypt-based, such as: Arab Contractors, Orascom Construction Industries (OCI) and Hassan Alam Sons Group.

However, certain perennial risks plague the Egyptian construction industry. The country has in the past witnessed terrorist attacks such as the one in Red Sea resort of Sharm el-Sheikh in July 2005. An undercurrent of terrorism adversely impacts the tourism industry, thereby affecting revenues. These can also render Egypt a less attractive destination for foreign direct investment (FDI) inflows, thereby affecting the overall industry growth and gross domestic product (GDP). The construction industry has also been dampened by high material and construction costs.

5.2 Experiences from other Countries

In this part of the study we try to discuss the experiences of other Countries to construct Sustainable Cities and learn lessons from them.

5.2.1 Environment - UAE: Coming Up – MASDAR World's First 'Zero-Carbon' City

Called the Masdar (meaning ‘source' in Arabic) Initiative, this ambitious plan which gives some ideas for planning of Desert Areas for a 'Green City' is being driven by the Abu Dhabi Future Energy Company. "As the first major hydrocarbon-producing nation to take such a step, Abu Dhabi has established its leadership position by launching Masdar, a global cooperative platform for open engagement in the search for solutions to some of mankind's most pressing issues - energy security, environment and truly sustainable human development".
Social Dimension
The city, to be built on an area of six square kilometers on the outskirts of Abu Dhabi, has been designed by British architect Lord Foster (Foster and Partners). The city would be walled on all sides, and house 50,000 people and 1,500 businesses. The electricity for the entire city would be generated by solar energy harnessed by photovoltaic panels. To start with, a large solar power station would be built so as to meet the energy requirements during the construction of the city, while buildings would be cooled by wind towers.

Financial Dimension (Cost, Sources).
World's First 'Zero-Carbon' City will cost five billion US dollar plan, a sum which might finance credit to a sci-fi film set, is envisaged for Abu Dhabi, the capital of the United Arab Emirates (UAE). When completed, in 2025, it will be the nearest thing yet to a zero-carbon, zero-waste city.¹

Urban & Planning Dimension.
Using the traditional planning principles of a walled city, together with existing technologies to achieve sustainable development, this six sq km expanse will house an energy, science and technology community.

As for site planning, the city would be oriented north-east to south-west to ensure optimum balance of sunlight and shade. There would be no cars zooming around the city, with residents getting to and from via trains and automated transport pods. Three levels for movement for the city would include a light railway between Masdar to Abu Dhabi, a second level for pedestrians, and a third for “personalized rapid transport pods.” The public transportation has been so planned that none of the city’s inhabitants will be more than 200 meters from the nearest public transportation link. Management Systems will encourage reuse and minimal resources, with 99% of the waste generated in the city getting reused, or composted, and all waste water would be reused as well, with solar energy desalination systems.

Usage Dimension.
The ‘Green City’ will house the Masdar Institute of Science and Technology, a graduate science and research institute that will be established in cooperation with the Massachusetts Institute of Technology; world-class laboratories; commercial space for related-sector companies; light manufacturing facilities and a selected pool of international tenants who will invest, develop, and commercialize advanced energy technologies.

"They are creating a synergetic environment; it is a true alternative energy cluster with researchers, students, scientists, business investment professionals, and policy makers in the same community. It will combine the talent, expertise and resources to enable the required technological breakthroughs," Jabber explained to IPS.

¹ http://www.masdar.ae/en/home/index.aspx
Cultural Dimension
This self-sustaining city is expected to provide up to 1,500 companies with an attractive incentives package, including a one-stop shop programmed for government services, transparent laws, 100 percent foreign ownership, tax-free environment, intellectual property protection and proximity to nearby manufactures, suppliers and markets. The environment which will be in Masdar, will lead to creative zones and lots of cultural parks for people in Masdar.¹

Ecological Dimension
According to a recent report by the Intergovernmental Panel on Climate Change, the greenhouse effect on climate change in the Middle East region will increase the region's temperatures by 1-2 degrees Celsius during the next 25 years. The ‘Green City' plan is a part of Abu Dhabi's decision in April 2006 to embrace renewable and sustainable energy technologies².

In another initiative in March, the UAE signaled the commencement of a major national carbon dioxide emission reduction programme by announcing an initiative aimed at delivering a national carbon dioxide capture and storage (CCS) network.

It is estimated that the CCS network could reduce UAE's carbon dioxide emissions by almost 40 percent, increase oil production by up to 10 percent and liberate large quantities of natural gas. This could be achieved through the separation of gas from industrial and energy related sources and its transportation to oil reservoirs for enhanced oil recovery.

