

Challenges and Opportunities to Compact Urban Forms in Dubai

Urban environments are being transformed and developed at a massive pace and scale, which often precludes foresight and justification. Dubai, for example, is a case where numerous mega-scale developments were constructed in record time without being contagious or integrated into the existing urban environment. With this extreme and intense form of urbanism, the magnitude of ecological and social concerns has increased rapidly, leading to pressing spatial and morphological challenges.

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This paper attempts to elaborate whether or not high-density residential neighborhoods could be effectively implemented or be the norm in Dubai, as opposed to the status quo low density and single-use practices. In particular, I conducted a case study analysis of Dubai that explores and compares specialist, resident, and government opinions of compact urban forms for neighborhood development in Dubai. Results reveal that while experts and policy makers value urban compactness, residents of Dubai perceive density as a threat to their living conditions and privacy.

INTRODUCTION

Much of the discourse concerning housing stocks and policies in Dubai are driven by government policies, cultural norms, and market forces. This urban agenda has created ethnic and socio-economic enclaves and segregation. Citizens, native-born, have their own subsidized neighborhoods. Expatriates, including high- and middle-income classes, live in new mega projects like tower complexes, gated communities, islands, or themed projects, while a group of low-income class and migrant workers live in old districts, industrial sites, and labor dorms.

The whole planning system in Dubai and the broader region supports the idea of “separating” the national housing from non-national residential districts. Every citizen (native-born) household receives a government subsidy composed of a land parcel (minimum size 10,000 square feet) with no interest mortgage or a new move-in ready home. These native-born subsidized neighborhoods, as shown in (Figure 1), occupy a large swath of Dubai’s built landscape and are predominantly designed as low density, single-use residential zones. For that reason, it is critical to assess the evolution, historical progression, and morphological nature of these neighborhoods.



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There is a universal realization among scholars that density in residential neighborhoods is needed but there is resistance towards implementing policies that would encourage a dense environment in Dubai. Notions such as compact urban forms, inclusive housing, which entails providing various living options for different ethnicities to live among local families, are discouraged, and seen as not realistic, politically as well as culturally. Thus, low density patterns and social exclusion are institutionalized and implemented in a way, by maintaining the status quo of segregation, fragmentation, and low density neighborhoods.

For that reason, this project aims to unfold and assess Dubai's national residential districts by (1) mapping and analyzing the development and characteristics of existing Emirati neighborhoods; and (2) exploring stakeholders' opinions regarding implementation of new neighborhood typologies that emphasize high density. In particular, this paper explores and articulates a series of preferences, reactions, and opinions for designing an alternate Dubai neighborhood form that integrates economic, ecological, and social components.

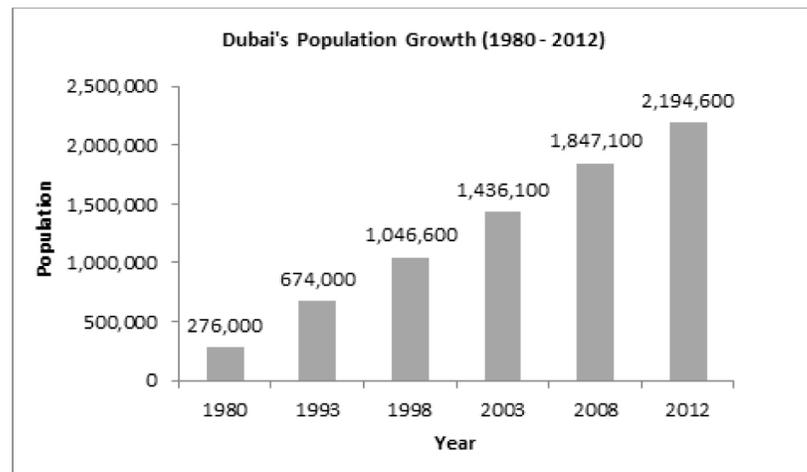
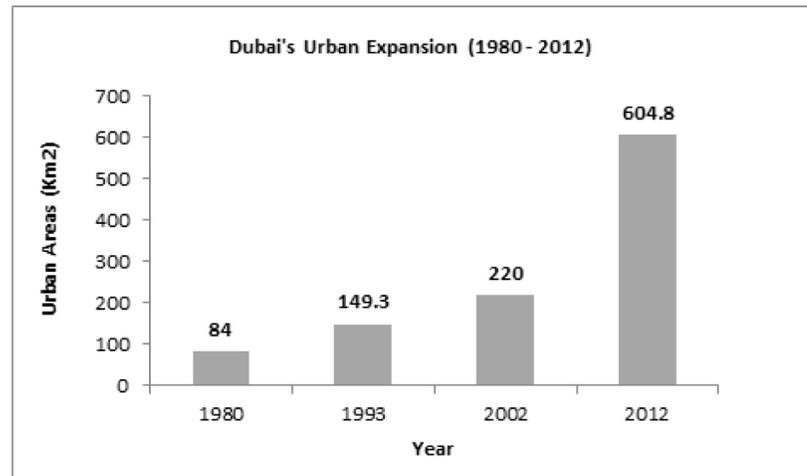
In order to address these questions and provide a more detailed description of Dubai's national housing landscape, which in turn would inform scholarship and practice, the following outline will be considered:

