New Urbanism, Smart Growth and Informal Areas: A Quest for Sustainability

Heba Allah Essam El-Din Khalil
Department of Architecture, Faculty of Engineering, Cairo University, Egypt.

Abstract

Informal urban growth has been the primary trend of urban growth for the past decades, mostly in developing countries where there is a clear lack of proper urban planning and management. Thus the study of these areas and their impact is most needed. On the other hand, in the developed world, there has been a debate about sustainable development and whether to go compact or to disperse and integrate with nature. There are a number of middle positions; the urban village, 'new urbanism', the sustainable urban matrix, transit-oriented development, smart growth and sustainable urbanism, which try to combine the energy efficiency gained from a compact urban form with the broader quality-of-life aspects gained from the dispersed city. This paper attempts to compare the main guidelines of sustainable urbanism theories to informal urban development, addressing issues of sustainability. The study will depend mainly on informal areas built on agricultural land, which is almost exclusive to Egypt rather than squatter areas. By highlighting their sustainability advantages and the disadvantages, potentials can be preserved when attempting to upgrade or rebuild these areas and assure their sustainability based on local proven experience. Thus, participating in the quest for more sustainable cities locally rooted rather than globally induced.

Keywords: new urbanism, smart growth, sustainable urbanism, informal areas, upgrading.

1 Introduction: Urbanization and Sustainability

Urbanization is the leading sector humans are working on where the ever-growing population is spreading globally, and constantly moving into cities. The major urbanization activities are taking place in the developing world. Over the past 50

years, cities have expanded into the land around them at a rapid rate. Highways and transport systems have been built and valuable farmland has been lost.

Globally, urbanization levels will rise dramatically in the next 40 years to 70 per cent, with a population of almost 6.4 billion. (UN Population Division, 2007) According to the UN- Habitat 2008 report "The State of the World's Cities 2008/2009: Harmonious Cities", every day 193,107 new city dwellers are added to the world's urban population, which translates to slightly more than two people every second. In developed nations, the total increase in urban population per month is 500,000, with annual growth rate of 0.54%, compared to 5 million in the developing world, with annual growth rate of 2.67%, for the years 2000-2005.

Cities and urban settlements must be prepared to meet this challenge. In order to avoid being victims of their own success, cities must search for ways in which to develop sustainably. A successful city must balance social, economic and environmental needs: it has to respond to pressure from all sides.

There are a number of arising theories that define sustainable urban development. In the western world there are urban movements that combat suburbanisation, such as "new urbanism", smart growth, TOD and sustainable urbanism. They attempt to achieve more environmentally sustainable urbanism. This urbanism as specified by the UN-HABITAT (2009) requires that (a)greenhouse gas emissions are reduced and serious climate change mitigation and adaptation actions are implemented; (b) urban sprawl is minimized and more compact towns and cities served by public transport are developed; (c) non-renewable resources are sensibly used and conserved; (d) renewable resources are not depleted; (e) the energy used and the waste produced per unit of output or consumption is reduced; (f) the waste produced is recycled or disposed of in ways that do not damage the wider environment; and (g) the ecological footprint of towns and cities is reduced.

While cities in the developed world grow in a planned pattern, following one code or the other, compact or dispersed, those in the developing world mostly grow informally. This informal growth poses an additional challenge to the urbanisation process itself. The Habitat agenda stresses that cities, in their quest for development, should consider social aspects. These aspects are (a) equal access to and fair and equitable provision of services; (b) social integration by prohibiting discrimination and offering opportunities and physical space to encourage positive interaction; (c) gender and disability sensitive planning and management; and (d) the prevention, reduction and elimination of violence and crime. (United Nations Human Settlements Programme UN-HABITAT, 2009)

The paper addresses the issue of informal urbanization in the developing world and compares it to sustainability criteria as specified by the new trends of sustainable urbanism. The paper highlights the green aspects of the most form of urbanization in the developing world, with special reference to Egypt, as opposed to the dominating idea of unsafe, informal and illegal areas. These sustainability potentials can be the ground for upgrading programs beside the provision of shelter, water, sanitation and services.

2 Western Urbanization and The Call for Sustainable Urban Development

The developed world urban settlements are expanding mainly by suburbanization and the creation of new settlements. There is much debate about how to urbanize sustainably, how to combat the disadvantages of current planning theories ruling urban expansion. There are mainly two trends or two poles driving urban planning and growth; the compact and the dispersed development.