Economic Dimension
Abu Dhabi also plans to invest 350 million US dollars in a 100 megawatt solar power plant and hopes to tap into a growing global trend among environment-conscious investors. The plant will be expandable to 500 Mw with a target to generate enough power for 500,000 households.

To encourage people to be a part of this setup amid harsh weather conditions that witness temperatures soaring up to nearly 50 degrees Celsius during July and August, a pedestrian-friendly environment has been planned with narrow streets and shaded walkways. The maximum distance to the nearest transport link and facilities is likely to be no more than 200 m and will be complemented by a rapid personal transport system.³

5.2.2 Dongtan Eco-city (Shanghai)— The World’s First Sustainable City

¹ http://www.walbridge.com/index.cfm/Expertise/CaseStudies/Masdar_Sustainability_Case_Study_
² http://ipsnews.net/news.asp?idnews=38187
Dongtan, located on the island of Chongming, near Shanghai, China, is designed not only to be environmentally sustainable, but also socially, economically and culturally sustainable as planning target from start. It is located in the middle of the marshes at the eastern tip of Chongming, China's third-largest island, at the mouth of the Yangtse River.¹

**Environmental Dimension**
The first phase of the construction process of Dongtan Eco City, which is developed by the Shanghai Industrial investment Corp, will be completed in 2040. Dongtan Eco City, roughly the size of Manhattan, will be the world's first fully sustainable Cosmopolis when completed in 2040. Up to 80% of solid waste will be recycled. Organic waste is burned in an incinerator, catering for part of the town's electricity requirements. Dongtan stands on the shores of a canal, in the middle of a designated nature reserve with outstanding biodiversity, and is one of the main attractions for visitors to the international Expo in Shanghai. The journey to the metropolis, via a huge bridge and tunnel complex, takes only 45 minutes.²

**Political Dimension**
Returning to the present day, the Dongtan project is an attempt to solve an increasingly pressing problem. China has so far given priority to the quantity of construction, but now it must focus on quality. This means a radical change in town planning strategy and transformation to sustainable development, even though the country has to deal with one of the most spectacular migratory movements in the history of mankind. Between now and 2020 China needs to build 400 new towns - nearly 30 towns a year - to accommodate more than 300 million people from the countryside. Hence the decision to build a model city on Chongming Island emerged.³

**Social Dimension**
At present, about half a million people live in the district of Chongming, traveling to the outskirts of Shanghai on speedboats and ferries. They occupy two small towns and a myriad of little villages, as yet spared by the building frenzy of neighboring districts. A motorway, which is often deserted, already crosses the island. Dongtan, which will be built nearby, will have a population of 50,000 to 80,000 by 2010, rising to 500,000 by 2040.

**Economic Dimension**

¹ http://www.arup.com/eastasia/project.cfm?pageid=7047
² http://www.arup.com/eastasia/project.cfm?pageid=7047
³ http://www.arup.com/newsitem.cfm?pageid=7009
"In 20 years," says Ma Chengliang, the manager of SIIC Dongtan, "the Chinese economy has grown so fast that we are already suffering energy shortages. To maintain our current growth rate, we must opt for sustainable development. In Dongtan we want to demonstrate what can be done in terms of renewable energy, clean transport systems and sustainable lifestyles. The model was designed so that it could be extended to the rest of Chongming, serving as a prototype for the whole country."

Estimated planning for the city and phases in the future will cost around $US 2.5 billion.

Standing on the site of the new town, Alejandro Gutierrez, Arup's senior architect, explains: "Dongtan will be compact, inspired by traditional Chinese towns in which water plays an important part. Social factors are essential. It will have a diverse population, affordable housing, at least 30,000 jobs on the spot, schools and a hospital, to ensure it is not dependent on Shanghai."  

**Ecological Dimension**

The most original feature of Dongtan is its eco-friendly design. It will have an ecological footprint (the total area of land required to sustain an individual) of two hectares per person, three times less than Shanghai, London or Paris.

Dongtan is surrounded by miles of wetland, vital for birds migrating between Australia and Siberia. It is determined to preserve the quality of its air, so motor vehicles must be carbon-neutral and the plans provide for the construction of hydrogen filling stations for fuel cells.

To meet the town planners' requirements, Arup has even designed small, lightweight vehicles that consume little energy and travel almost bumper-to-bumper, taking up little room on the roads. Dongtan aims to be energy self-sufficient, meeting all its requirements with renewable sources - solar, wind and biomass energies.