1. A review of Dubai's urban growth and history.
2. This will then be followed by reviewing the evolution of the built landscape and characteristics of native-born housing districts.
3. Then, the discussion will be contextualized by addressing the effectiveness of compact urban forms in promoting sustainable development.
4. Afterwards, the study will present stakeholder's opinions and reactions towards compact developments in Dubai
5. Finally, the study will conclude with discussing challenges and opportunities for implementing policies that promote a denser urban fabric in Dubai neighborhoods.

Figure 1: The shaded area shows the location and landscape of native-born neighborhoods within Dubai's context in 2007. (Source: <http://www.passportdiary.com/category/tropical/>).

BACKGROUND ON DUBAI'S GROWTH

Dubai is a dynamic international business core, population center, and tourist's destination. It has transformed dramatically from a small fishing village to a global center. According to some observers, it is probably the world's fastest-growing city and international hub in the Middle-East. The city has experienced excessive development over the last 25 years. It grew from 276,000 people in 1980 to almost 2 million today (Parsons-HBA, Inc). Moreover, the urban areas expanded from 84 km² in 1980 to more than 604.8 km² in 2012 (Parsons-HBA, Inc). Figure 2 and 3 illustrate the rapidness and intensity of Dubai's urbanization process and population growth.



Literature on Dubai indicates that the city had undergone four fundamental phases of urban expansion: the first phase extended from 1900 to 1955, the second phase extended from 1955 to 1970, the third phase extended from 1970 to 1990s, and the fourth phase extended from 1993 to present.

The first stage of growth which was extended from 1900 to 1955 revealed an outline of deliberate and partial physical expansion due to constrained economic activities and trivial growth in population (Elsheshtawy, 2004). Until 1955 the

One official interviewed claimed that any planning decision that aims to reduce the area of the subsidized lands will certainly disappoint locals and make them dissatisfied with the national housing programs and subsidies. Therefore, public officials in Dubai should seek social approval above all else if the city reaches a

urban area didn't surpass 3.2 km² and the land use was roughly residential with limited commercial zones. Most of the people settled close to the creek mouth, and worked in fishing, pearl diving, and trade (Gabriel, 1987). Houses were built compactly, intentionally close to each other in clusters, to achieve the function of privacy and collective tribal safety (Heards-Bey, 1982).

The second stage of Dubai's urban growth is described as compact expansion, extending from 1955 to 1970. In 1955 the population of Dubai reached 56,000. In 1960, British architect named John Harris designed a master plan which had a great impact on urbanization. It called for the provision of a road network; dividing the city into zones marked for housing, commerce, industry, and government. The urban area during this period exceeded 5.2 km². During that time, oil had not been discovered in commercial quantities, and that created an obstacle and kept the modest goals of the city in line (Gabriel, 1987).