2.1 Compact vs. dispersed urban development

The main principle in the compact city theory is high-density development close to or within the city core with a mixture of housing, workplaces and shops. This implies densely and concentrated housing development, which favors semi-detached and multifamily housing. This development supports a number of other attributes that are favorable to sustainable energy use: low energy use for housing and everyday travel, efficient remote heating/cooling systems, proximity to a variety of workplaces, public and private services, as well as a highly developed public transport system. The supporters of the compact city theory (for example, Jacobs, 1961; Newman and Kenworthy, 1989; CEC, 1990; Elkin et al., 1991; Sherlock, 1991; Enwicht, 1992; McLaren, 1992) believe that the compact city has environmental and energy advantages, as well as social benefits. However, the main justification for the compact city is that it results in the least energy-intensive activity pattern, thereby helping us cope with the issues of global warming.

The supporters of the dispersed city, on the other hand, as stated by Næss (1997) suggest the green city—i.e. a more open type of urban structure, where buildings, fields and other green areas form a mosaic like pattern. (Holden & Norland, November 2005) However, this dispersed development that embraces nature into the urban context has other impacts that are not at all sustainable. Sprawling land development has been consuming most of American countryside at an alarming rate. Sprawl is defined as development that is dispersed, auto-dependent, single use, and impossible to walk to your daily needs. There is a growing general awareness that low-density residential development threatens farmland and open space, raises public service costs, encourages people and wealth to leave central cities, creates serious traffic congestion, and degrades the environment and our quality of life. (Tirado)

The disagreements between the compact city and dispersed city discourses can, to a large extent, be summarized as a debate about two issues: which form affords the greater energy efficiency; and, which aspects of sustainable development are more important? (Khalil, 2009)

2.2 Emerging trends in urbanization

The dispute between the two camps (compact and dispersed) has led to the development of a number of middle positions, which try to combine the best

aspects of both the compact and the dispersed city discourses, while at the same time trying to avoid the disadvantages of each. Among such alternative middle positions are the urban village (Newman and Kenworthy, 1999; Thompson-Fawcett, 2000), 'new urbanism', the sustainable urban matrix (Hasic, 2000), transit-oriented development (Boarnet and Crane, 2001), smart growth (Stoel, 1999), decentralized concentration (Breheny, 1996; Høyer and Holden, 2003; Holden, 2004) and sustainable urbanism (Farr, 2008). These alternatives all try to combine the energy efficiency gained from a compact urban form with the broader quality-of-life aspects gained from the dispersed city. (Holden & Norland, November 2005)

2.2.1 Smart Growth

Smart growth initiatives identify the relationship between development patterns and quality of life by implementing new policies and practices promoting better housing, transportation, economic development and preservation of environmental quality. It has its roots back to the 1970s, however, it consolidated when Harriet Tregoning, then Director of Development, Community, and Environment at the US Environment Protection Agency, developed the ten principles of smart growth in 1996. At that time, many enviromentalists were simply anti-growth, viewing all development, without distinction, as hostile to the environment. These principles succeeded in uniting a decentralized grassroots movement of local and regional citizen activists and municipal leaders under the Smart Growth banner. (Farr, 2008)

The ten principles of Smart Growth are: (1) mix land uses; (2) take advantage of compact building design; (3) create housing opportunities and choices for a range of household types, family size and incomes; (4) create walkable neighborhoods; (5) foster distinctive, attractive communities with a strong sense of place; (6) preserve open space, farmland, natural beauty, and critical environmental areas; (7) reinvest in and strengthen existing communities & achieve more balanced regional development; (8) provide a variety of transportation choices; (9) make development decisions predictable, fair and cost-effective and; (10) encourage citizen and stakeholder participation in development decisions. (Tirado)

2.2.2 New Urbanism

The congress of New Urbanism CNU was founded by six architects – Peter Calthorpe, Andres Duany, Elizabeth Plater-Zyberk, Stephanos Polyzoides, and Daniel Solomon in 1993.They united around a shared vision of promoting traditional urbanism as an antidote to conventional sprawl. A founding goal of the CNU was to write a charter that would rebut CIAM and its Athens Charter and serve as a governing document for this reform movement.

Farr (2008) states that the greatest strength of the CNU has been its design excellence and rhetorical mastery in communicating the vocabulary of urbanism as it related to clients' projects. It has excelled in creating mixed-use neirhbourhood developments and transit villages, featuring town centres, fine-

grained walkable street grids, and a highly diverse ensemble of traditional buildings and architectural styles. He adds that the two new urbanist innovations, the urban-rural transect and the smart code, both developed by Andres Duany, have the potential to reshape the urban development process. The urban-rural transect applies the ecological framework of the natural transect to describe human settlements across a spectrum of intensity ranging from wilderness to dense urban centres. The smart code is a transect-based, form-based code which seeks to replace existing zoning codes with new codes which are simple, clear and can be calibrated locally.