However, the design team realizes that it will have many obstacles before achieving its idea. "Even if, with the right design and materials, you manage to build homes that operate at only two-thirds of current energy levels, individual behavior may completely upset your plans," says Gutierrez. "That is why we need a combination of rules, outreach and price incentives to educate the occupants and halt excessive consumption."

**5.2.3 Austin As a sustainable City**

Its population is 650,000, metropolitan area is 1,250,000, land area 272 sq. miles and rainfall: 33 inches per year. Seven council members are elected. Council selects a city manager. Electricity is provided by the municipally-owned Austin Energy (AE). Natural gas is provided by the Texas Gas Service. Peak electricity load occurs on weekday afternoons in the summer.

1 http://www.arup.com/newsitem.cfm?pageid=7009

Austin • Chicago • Fort Collins • Portland https://rmc.sierracclub.org/energy/library/sustainable cities.PDF
Managerial Dimension (Governance)

EE and RE programs began in 1982 to develop the city of Austian. Austin is working toward being the “Clean Energy Capital of the World.” The Austin City Council, Austin Energy, the Chamber of Commerce, and the University of Texas actively participate in the city’s renewable energy programs. The Chamber has a Clean Energy Council to expand on the region’s alternative energy industry. The original impetus came from the city council member, and present Deputy Manager of Austin Energy. Austin Energy’s strategic plan goes into detail on why, what, how, and programs needed to achieve its vision and mission.

**Vision:** “We want Austin to be the most livable community in the country.”

**Mission:** “To deliver clean, affordable, reliable energy and excellent customer service.”

Austin Energy’s primary objectives for its service area are: excellent customer satisfaction, to create and sustain economic development, provide exceptional system reliability, maintain financial integrity, and strong commitment to a renewable portfolio standard (RPS). The RPS is viewed as integral to the other objectives through reducing both costs and electricity supply cost risks. The plan states: “we have two measures for our energy resource objective. Our first measure is to achieve a renewable portfolio standard of 20% by 2020. For our second measure, we intend to achieve an energy efficiency target of 15% also by 2020; the project is estimated to be finished by 2020.”

Financial Dimension (Costs, Sources)

**Funding** As a municipal utility, Austin Energy is funded through the inclusion of costs in customer rates. However, any increased costs due to efficiency measures or renewable initiatives are being offset by the decreased rates associated with not having to build new power plants. The utility obtains grants and low and zero interest loans through state and federal programs.  

**Reduced Energy Costs** Over time, the combined decreases in energy demand associated with efficiency and renewable programs have saved the city from electricity needs equal to the annual output of a 500 megawatt power plant. Through thoughtful application of such measures, Austin has in essence built a “conservation power plant” instead of an actual coal fired plant. A plant of that size can power 50,000 homes.

The real-cost savings are well illustrated by measures taken within the city’s schools. AE managed and implemented a retrofit program for the school district on 40 schools (3.5 million square feet). Combined total costs were $3.8 Million.

The state provides low interest loans for this kind of project. Combined rebates (similar to rebates offered to all customers) were $0.6 million, thus saving the district $480,000 per year in energy costs. The payback is 6.9 years on energy costs alone. In addition to

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1 SUSTAINABLE CITIES Best Practices for Renewable Energy & Energy Efficiency
Austin • Chicago • Fort Collins • Portland h ttp://rmc . sierrae club.org/energy/library/sustainable cities. PDF
reducing energy usage, the retrofits improved bad lighting and reduced maintenance problems and cost.

**Ecological Dimension**

**Green Building** The City of Austin started the first Green Building Program in the U.S. in 1991. Operated by Austin Energy since 1998, the program evaluates the sustainability of residential single family, multi-family and commercial buildings using locally developed rating tools or the USGBC’s LEED program. In addition to evaluating the level of sustainability of buildings, program staffs provide plan review and recommendations, individual consultation on products and systems, and assistance in applying for incentives or assistance from other City departments or programs to the construction industry. The program provides monthly seminars on various Green Building topics for industry professionals.

In addition to working with industry to develop a supply of green buildings, the program works with the public to develop demand for more green homes and offices. The Green by Design workshops are held quarterly and still attract full houses of 80 to 100 people after more than three years. Ads and articles written by program staff promoting the benefits of green building and builders who have participated in the program during the previous year are run in the local media.

AE offers a voluntary program for builders to acquire a Green Building star rating for their new construction. Builders are trained, then they fill out a checklist. AE inspectors visually check that the items listed in the checklist are installed. In the last year, 1,087 homes - 25% of new, single family construction - were star rated in Austin Energy’s service area.