Dubai then underwent what some have called "planned suburban growth" a period of rapid expansion which started in 1970 (AlShafieei, 1997) and continued till the 1990s. This period witnessed a huge expansion in the national housing neighborhoods. The urban area in this phase increased from 18 km² in 1971 to 84 km² in 1980 and then to 149.3 km² in 1993. The population increased from 100,000 in 1971 to 276,000 in 1980 and then to 674,000 in 1993 (Parsons-HBA, Inc, 1995). The growth at this period was very fast due to the availability of economic resources, and especially oil that was discovered in 1968.

Most of the references indicated that Dubai had undergone three major states of urban development; however, I claim that the city had undergone 4 stages of expansion, and the last stage extended from 1993 to present. In this stage, Dubai took many fundamental decisions in order to emerge as an international and global city. The first action towards globalizing the city was building a contemporary downtown area along Dubai's main highway corridor, Sheikh Zayed Road. Spectacular amount of contemporary high-rises were built, in early 1990s, alongside this stretch of highway resulting in shifting the city's skyline, image, and center (Elsheshtawy, 2004).

BACKGROUND ON NATIVE-BORN NEIGHBORHOODS

The built landscapes of Emirati neighborhoods in Dubai have taken distinctive forms during different historical periods. Each period is characterized with certain neighborhood form and typology (see Figure 4). Certain neighborhood forms and patterns tend to be used constantly for many years until other dominant forms took their place. This evolution of forms is typically attributed to changes in zoning ordinances, changes in planning regulations and codes, and changes in people's socio-economic status. Understanding the progression of housing patterns and policies is critical to the future development of Dubai's housing landscape.

Density of the built environment is usually measured by two significant indicators. The first one is population density (gross density), and the second one is density of built form (net density) (Burton, 2002). Unlike Dubai's suburban neighborhoods that were developed after the 80s, traditional central neighborhoods that were designed in the late 60s and early 70s are characterized with high density standards. For example, 15 and 17 units per acre represent Dubai's subsidized communities that were planned in the late 60s and early 70s with an average lot size of 50 X 50 feet, with 100% lot coverage (see Figure 5 & 6).



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Figure 4: The morphological evolution of national housing landscape from 1960s to 2000. From left to right: (1) Late 60s and early 70s traditional urban neighborhoods with its interconnected street systems and alleyways (density=15 to 17 units/acre); (2) Late 80s and early 90s suburban neighborhoods with broken street system and superblocks (density=3 units/acre); (3) Late 90s and early 2000 suburban neighborhoods (density=4 units/acre). There is no notable change between the two types of suburban neighborhoods. In both density remains low.

This high density configuration also reflects the density of Ebenezer Howard's "Garden City" concept. Howard, in his original Garden City, limited the net density to 15 dwellings per acre (Jenks & Dempsey, 2005).

Prosperity from oil revenue in the late 1970s; real estate speculation in the 1990s; and availability of financing through banks contributed to the resulting changes in national housing forms and policies, and thus the derivation of a spatially and ethnically fractured city structure. The planning and design schemes of the national housing typologies after the 1970s suffered from what scholars call sprawl and leapfrog development. The traditional grid pattern was replaced with large super blocks that are surrounded by major multi-lane highways and grade separated interchanges that constrain connectivity. In addition, the vibrant communities with close knit homes were replaced with larger land parcels. Dubai's neighborhood development followed the post WWII North American model of urbanism, typically characterized by low density, and discontinuous patterns. For example, three units per acre represent the net density of Dubai's subsidized communities that were planned in the late 80s and early 90s with an average lot configuration of 100'X 150', with 60% lot coverage. Four units per acre represent the net density of Dubai's subsidized communities that were planned in the late 90s and early 2000 with an average lot configuration of 100'X 100', with 60% lot coverage (see Figure 7 & 8) . Table 1 demonstrates the historical development patterns and density configurations of national housing neighborhoods in the last four decades.

Although studies show that the average family size in the Emirates has reduced from 5 to 3 in the last three decades, the density of built form has decreased (Parsons-HBA, Inc, 1995). For many years, the housing of the local population, in which the standards of living and land size remain very high, received great subsidies from the government. But this might not continue along the similar path and the local authorities in Dubai might minimize the living conditions by reducing the lot and unit size through time. In fact, the last two decades witnessed a reduction of lot sizes in subsidized neighborhoods from (100'X 150') to (100'X 100'). This gradual reduction in land areas garnered serious criticism from the indigenous population in which dissatisfaction and reactions were mainly expressed through the local press and live-radio broadcasts. For that reason this research provides critical insights by exploring how different stakeholders react and perceive high-density standards within the future development of Dubai's neighborhoods.