The principles of urbanism can be applied increasingly to projects at the full range of scales from a single building to an entire community. These principles are as follows: (Priciples of New Urbanism)

1. Walkability: implying that (a) most things are within a 10-minute walk of home and work; (b) pedestrian friendly street design (buildings close to street; porches, windows & doors; tree-lined streets; on street parking; hidden parking lots; garages in rear lane; narrow, slow speed streets) and; (c) pedestrian streets free of cars in special cases.

2. Connectivity: having (a) an interconnected street grid network that disperses traffic & eases walking; (b) a hierarchy of narrow streets, boulevards, and alleys and; (c) a high quality pedestrian network and public realm which makes walking pleasurable.

3. Mixed-use & diversity: having (a) a mix of shops, offices, apartments, and homes on site. Mixed-use within neighborhoods, within blocks, and within buildings and; (b) diversity of people - of ages, income levels, cultures, and races.

4. Mixed housing: with a range of types, sizes and prices in closer proximity

5. Quality architecture & urban design that emphasises beauty, aesthetics, human comfort, creates a sense of place; and advocates special placement of civic uses and sites within community. Moreover, the human scale architecture & beautiful surroundings nourish the human spirit.

6. Traditional neighborhood structure, where there is (a) a discernable center and edge with public space at center; (b) importance of quality public realm; public open space designed as civic art; (c) a range of uses and densities within 10-minute walk and; (d) transect planning: highest densities at town center; progressively less dense towards the edge. This urban-to-rural transect hierarchy has appropriate building and street types for each area along the continuum.

7. Increased density where more buildings, residences, shops, and services are closer together for ease of walking, enabling a more efficient use of services and resources, and creating a more convenient, enjoyable place to live.

8. Green transportation including (a) a network of high-quality trains connecting cities, towns, and neighborhoods together and; (b) pedestrian-friendly design that encourages a greater use of bicycles, rollerblades, scooters, and walking as daily transportation.

9. Sustainability insuring (a) minimal environmental impact of development and its operations; (b) eco-friendly technologies, respect for ecology and value of natural systems; (c) energy efficiency, less use of finite fuels; (d) more walking, less driving and; (e) more local production.

10. Quality of life that result from the previous aspects, where places are created that enrich, uplift, and inspire the human spirit.

2.2.3 Transit oriented development TOD

Also known as Transit Oriented Design, or TOD, it is the creation of compact, walkable communities centered around high quality train systems. This makes it possible to live a higher quality life without complete dependence on a car for mobility and survival. It is a major solution to the serious and growing problems of peak oil and global warming by creating dense, walkable communities connected to a train line that greatly reduces the need for driving and the burning of fossil fuels.

Components of transit oriented design include (a) walkable design with pedestrian as the highest priority; (b) train station as prominent feature of town center with a regional node containing a mixture of uses in close proximity including office, residential, retail, and civic uses; (c) high density, high-quality development within 10-minute walk circle surrounding train station; (d) collector support transit systems including trolleys, streetcars, light rail, and buses, etc; (e) designed to include the easy use of bicycles, scooters, and rollerblades as daily support transportation systems and; (f) reduced and managed parking inside 10-minute walk circle around town center / train station.   (Transit Oriented Development)

2.2.4 LEED for Neighbourhood LEED-ND

Leadership in Energy and Environmental Design LEED which is a set of standards for green buildings was set in 1998. Its rating system was launched in 2000 by the United States Green Building Council USGBC. The LEED standard combines prerequisites, with optional credits that earn points towards an overall score. The levels of performance start at certified on the low end and platinum on the high end.

However, as Farr (2008) criticises, the shortcoming for LEED is its building-centric focus and low value it places on a project's location and context, particularly concerning auto-dependency. In 2002, the USGBC Board of Directors inaugurated the LEED for Neighbourhood Development rating system in partnership with the Congress of New Urbanism and the National Resource Defense Council. Moreover, it increases the weighting given to land use and transportation concerns. In 2005, the USGBC board modified its mission to address both buildings and community.

2.2.5 Sustainable Urbanism

In a more comprehensive movment, Farr (2008) establishes a new concept 'Sustainable Urbanism'. He states its basic tenets as walkable and transit-served urbanism integrated with high-performance buildings and high-performance infrastructure. Sustainable Urbanism emphasizes that the personal appeal and societal benefits of neighbourhood living – meeting daily needs on foot- are

greatest in neighbourhoods that integrate five attributes: definition (defined centre and edge), compactness (increasing sustainable effectiveness), completeness (daily and lifelong utility), connectedness (integrating transportation and land use), and biophilia (human access to nature).