As of 2000, all new city-owned buildings must be at least LEED Silver standard. The redevelopment of the now closed Robert Mueller Municipal Airport will contain over 5 million square feet of commercial space and over 4,000 residential units when built out. All commercial buildings must meet either a LEED Silver standard or attain 2 stars on the Austin Energy Green Building Program’s Commercial Rating tool. All housing must meet an Austin Energy Green Building three star level.

**Economic Dimension**

**Multi-family Building Programs** 40% of AE’s customers live in rental housing. Many of these rental units are in multi-family buildings. AE’s website has an apartment finder that helps perspective renters find energy efficient apartments.

This resource provides a strong incentive for property owners to implement energy efficient measures on their rental units. Other incentives for multi-family building owners include lower operating costs, increased occupancy, increased market values, and rebates up to $100,000. For their part, tenants see utility savings of up to 40%, improved air quality, and a higher level of comfort.
More than 40,000 apartment units throughout Austin have received rebates for energy investments through the Multi-Family Program totaling over five million dollars.¹

**Income Qualified Programs** Free programs are available to income qualified homeowners and to renters who have been in a home, mobile home, or duplex for a year.

**New Businesses - New Jobs** Austin Energy created an economic development incentive to bring solar manufacturing to Austin. The solar rebate is increased to $6.25 per watt for solar installations that use solar equipment manufactured in Austin.

The renewable program itself caused the number of Austin-based registered solar installers to increase from 3 to 8 solar installers in one year.

### 5.2.4 Chicago as a sustainable City

Population: 2,890,000, metropolitan area: 8,400,000, land area: 228 sq. miles, rainfall: 36 inches per year, Cooling degree days: 940, heating degree days: 6176. Mayor is elected. City Council consists of 50 Aldermen. Sustainability as a major goal started in the year 2000. Natural gas is provided by Peoples Energy. Peak load occurs mid-day during the summer.

Chicago is a member of the Chicago Climate Exchange. While the city does track its greenhouse gas emissions, it does not trade them, preferring to bank or retire them.

**Managerial Dimension (Governance)**

Mayor Richard M. Daley’s oft-stated goal is for Chicago to become “the most environment-friendly city in America.” Mayor Daley has suggested that “encouraging environmental innovation will be beneficial for the health of both our citizens and our economy. Conserving natural resources, and encouraging environmentally efficient behavior from citizens and businesses, not only ensures the sustained health of the City but it also makes plain common sense of life in our great neighborhoods.” “Leading by example” is Chicago’s intent. The city has established aggressive goals for city and allied agency buildings, including a target of 20 percent municipal electricity from renewable resources by 2005, and an envisioned 30% reduction in environmental footprint by 2020.

In 2005, Chicago released an 80-page Environmental Action Agenda: Building the Sustainable City. The comprehensive and detailed plan is divided into 17 functional areas - Airports to Waste and Recycling.

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¹ SUSTAINABLE CITIES Best Practices for Renewable Energy & Energy Efficiency
Austin • Chicago • Fort Collins • Portland sierrac club.org/energy/library/sustainable cities. PDF
There are three primary strategies within the agenda:

1. Conserving, protecting, and restoring natural resources.
2. Encouraging healthy environmental practices.
3. Leading by example.

Each functional area has sections for Mission, Accomplishments, Action Agenda for 2005, and Action Agenda for 2010/2020.¹

**Financial Dimension (Costs, Sources)**

**Funding** Initial funding was greatly helped by a 1999 settlement agreement with Coming for $100 million. The settlement came about after power failures during major heat waves in 1995 and 1999 resulted in hundreds of deaths.

EE & RE projects are paid for via the settlement fund, together with grant monies, funds from the city budget, and other funding mechanisms.

Additional funding of $6 million was negotiated within the Chicago municipal franchise agreement with Coming. This was partially used to fund the Chicago Solar Partnership.

**Reduced Energy Costs** The City is in the process of auditing and retrofitting 15 million square feet of public buildings with efficient equipment for heating and cooling, lighting and ventilation. Energy savings are estimated to be $6 million annually. In addition, the retrofits will reduce annual pollution significantly — an estimated 30,000 tons of carbon dioxide, 84 tons of nitrous oxides and 128 tons of sulfur dioxide.

**Ecological Dimension**

**Green Building** Because city buildings are expected to have a 100-years life, the city has made huge commitment to designing and building superior new structures.

If a commercial builder takes city money under a grant program for a new building, their end-product must have a green roof, be energy star compliant, or be LEED certified.