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National housing evolution	Net Density: # of Units / Acre	Lot Configuration	Density Level
Late 60s and early 70s	15 to 17 units	50 X 50 feet (2500 ft ²)	High
80s and early 90s	3 units	150 X 100 feet (15000 ft ²)	Very Low
Late 90s and 2000	4 units	100 X 100 feet (10000 ft ²)	Very Low

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POTENTIAL BENEFITS OF COMPACT URBAN FORMS

The most critical period in the history of the debate between advocates who focused on the physical attributes of cities spanned from 1898 through 1935. During this period the boundaries of the debate were mapped out by three cases: The Garden City, the Radiant City, and the Broadacres City. While Le Corbusier's Radiant City represents extreme centralism and Wright's Broadacres City shows extreme decentralism, Howard's Garden City delineates a middle ground. In fact, Howard ought to be regarded as neither a centrist nor a decentrist, but as a representative of a "compromise" position because he did favor density; and he did favor containment and linkages (Breheny, 1996).

Following the physical determinists' ideas of future forms of city, Dantzing & Saaty (1973) proposed the "compact city" concept. Their perspective was to enhance livability and quality of life. Urban compactness includes density of the built environment, intensification of its activities, efficient land use planning, diversity and mix of uses, containment initiatives (urban growth boundaries or green belts), and efficient transportation systems (Jabareen, 2006). Compactness also refers to urban contiguity and connectivity, which implies that future urban growth should take place adjacent to existing urban fabrics (Wheeler, 2003). For many researchers and practitioners, compactness is very essential to achieve sustainability. Many argue that the sustainable city should be compact, dense, diverse, and highly integrated (Dumreicher et al., 2000; Jabareen, 2006; Wheeler, 2003).

Sherlock (1990) found that compactness parallels with livability and works intensively to avoid long commuting, which is considered the most uneconomical and inefficient aspect of modern cities. Newton (2000) found that the compact city emerges as the most fuel-efficient of urban forms. Other scholars argued that compact cities offer opportunities to reduce gasoline consumption for

Figure 5: A shaded alleyway where people socialize and interact on daily basis.

Figure 6: A traditional Dubai neighborhood with its close knit homes. Today it is mainly occupied by the working class as the majority of native-born residences migrated to suburbs.

Figure 7: Evolution of density standards and land parcel configuration of the national housing districts.



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traveling, since work and recreational facilities are combined with housing (ECOTEC, 1993; Newman & Kenworthy, 1989; Hillman, 1996). Furthermore, Elkin, McLaren, & Hillman (1991) found that compact urban forms reduce transport of energy, water, materials, goods, products, and people. It is also argued that a good quality of life can be achieved in spite of the high concentration of people (Jabareen, 2006).

Since the worldwide adoption of sustainability objectives in the early 1990s, there has been increasing attention to the concept of the compact city. The major claimed benefits of the compact city include: conservation of lands; less need to use private automobiles; less fuel emissions; more public transport use, more diversity of houses and job opportunities; more walking and biking; better access to services and everyday amenities; efficient infrastructure provision; efficient use of land resources; and regeneration of neglected and abandoned urban areas. These advantages contribute to the goal of a more sustainable urban environment by not only focusing on social and economic dimensions of sustainability but also by considering environmental concerns (Burton, 2002).

Recognition of costs and environmental consequences of sprawl and unmanaged growth has prompted policy makers in many regions around the globe to endorse density which is considered a key aspect of urban compactness. But when we look at the urban design literature, it appears that from a wide range of urban form elements, density with regard to its “social impacts” and implications has been widely and extensively investigated (Bramley, Brown, Dempsey, Power, and Watkins, 2010). Several studies indicated that the public in general “prefer” low density developments (Bramley et al., 2010). Another argument made by Farr (2008) indicates that many people in North America perceive high density as a threat to their quality of life and sense of privacy. These statements are further asserted by Jenks and Dempsey (2005) who argued that people generally lean towards low density housing forms. The situation is no different in Dubai. Cultural norms and housing policies lean towards single-use, low density neighborhoods despite the expected ecological and social benefits of high density configuration.