2.3 Main Guidelines For Sustainable Urban Development

According to the previously mentioned new trends in urban planning, the main guidelines for sustainable urban development can be formulated in a number of criteria. (a) Defined neighbourhood with a defined centre and edge comprising a traditional neighborhood structure and advocating high quality architecture & urban design. (b) Compactness for an increased sustainable effectiveness through advocating walkability, connectivity, increased density and compact building design. (c) Completeness with daily and lifelong utilities including diversity of mixed-uses, mixed housing and fostering distinctive, attractive communities with a strong sense of place. (d) Connectedness with integrating transportation and land use, green transportation and a variety of transportation choices. (e) Enhancing the Quality of Life by preserving open space, farmland, natural beauty, and critical environmental areas and a more balanced regional development, promoting human access to nature. (f) Such sustainable urban development should encourage citizen and stakeholder participation in the development decisions.

3 The Developing World Urbanization: Informalization

Informal growth is the dominating pattern in the urbanisation process all over the developing world. It is the way how people supply their needs where their governments fail to do. Informalization can be defined as "a process which is unregulated by the institutions of society in a legal and social environment in which similar activities are regulated" (Oldham, Shorter, & Tekçe, 1994, p.10)

Roy (2005) states that there are two different perspectives dominating debates around informality. The first one is derived from Urban 21 Report published in the book Urban Future 21: A Global Agenda for 21st Century for the authors: Sir Peter Hall and Ulrich Pfeiffer. They see informally growing cities as deteriorating, decaying, and uncontrolled. The second prespective is pioneered by Herando De Soto in his book The Mystery of Capital (2000), where he considers informality as a heroic adventure. He views informal economy as people's natural and creative reaction to government inefficiency in supplying basic needs for the poor. However, these two perspectives represent two antidotes, where either is not solely true in itself. Instead, informality can be seen as a pattern for urbanization instead of versus formal sector, providing a promising resource instead of a catastrophe.

A recent definition of informal areas in Egypt is "all what is self-built, whether single or multi storey buildings or shacks, in the absence of law and urban regulations enforcement. They are areas built on land not allocated for construction as specified in the city urban plan. Despite the buildings' conditions may be good, they might be unsafe environmentally and socially, and or lacking

basic infrastructure and services." (General Organization of Physical Planning GOPP; United Nations Development Program UNDP, 2007)

There are mainly two types of informal areas: squatter areas and informal subdivisions. Squatter areas are mainly chaotic, unplanned and marginal, while informal subdivisions are subdivided land with legal ownership but lack infrastructure and areas for public services and uses. (Imperato & Ruster, 2003)

In Egypt, the general classification of informal areas includes the informal areas built on agricultural land, areas built on desert land, (the two main patterns of informal areas), in addition to shacks and environmentally unsafe areas.

3.1 Informal areas built on agricultural land.

They are illegal because they are built on agricultural land, not allocated for construction, and they defy the banning of mixed uses as specified by law. Their general characteristics are: (a) narrow long streets with width no more than 4-5 meters, some even with dead ends; (b) regular block shapes according to agricultural basins subdivisions and; (c) housing units having constant depth but with different street frontage. Heights are according to owner's affordability.

3.2 Informal areas built on desert land.

They appear on vacant land on city fringes, where the land is publicly owned, making the buildings there illegal. Their general characteristics are: (a) curved, uneven streets; (b) temporary houses made of primitive materials such as tin, carton or straw and; (c) insecure tenure.

3.3 Informal areas upgrading programs

Informal areas and slums pose a significant threat to the green agenda as many are built on physically unsafe land that is vulnerable to natural hazards. They often deprive the city of surrounding agricultural land and foreshore land for flood control and natural bio-filtration from fringing wetland vegetation. Severe erosion can result from steep slopes when they are settled upon.

Informal areas and slum upgrading programs are mainly concerned with a totally different agenda. These programs are oriented towards the brown agenda with 5 main dimensions namely: access to safe water, sanitation, providing secure tenure, durable housing and sufficient living area. These are the indicators set by UN- Habitat to identify the improvement of slum dwellers as stated by target 11 of the millennium development goals MDGs. However, this focus neglects other aspects of environmental sustainability such as reducing greenhouse gas emission, minimizing sprawling, sensible use of non renewable resources, waste recycling, reduced energy consumption and reduced cities' ecological footprint.