The Green Bungalow Program renovated four abandoned bungalows for moderate income ownership. Energy efficient and environmentally sustainable rehabilitation techniques incorporated into the project afforded energy savings of up to $1,050/year. Drawing considerable public attention, the program was publicized through newspaper and magazine articles, websites and conference presentations. Over 2,000 people have toured the houses.

¹ SUSTAINABLE CITIES Best Practices for Renewable Energy & Energy Efficiency
Austin • Chicago • Fort Collins • Portland sierraclub.org/energy/library/sustainable cities. PDF
Economic Dimension

Multi-Family Building Programs Most of the multi-family EE activity in Chicago has been aimed at either city-owned or managed properties. 63 multifamily buildings - or 1,447 units - have been rehabilitated since 1988. Seven new multi-family buildings - 570 units - have been built so as to maximize energy efficiency. Results include an average space heating reduction of 50%.

Income Qualified Programs Working with other agencies, the city has created the New Homes for Chicago Program. The award-winning New Homes for South Chicago project is being developed by consultants in Partnership with the Chicago departments of Housing and Environment. This 25-homes project incorporates many energy efficiency features. For example, the homes are constructed with Structural Insulated Panels (SIPs).

Half the homes will also include solar electric (Photovoltaic) systems. Funded and supported by a variety of grants and programs, the goal was to make this project as green as possible. Lessons learned so far include that SIPs, while more expensive to buy, in fact cost lower than standard construction framing due to reduced labor and waste cost.¹

¹ Sustainable Cities Best Practices for Renewable Energy & Energy Efficiency: Austin • Chicago • Fort Collins • Portland  www.sierraclub.org/energy/library/sustainablecities.PDF
6. Criteria-Model for Sustainable Egyptian Cities

Today, cities worldwide are confronted with an enormous quantity and quality of challenges which cannot be handled by traditional methods of management and governance any longer. The social, economic, ecological and cultural problems are pressing and cumulating even further due to accelerated growth, change, and globalization.

In the future, more cities will adapt and follow principles and criteria of Sustainable Development.

By examining the characteristics of a sustainable community, a better understanding can be reached about defining a sustainable community. Being very complex entities, cities can be characterized by a number of different properties. These properties may change across countries and geographical regions. Therefore there is no intention in this chapter to deliver the ultimate criteria system, to offer the miraculous one-size-fits-all definition. Rather, it is intended to present food for thought, material for a better orientation of one’s own working field and tasks, to serve a sound basis for defining an individual system for specific circumstances through all major stakeholders in a community. Only such a participatory approach towards defining criteria will mobilize support and foster legitimacy for the whole activity and project.

As mentioned above, the most important sustainability dimensions in sustainable cities are: economy, environment, social cohesion, and governance. They are the pillars of a sustainable city. These must be in balance and therefore require an integrated approach. Dialogue is the basic principle for achieving this for Local Agenda 21.¹

**Economic** issues include good jobs, good wages, stable businesses, appropriate technology development and implementation, business development, etc. If a community does not have a strong economy, then it can not be healthy and sustainable over the long term. From an environmental standpoint, a community can be sustainable over the long term only if it is not degrading its environment or using up finite resources.

**Environmental** concerns include protecting human and environmental health; having healthy ecosystems and habitat; reducing and/or eliminating pollution in water, air, and land; providing green spaces and parks for wildlife, recreation, and other uses; pursuing ecosystem management; protecting biodiversity; etc.…

**Social** issues addressed in sustainable community efforts include education, crime, equity, inner-city problems, community building, spirituality, environmental justice, etc. If a community has significant social problems, such as serious crime, then it cannot be healthy and stable over the long term.

¹ This and some of the following formulations are taken from The Hague, 23, 24, 25 June 1999: http://www.denhaag.nl/sust.cities99/theme.htm
The management and governance of human settlements is a basic part of the development of civilizations for several thousands of years. Most sustainable community efforts also involve an open process in which every member of the community is encouraged to participate. The focus is on consensus building for the community. The emphasis is on communication and cooperation among many different interests and stakeholders from the community and also from those outside the geographic community if their actions might affect the community. Compromise by special interests is also important where necessary. All the different segments of the community at the local and regional levels, including businesses, individuals, environmental and community groups, and the government, need to cooperatively work together to move toward sustainability.