The Department of the Environment, Transport and the Regions (DETR) (1998) found that significant land savings can be made by avoiding development below

Figure 8 & 9: A typical street view of a Dubai suburban neighborhood.

densities of about 10 dwellings per Acre. Another standard was generated by Ebenezer Howard's who limited the net density to 15 dwellings per acre in his "Garden City." However, the new garden city standards have limited the net density from 6 to 12 dwellings per acre (Jenks & Dempsey, 2005). LEED ND (Leadership in Energy and Environmental Design, Neighborhood Development) has also introduced another density figure. In particular, they limited the net density to 7 residential units per acre (Farr, 2008).

When we look at the aforementioned standards of sustainable density, it appears that the density of Dubai's traditional neighborhoods of the 1970s, 17 residential units per acre, is merely high. Whereas the density of Dubai's suburban neighborhoods (3 to 4 units per acre) is relatively very low which in terms prevents the creation of compact neighborhoods. For that reason, this paper aims to explore, articulate, and advance design tactics that promote better sustainable urban design for Dubai. In particular, the paper attempts to elaborate whether or not high-density residential neighborhoods could be successfully implemented or be the norm in Dubai, as opposed to the present formal attributes and existing zoning regulations of neighborhood development. This research contributes to furthering understanding about place-specific possibilities for creating sustainable cities.

METHODOLOGY

My data is derived from a wide range of people including academics, practitioners, residents, and policy makers, and strives to think, benefit, and generate discussion about the design of future neighborhoods. I argue that this paper contributes to the existing body of knowledge by stating that understanding sustainable urban design does not only entail ideal design principles, but also it involves understanding/exploring the cultural and political traditions of the place. It is vital to be aware of users' acceptance of and satisfaction with individual, particular design strategies as well as policy makers' assessment of implementation constraints. To fulfill this goal, the paper involved three kinds of respondents: specialists in sustainable urbanism, policy makers, and public. I interviewed the government planning specialists while I used the survey methodology to obtain public and experts responses. Part of the research design involved synthesizing those three subject's responses to compare different opinions and reactions across research participants.

FINDINGS

Specialists in urban design and planning from different geographic settings were brought together in a Delphi study to rethink urbanism in Dubai. The Delphi method is based on a structured process for collecting and analyzing information from a panel of experts in the field by a series of questionnaires interspersed with opinion advice (Adler & Ziglio, 1996). In this study, participants were asked to choose the most appropriate minimum level of residential density for detached single family units (one to two stories) in Dubai. Findings revealed that the vast majority of experts (30 out of 38 participants) recommended high density levels that completely deviate from the current standards in Dubai. Only a few experts selected a density level akin to current standards: two experts voted for 3 units per acre and six experts for 4 units per acre. A greater number of experts, a total of 14, suggested a minimum density of 7 units per acre. This number fairly corresponds to New Urbanism standards as well as to new standards of Garden City in which the net density is limited to 6 to 12 dwellings per acre. Fifteen units per acre, a density level that is equivalent to Howard's Garden City

and older districts of Dubai, is another high density level that is strongly recommended by the panel (a total of 9 votes). Other panel members (n=7) suggested density levels of 5 to 10 units per acre. This will lead to a conclusion that a suitable minimum level of residential density for detached single family units (one to two stories) for new neighborhoods in Dubai should range from 7 to 17 units per acre.

This research also involved collecting survey responses from local and expatriate residents in Dubai and interviewing Dubai government officials in order to identify and to understand the relevant political and cultural aspects as well as obstacles associated with the experts' design recommendations. In particular, survey responses were used to: (1) identify the public opinion surrounding the density levels suggested by an international and local panel of experts; and (2) understand how the public value and prioritize the suitability of the proposed density to Dubai's cultural environment. A total of 151 subjects (UAE citizens + residents) participated in this research effort. Survey results revealed that some participants appreciated the potential benefits of high density levels, while the majority of participants (mostly locals) thought that high density levels do not suit Dubai's social and cultural traditions.