4 Do Informal Areas Possess Sustainable Potentials? Is Informalization "Smart"?

Usually when informal areas or slums are addressed, the brown agenda is the main concern and its relative indicators. However, they are rarely seen as having green aspects or sustainable characteristics. The following section discusses the presence of many of the sustainability aspects as stated by the new trends in urban planning in informal areas in the Egyptian context through 4 examples. Boulaq AlDakrour and Giza Northern sector (Imbaba) are 2 informal districts of Cairo, each with around 700-900 thousand inhabitants. The other examples are 2 upgrading projects, one located in vacant land of the relocated Imbaba airport, and the other in Zeinhom district, a formerly shack area that was demolished.

4.1 Defined neighbourhood (with quality architecture and urban design)

Informal areas usually have defined edges that separate them from their surrounding areas, a railroad, canal or ring road. They have a distinct urban pattern, especially those following agricultural basins subdivisions. However they don't have centres, instead, the main streets act as the centres with concentration of uses and markets. Secondary streets act as recreational spaces where children play due to the prevailing sense of security. (Figure 2)

What these areas lack is an overall urban vision as they are built incrementally. Moreover, where the land is privately owned, open spaces are usually overlooked as they have little or no economic revenue. Also, when there is an open space it is not taken care of unless there is a strong sense of community between residents. As for the quality of architecture, in some areas, it can be poor but can be upgraded to promote local character and sense of place. However the prevailing visual image is homogeneous, due to building with the same materials, bricks and concrete, and following the same urban pattern. (Figure 1)

4.2 Compactness:

Informal areas are compact with densities, e.g. 890 person/hectare in Boulaq Aldakrour district, exceeding other formal areas due to the privately development mechanism. Thus, providing a perfect setting for walkability and energy efficiency. The buildings are stacked together with usually only one free façade which minimizes thermal loads, maximizes space use and enhances energy efficiency. Compactness can be explained through the following aspects.
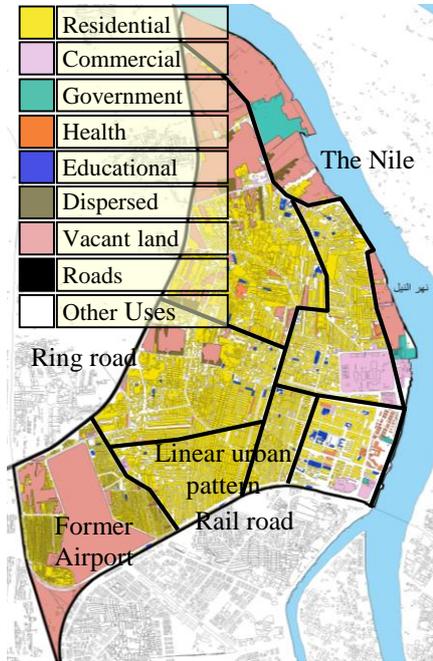
Figure 2 Giza Northern sector current Land Uses (Ministry of Housing, Utitilties and Urban Development, 2008)

Figure 1 Homogeneous buildings in Boulaq AlDakrour district

4.2.1 Walkability:

Informal areas are characterised by narrow streets which are mainly pedestrian. Services which are mainly community built are usually within less than 10 minutes walking distance. (Figure 3) However government provided services may not exist in close proximity.

4.2.2 Connectivity

Streets are interconnected; however they advocate pedestrians to vehicles as they are narrow. Although there is a network of wider streets, due to increased traffic load, they are usually congested specially at market places and area entrance points. Moreover, streets can be too long without crossings, which decrease connectivity. (Figure 4)

4.2.3 Increased density

Informal areas are characterized by very high densities (e.g. in Boulaq AlDakrour ranges from 490 to 2500 persons/ hectare) that usually upgrading programs tend to relocate some families to decrease this density if possible. However, high density should be kept, unless it poses a threat to human living conditions. The UN-HABITAT suggests a maximum crowdness indicator of 2persons/room.
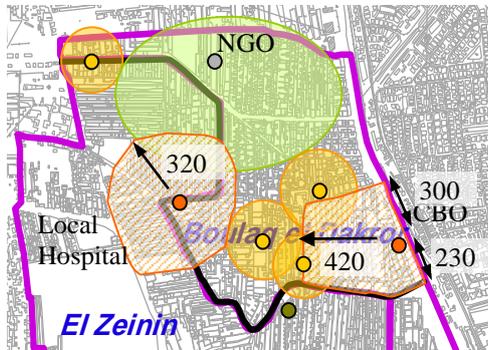
Figure 3 Community hospital, nursery, vocational centre located within 300– 500m for daily accessability
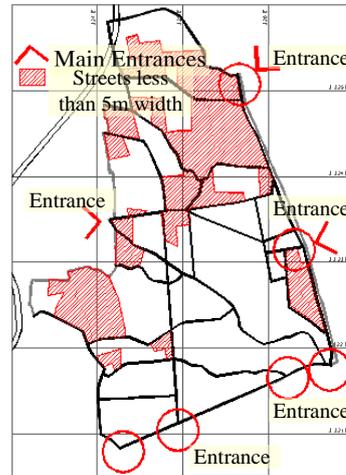