6.1 Definition set for Sustainable Cities

Within the scientific discourse about sustainability there are more than 200 different definitions in use. Based on many other definitions and concepts and in order to contribute to the rapid development of cities in Egypt, we propose - based on the principles of sustainable development - the following criteria for sustainable cities for Egypt. Sustainable cities in Egypt should

- Utilize and mobilize all relevant means – knowledge, stakeholders, etc. – to improve and secure the quality of life for its citizens and guests, and for future generations.
- Use all resources efficiently (by resource management), and actively seek to retain and enhance a locally/regionally based economy (sustainable economics, self-sufficiency).
- Know the costs of non-action, of postponing urgent decisions and actions. They are open to learn from their own experience and from others, they initiate a continuous learning process and reflexive management.
- Take steps to take into account future generations and to take a balanced and healthy course over the long term.
- Have a strong sense of responsibility, care, solidarity, human development, ethical principals, happiness, feel like "home", safety and security – regardless of citizens' individual beliefs, sex/gender, age, class and race.
- Create a vision that is embraced and actively promoted by all of the key sectors of society, including businesses, disadvantaged groups, environmentalists, civic associations, government agencies, and religious organizations.

• Build on their assets, local traditions and potentials, use all their resources effectively and try to be innovative: to make their city and their citizens "fit for future".

• Create a pervasive volunteer spirit and a sense of community that is rewarded by concrete results. Partnerships between and among the government, the business sector, and nonprofit organizations are getting common. Public debate and participation oriented on the local specific needs in these communities is engaging, inclusive, and constructive and creates ownership.

6.2 Sustainable Cities for Egypt - A Criteria Model

A sustainable Egyptian city can be described as one that is able to provide the basic needs of the population along with the necessary infrastructure of civic amenities, health and medical care, housing, education, transportation, employment, good governance, etc. It should take care of the population's needs and all sections of society without discrimination. As it pertains to conditions in Egypt, due emphasis would be in controlling population growth and providing housing to the impoverished sections of society who live in sub-human conditions in slums, eking out livelihoods below the minimum wages and creating environmental degradation. Burgeoning population also leads to exploitation, crime and lawlessness due to shrinking job opportunities. For example, the population of Cairo increases every year due to migration, putting a question mark on the sustainability of this capital metropolis. This alarming increase in population puts an unacceptable strain on housing, employment, healthcare, water and electricity. Large "green" areas are converted to housing colonies leading to environmental degradation.

The following table presents a combination of the different dimensions of Sustainability and their specific manifestations on different levels of reality. For each of the five Sustainability dimensions, 3 distinct features are formulated for sustainable Egyptian Cities.

Table 6: Criteria Model for Sustainable Cities in Egypt

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Fields of Action</th>
<th>Quality Targets</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>Ecological urban design</td>
<td>Compact forms of residential development - Smart architecture - Natural open</td>
<td>Ratio of natural open space per capita, public transport intensity, green</td>
</tr>
<tr>
<td></td>
<td>Green architecture</td>
<td>spaces - Mixed land use; homes, jobs and shopping in close proximity - Affordable</td>
<td>buildings, population density, informal areas etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>housing; Public transport</td>
<td></td>
</tr>
<tr>
<td>Economic</td>
<td>Increase in resource efficiency</td>
<td>Good jobs - Decent wages - Stable businesses - Appropriate technology</td>
<td>Employment rate, vocational training and qualification quota, average</td>
</tr>
<tr>
<td></td>
<td>High employment and decent jobs</td>
<td>development and</td>
<td>wage of women,</td>
</tr>
</tbody>
</table>
### Sustainable Cities in Egypt

#### 6.3 Suggestions: Steps and Success Factors for Sustainable Cities

Leading a community towards Sustainability is ambitious and necessary. Fortunately many cities have begun this innovative kind of future-oriented process. Based on the experience in sustainability projects in many European countries and elsewhere, it is of utmost importance to improve, innovate and modernize policy and management activities (towards sustainable governance). There are twelve steps identified for initiatives for SD that have to be considered, and which are factors for success:

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<table>
<thead>
<tr>
<th>Socio-cultural</th>
<th>Implementation - Business development - Good infrastructure</th>
<th>closure rate, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Populations structure Quality of life Better education Safety and health Gender equality Public debates, pluralism and tolerance (media etc.)</td>
<td>Re-use of materials – Reclamation - Reduction of industrial waste - Using wind and solar energy - Eliminating pollution in water, air, and land</td>
<td>Share of renewable energy sources in total energy consumption, % greenhouse gas emissions, concentration of air pollution, etc.</td>
</tr>
<tr>
<td>Increased role of local government – Decentralization - Local capacity – Corruption – Better resources</td>
<td>Better transparency - Public participation - Equity</td>
<td>Level of decentralization - adequacy of financial resources – election participation etc.</td>
</tr>
</tbody>
</table>

This system of dimensions, criteria and indicators for a sustainable city development is meant to function as an inspiration for decision-makers, organizations and interested citizens. It has to be underlined again, that as part of a process of an activity towards sustainable development, the use of criteria and principles is crucial because it is all about quality of life and concrete impact and lasting solutions. Criteria etc. serve as guidance for all action, small and big, individual and collective. Therefore it is necessary to construct or (re)define specific criteria systems for each major city strategy.