Figure 4 Street hierarchy and entrances in Boulaq AlDakrour, (GOPP; Giza Governorate; GTZ; Ministry of Housing, Utilities and Urban development, 2004)

4.3 Completeness with daily and lifelong utilities:

These areas have a variety of uses that make them complete and independent for daily needs. They can be considered as a separate identity and provide lifelong utilities for many residents. Residents can spend their life working, living in an informal area without having to go outside except for some higher educational and health services. This can be apparent through the following aspects.

4.3.1 Mixed-use & diversity

Informal areas are usually characterised by mixed uses which are seen by the formal authorities as incorrect. However, it is the mixed uses that give the area its richness, liveliness and advantage of availability of needs within the area, an advantage sought by the new urban trends plans. (Figure 5) these areas also offer uses and utilities for a diverse spectrum of groups, ages and incomes.

4.3.2 Mixed housing

There is a variety of housing opportunities in informal areas since they are community built and are driven by their needs. Different sizes are available and in some areas there is a variety of standards, especially in informal areas built on private lands. In Boulak Al-Dakrour, Giza, Egypt, there are buildings with high standard apartments and other buildings accommodating more than one household per unit. This diversity and community driven development pattern adds to the area's sense of place, as opposed to the identical blocks in publicly developed projects.
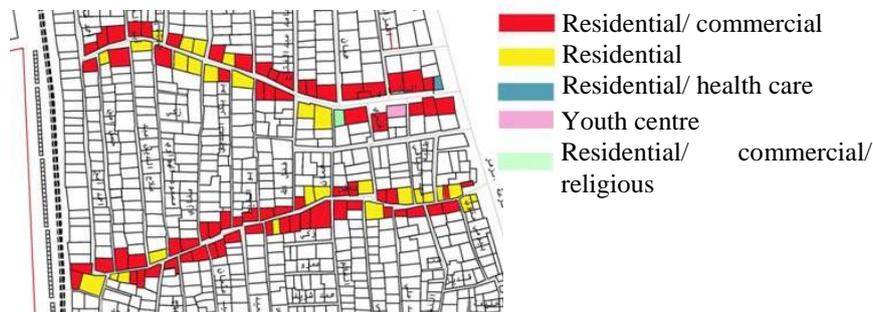
Figure 5 Mixed uses prevail in streets of Boulak Al-Dakrour (GTZ, 2007)

4.4 Connectedness with integrating transportation and land use

Informal areas have their own transportation network and modes that might be exclusive to them, which is why entrances to these areas are always considered as transportation nodes. They rely on private transportation modes, ranging from microbuses, pickup trucks, and recently autorickshaws (toktok). These are usually in bad condition, and driven by unlicensed drivers, thus posing threat to passengers' lives and to the environment. However, sometimes these areas are built beside railways, underground metro or transportation stations and can benefit from such facilities. Despite this drawback in transportation in informal areas, people use bicycles a lot or walk, thus adding to the area's green advantages. Land uses are distributed according to needs, where commercial uses and other services are distributed along the main streets, leaving the narrower streets for residential and recreational uses.

4.5 Enhancing the quality of life:

Since informal areas usually grow on undeveloped land whether it is agricultural or high risk zones, they do not provide access to nature. On the contrary they are a threat to nature. This can be overcome by preserving whatever vacant land that still exists inside the informal areas, and belting the whole area to prevent its further encroachment on green fields. However since these areas are usually on the fringes of cities they have the advantage of proximity to nearby nature. Hence, providing an outlet for overcrowded residents to enjoy nature. The quality of life of informal areas residents can be enhanced through addressing the attributes of the brown agenda and emphasizing their green advantages.