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<table>
<thead>
<tr>
<th>Environmental</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing resource use - Renewable energy - Healthy ecosystems and habitats (water, air etc.)</td>
<td>Re-use of materials – Reclamation - Reduction of industrial waste - Using wind and solar energy - Eliminating pollution in water, air, and land</td>
<td>Share of renewable energy sources in total energy consumption, % greenhouse gas emissions, concentration of air pollution, etc.</td>
</tr>
</tbody>
</table>

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### Table: Criteria for Sustainable City Development

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Criteria</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-cultural</td>
<td>Good business base Training and qualification (human capital)</td>
<td>implementation - Business development - Good infrastructure</td>
</tr>
<tr>
<td></td>
<td>Populations structure Quality of life Better education Safety and health Gender equality Public debates, pluralism and tolerance (media etc.)</td>
<td>Premature mortality, primary school education quota, literacy, crime rate, health expenditures, hospital occupancy etc.</td>
</tr>
<tr>
<td>Environmental</td>
<td>Reducing resource use - Renewable energy - Healthy ecosystems and habitats (water, air etc.)</td>
<td>Share of renewable energy sources in total energy consumption, % greenhouse gas emissions, concentration of air pollution, etc.</td>
</tr>
<tr>
<td>Governance</td>
<td>Increased role of local government – Decentralization - Local capacity – Corruption – Better resources</td>
<td>Better transparency - Public participation - Equity</td>
</tr>
<tr>
<td></td>
<td>Re-use of materials – Reclamation - Reduction of industrial waste - Using wind and solar energy - Eliminating pollution in water, air, and land</td>
<td>Level of decentralization - adequacy of financial resources – election participation etc.</td>
</tr>
</tbody>
</table>
1. **Utilizing Tools**: For identifying the current situation and major challenges on the local level, tools should be utilized like SWOT-analysis, sustainability reporting, establishing task forces, establishment of parliamentary Inquiry Commissions etc.

2. **Defining indicators and setting up a Strategy**: For setting goals and priorities approaches like the creation of a community vision, systems of indicators, and the development of a local strategy for SD or a Local Agenda 21 should be used.

3. **Strong management**: For increasing the relevance and impact of SD in the community, steps should be taken like a supportive decision by city council, resolutions adopted by local parliaments, self-commitments declared by organizations from civil society and especially business to act according to SD principles.

4. **Policy integration**: For increasing integration and producing synergies between sectors and programs several approaches have been used; for instance to combine LA-21-processes with other community procedures like Integrated City Development, administrative reform, city marketing, policies to reduce climate change, and sometimes in the course of these activities resort-crossing lead visions and SD-indicators were established.

5. **Internal Communication and Coordination**: For improving goal-orientation and efficiency on the local level, the establishment of central clearing- and coordination offices, professional moderators, process management, and qualification activities for actors should be put in place, councils and advisory boards are recommended.

6. **Incentives for projects and innovations**: In order to make sustainability "visible" attractive projects should be realized within the local authorities and corporations. Incentives such as awards and prizes could be used as a support for projects with strong impacts.

7. **Resource mobilization**: For mobilization and strengthening of resources, steps have been taken like exchange place for volunteers, citizens foundations, citizens budgets, pilot projects between citizens and administrations, regular feedback from and to volunteers; corporations can support sponsoring and fundraising.

8. **Strong Public Relations**: For communicating the activities and results, smart public relations should be practiced, attractive presentation of success stories and possibilities for concrete action and participation in relevant media, using internet, newsletters, printed products, initiating awards etc.

9. **Deepening Participation**: For enhancing and deepening participation and civic engagement, methods like Round Table, Future Workshops and Future Conferences, Open Space, Planning Cells, Public Hearings, Citizens Decisions should be used.
10. **Local and Regional Networking**: In order to strengthen SD-activities, several approaches for local and regional networking could be used, such as city-belt-cooperation, Local Agenda 21-Networks etc.