4.6 Stakeholder participation

Informal areas were self built by the community and its informal sector. Almost all development decisions are community directed. The community has succeeded in providing housing and basic services through collaborative efforts. Other services, such as child care facilities, medical centres, training centres, etc., are usually provided through community based organisations. Thus, these efforts provide a solid ground for further participation
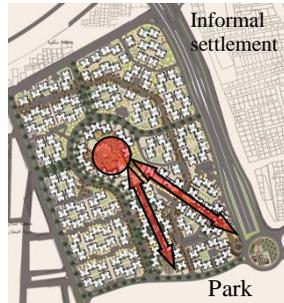
Figure 6 Imbaba Airport housing area. (Ministry of Housing, Utitilties and Urban Development, 2008)

Figure 7 Zeinhom Gardens housing project with its 3 stages (Cairo Governorate; Housing and Utilities Sector, 2009)

Most upgrading programs focus on the 5 main dimensions in accordance with the UN-Habitat indicators namely: access to safe water, sanitation, providing secure tenure, durable housing and sufficient living area. In this quest these programs might overlook the green potentials of the informal area to the extent they might decrease them. The rebuilding projects provide a perfect opportunity to build on the green potentials of informal areas and avoid their pitfalls.

In Imbaba housing project, managed by the government, a community piazza is designed to be the heart of the neighbourhood (13896 inhabitants on 22 hectares). The area is designed with 2 main mixed uses axes that link the areas to the adjacent park and lead to the main piazza with its community facilities (e.g. nursery and mosque). The design promotes pedestrenisation with proximity of services within 600m. The density is 630 persons/ hectare resembling the surrounding district, and commercial uses are integrated with residential buildings. The area provides a diversity of housing alternatives with one, two and three bedroom flats and handicapped adapted units, thus adding completeness to the area. However no green transportation was integrated into the project, only linking the area to the public bus root and the public/private microbus service. The project aspires to enhance the quality of life of relocated families due to demolishing their former houses during main streets widening in the comprehensive plan to upgrade Giza Northern sector. Moreover the nearby new park is one of the ambitious projects to improve the quality of life for the whole sector. This project has special significance as it had a lot of debates about it through the media for around 5 years or more since the relocation of Imbaba airport and hence the availability of its site for development. Various stakeholders participated in different stages from the preliminary concept to the various surveys and assessing needs and priorities. (Figure 6)

In Zeinhom Gardens Housing project the case was different. The site was formerly a shacks area and was designated for demolishing. The project, initiated by the government and the Red Crescent NGO, was implemented on 3 stages. The 1st and 2nd stages had typical designs for buildings with limited variations in colours; however the 3rd stage was adapted to contextual Islamic heritage of old

Cairo. The area is designed with pedestrian friendly streets and paths; however densities were lowered in the 1st stage to 388 persons/ hectare then increased in later stages to 580 persons/ hectare. Commercial facilities were built separately and were not allowed to be integrated into residential buildings; however services are provided within 10 minutes walking distances. Housing varieties are limited; however each phase avoided previous problems with unit design. The area depends on public/ private microbuses. The low built density has provided a lot of open spaces which enhanced the quality of life in the area, but their maintenance require much effort. This project was designed and implemented with minimum community participation except for 1st stage residents' requests that were integrated in later stages. (Figure 7) The previous discussion can be clearly seen through Table 1 which demonstrates the green aspects of examples of informal areas

Table 1: Analysis of the sustainability aspects of existing and rebuilt informal areas

Sustainable urban development	Giza Northern sector	Boulaq Al-Dakrour district	Zeinhom Gardens housing project	Imbaba Airport housing project
Defined neighbourhood: Quality Architecture & Urban Design	Defined boundaries and sense of security	Defined boundaries and sense of security and homogeneous buildings	3rd phase adapting to contextual Islamic heritage	Community piazza with mixed uses to promote sense of place and urban life
Compactness: Walkability Connectivity Increased Density	Pedestrian friendly streets	Pedestrian friendly streets	Pedestrian friendly streets	Promoting pedestrenisation
	High densities with up to 650 persons/ hectare	High densities with up to 890 persons/ hectare	388 persons/ hectare then amended in 3rd phase	New area with density of 630 persons/ hectare
Completeness: Mixed-Use & Diversity Mixed Housing	Uses are mixed	Uses are mixed	Separate area for commercial market	Commercial use is integrated into residential buildings
	Housing is needs-driven	Housing is needs-driven	Identical units but each phase avoided previous problems	1, 2 and 3 bedrooms apartments with handicapped adapted units
Connectedness: Green Transportation	Privately owned and operated with an underground metro under construction	Privately owned and operated with underground metro on the edge	Private and public mode of transportation	Private and public mode of transportation
Enhancing the quality of life	Strategic planning with parks and open spaces	Local upgrading programs under implementation	Rebuilding with better qualities & open spaces	Area is linked to adjacent park.
Stakeholder participation in development decisions	It was initially developed by community	It was initially developed by community	Minimal participation in the design process	Stakeholder participation in assessing needs and priorities