11. **Strong Evaluation and Monitoring Systems**: In order to use resources in a more efficient way various tools for evaluation and controlling should be used, among them SD indicators, monitoring systems, SWOT-analysis, SD reports of administrations, institutions or corporations; Sustainability checks for bills in local and regional parliaments, competitions for SD.

12. **Capacity Building**: In order to develop supportive and strengthening context conditions, there should be concentrated support for capacity building (i.e. for monitoring and evaluation, conducting campaigns with support from all relevant institutions).

"Toolkit" for decision makers in a sustainable cities process (characteristics):

(i) Strategic thrusts are the product of high quality rapid assessment, the Vision, and SWOT analysis. The thrusts follow logically from the foregoing. Thus it is internally consistent.

(ii) It consists of a limited number of strategic thrusts, the product of tough choices. In a good strategy, **nothing is of equal importance**.

(iii) It is realistic, but challenging.

(iv) Because it focuses on a limited number of actions, the Sustainable City strategy has a high probability of producing results.

(v) Achievement is measurable, and is measured, using a set of lean, powerful results-oriented indicators.

(vi) Strategic thrusts are cross-cutting, rarely is a strategic thrust implemented by one agency. Different types of agencies, enterprises, and actors, different modes (e.g., public sector delivery, public-private partnerships, changed household behavior motivated by changed incentive structures, awareness campaigns) are utilized to implement strategies.

(vii) Responsibility for implementation is clearly defined, against definitive targets and timelines. Champions need to be identified to push implementation of each strategic thrust.

(viii) Incentives are in place to drive performance – to institutions and individuals that excel in strategy implementation. These can take a variety of forms, e.g., financial, awards, and community recognition.
(ix) Flexibility exists within the strategic framework to adapt and change tactics as conditions change, but the vision remains constant.

Sustainable Development at the local level is a basic issue for communities and their leadership. Yet, as is known from many examples support and incentives from the national level of a country are of utmost relevance, they can make a difference. In countries like Sweden, Great Britain and Germany specific help from the national administration and agencies made it able, that many cities started Sustainable processes, some of them very successful.

Therefore, in the case of Egypt with its strong central government, it should also support local activities with great esteem and resources. Besides the relevant ministries, state agencies and governorate institutions, the local sustainable development could become a major task for the Egyptian National Commission on Sustainable Development, which was established in 2006 by Prime Minister Dr. Ahmed Nazif (Prime Minister Resolution No. 74 2006). The Commission is chaired by the Minister of the Environment. The Commission has the task to adopt national policies for sustainable development and give direction for the integration of environmental issues in the sectors of development and various services, and to review and approve the national strategy for sustainable development. The Commission also ratified the plans and requirements for providing technical support to all the national authorities concerned to achieve sustainable development, evaluation and certification of action plans and proposed funding of the Technical Secretariat according to the priorities of national action plans. The Commission is adopting a platform for private support and will promote decentralization through the delegation of authority to institutions in various sectors and geographic ranges. The Commission is also asked to support the use of implementation methodologies to support decentralization and participation of all actors at various geographic levels. The Commission seems to be an important partner for local sustainability processes. It could mobilize many resources and commitment in communities.

1 Members of the Commission are high-ranking representatives from the ministries of finance, housing, oil, electricity, international cooperation, planning and local development, health, population, agriculture and Higher Education and Scientific Research, Education, Foreign Affairs, Information, Transport and the State for Administrative Development, investment, tourism, trade and industry. Furthermore, there are representatives of the National Council for Women, the Federation of Industries, the General Federation of Private Associations, the General Federation of Chambers of Commerce, the General Union of Workers, the Supreme Council of the Press, the Central Agricultural Cooperative Union and the National Council for Youth.
Attachment 1:
References and selected literature


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Attachment 2:
Interviews were conducted with the following experts

- Dr. Hala Adel
  National Authority for Remote Sensing and Space Sciences (NARSS)

- Ahmed Farouk
  Project Manager, Center for Development Services

- Dr. Sherif Al-Gohary
  Ein Shams University, Faculty of Architecture

- Dr. Mostafa Madbouly
  Deputy Chairman, GOPP-General Authority for Physical Planning (MHUUD)

- Ali Mokhtar
  Program Manager, Center for Development Services

- David Sims
  Urban Development Expert, Consultant for World Bank etc.

- Prof. Dr. Richard Tutwiler
  Director, AUC – Desert Development Center

- Prof. Dr. Adel Yasseen
  Ein Shams University, Faculty of Architecture

- Dr. Abd El-Wahab
  Banha University, Environmental Consultant

- Paul Weber
  Expert, German Development Cooperation (GTZ) Water Development Project