5 Conclusion

Unmanaged or chaotic urban growth is considered a significant obstacle to sustainable urban development. In a report about Egypt's achievement of the millennium development goals, it was recommended to plan and develop environmentally sustainable urban communities with affordable low-cost housing and improved operation and maintenance of water and sanitation services. (Ministry of Economic Development, 2008)

Since more than 60% of Egypt's urban development is informal, it is vital to study informal areas and analyze their sustainability. Through case study analysis, the paper highlighted some of their green characteristics. They are compact, walkable and dense. They provide lifelong needs with a variety of housing and mixed uses. They are initially needs driven and depend mainly on their communities participation in development. However, other absent sustainability aspects should be introduced as green transportation, and promoting access to nature. This can be done by controlling the encroachment of informal areas on agricultural land (belting informal areas), providing more sustainable housing opportunities, and transit oriented development. However the case might be different in slums and in squatter areas as they tend to be more environmentally hazardous.

The people's way of developing is "smart", however their settlements need a more comprehensive approach to insure the provision of needs; housing and services, in a more environmentally responsive pattern. This must be the basis for projects whether upgrading or redevelopment. The redevelopment projects showed how it is important to maintain high densities, walkability, mixed uses, mixed housing and to integrate with nearby open spaces. Providing access to safe water, sanitation, secure tenure, durable housing and sufficient living area should not divert projects from attending to other sustainability aspects.

On the other hand, new formal developments; especially for medium and upper strata, should not overlook the lessons learned from informal development. Low density dispersed suburbanisation is not the way for environmentally sustainable development. Henceforth there is a need to develop theories and guidelines for formal planning to address sustainability issues in both informal areas and their upgrading programs and new formal development deduced from the liveliness of informal areas and global guidelines for sustainable urban development, a more locally tailored theories and practices.

References

Cairo Governorate; Housing and Utilities Sector. (2009). *Zeinhom Gardens Housing Project.* Cairo: Cairo Governorate.

Farr, D. (2008). *Sustainable Urbanism: Urban Design with Nature.* New Jersey: John Wiley & Sons, Inc.

General Organisation of Physical Planning; Giza Governorate; GTZ; Ministry of Housing, Utilities and Urban development. (2004). *Boulaq AlDakrour District Guide Plan 2004-2017.* Cairo: GTZ.

General Organization of Physical Planning GOPP; United Nations Development Program UNDP. (2007). *Improving Living Condition within Informal Settlements through Adopting Participatory Planning: General Framework for Upgrading and Controling Informal Areas.* Cairo: Author.

GTZ. (2007). *Participatory Development in Urban Areas Program, Boulaq AlDakrour District.* Cairo: GTZ.

Holden, E., & Norland, I. T. (November 2005). Three Challenges for the Compact City as A Sustainable Urban Form: Household Consumption of Energy and Transport in Eight Residential Areas in the Greater Oslo Region. *Urban Studies, Vol. 42, No. 12* , 2145–2166.

Imperato, I., & Ruster, J. (2003). *Slum Upgrading and Participation: Lessons from Latin America.* Washington D.C.: The World Bank.

Khalil, H. (2009). Energy Efficiency Strategies in Urban Planning of Cites. *7th International Energy Conversion Engineering Conference IECEC 2009.* Orlando: AIAA.

Ministry of Economic Development. (2008). *Egypt Achieving The Millennium Development Goals: A Midpoint Assessment.* Cairo, Egypt: Author.

Ministry of Housing, Utitilties and Urban Development. (2008). *Project for Giza Northern Sector Development and Reuse of Imbaba Airport Site.* Cairo: Ministry of housing, Utilities and Urban Development.

Oldham, L., Shorter, F., & Tekçe, B. (1994). *A Place to Live, Families and Child Health in a Cairo Neighbourhood.* Cairo: The American University in Cairo Press.

Priciples of New Urbanism. (n.d.). Retrieved December 24, 2009, from New Urbanism: www.newurbanism.org/newurbanism

Roy, A. (2005). Urban Informality: Toward an Epistemology of Planning. *Journal of The American Planning Association , 71* (2).

Tirado, J. (n.d.). *Smart Growth Advances Nationally*. Retrieved December 24, 2009, from New Urbanism: www.newurbanism.org

Transit Oriented Development. (n.d.). Retrieved January 29, 2010, from Transit Oriented Development: Design for a livable sustainable future: www.transitorienteddevelopment.org

United Nations Human Settlements Programme UN-HABITAT. (2009). *Planning Sustainable Cities: Policy Directions, Global Report On Human Settlements, Abridged Edition.* UK & USA: Earthscan.

United Nations Human Settlements Programme UN-HABITAT. (2008). *State of the World's Cities 2008/2009: Harmonious Cities.* UK & USA: Earthscan.