Respondents (n=41) who generally found high density levels "very important" and have many advantages provided narrow and small amount of explanations to support their claim. In contrast, participants (n=110) who disagreed and thought that high density levels are "not important at all" or "somewhat important" provided an extensive amount of comments. Participants' opposition and concern about this strategy is attributed to several grounds. First, Dubai has vast land areas that are not utilized or taking advantage of, so there is no rationale to save lands. Second, as the UAE has a considerable amount of wealth and capital and as the citizens represent the lowest rate of the total population (almost 20%), reducing the living standards and quality of life through reducing the size of the granted lands is unreasonable. Third, many participants believe that high density levels will lead to a neighborhood "condensed and congested" with traffic and people and therefore unlivable. Fourth, socio-economic and cultural norms impose critical limitations on densification and land size related decisions. For example, local families usually are big in size and have several social obligations and requirements that necessitates space. One norm is that local families value the concept of living together. In many cases newly married couples live with their parents for many years until they can afford the expenses of building a new house on their subsidized lands.

Interviews with the local authorities in Dubai facilitated the determination of troublesome challenges and constraints for implementing high density neighborhoods defined by experts in the Delphi. Government interviewees (n=7), like experts, appreciated the merits of density. They argued that higher densities minimize the cost of infrastructure and service provision and potentially maximize the human relations between residents. One interviewed expert argued that Dubai should take a land-saving action in order to protect its resources for the future generations. If Dubai continued granting the citizens 15,000 or 10,000 square feet, after 10 or 15 years there might not be enough lands and capacity within the city structure to accommodate the future population. But interviewees also mentioned that reducing the subsidized lot configurations might lead to tension between the citizens and public institutions.

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decision to increase its density levels through providing smaller lots. Perhaps an open dialogue between the authorities and citizens in public discourses, hearings, and community workshops to educate and negotiate with the citizens would prove helpful to provide details and explanations about the implications, benefits, and consequences of high density levels.

DISCUSSION

Cultural resistance, as defined in this research and in urban design literature, to high density levels represents the first obstacle that places fundamental barriers on the development of compact neighborhoods, a core principle of sustainable urban forms. My research findings and some urban design studies demonstrate that people usually prefer low density developments over dense urban settings. It is important to note that people's satisfaction with and appreciation for their living environment is a core social sustainability indicator. Therefore, enforcement and implementation of high density compact neighborhoods in Dubai where there is a strong public resistance to compactness will lessen people's attachment to and appreciation of their home and neighborhood. This will challenge and make the social dimension of sustainability vulnerable. The main question worthy of careful investigation is whether experts and policy makers should and attempt to increase density levels and contain urban developments in Dubai, or should they listen to the public concerns and continue allowing for low density suburban development? I tend to agree with Bramley et al. that this question stimulates an old debate between two spatial arrangements: compact urban forms versus dispersed or sprawled urban forms that are more socially desired (2010).

CONCLUSION

In summary, experts argued that the current level of density in Dubai's subsidized neighborhoods is very low. They indicated that the current standard of three to four units per acre should be modified to a minimum of seven units per acre. Experts believe in the virtue of density as moderate to high density levels minimize the use of resources such as land and infrastructure expenses. High densities may also provide an opportunity for people to meet more often on the street and other social spaces than low density areas allow. Experts also believe that a high density neighborhood contains low density suburban developments or what is known as sprawl, reduces car dependency, promotes walkability, supports public transit systems and neighborhood facilities and businesses, and is aesthetically more attractive than sprawled communities.

Government officials in Dubai also have faith in the merits of density. They argued that higher densities minimize the cost of infrastructure and service provision and potentially enhance social interaction and relations. However, the local population in Dubai disagreed with both experts and officials, preferring lower densities (maintaining the current configuration of three to four units per acre) due to cultural and economic reasons. To resolve the issue of disagreements between stakeholders, I recommend educating the public about sustainable development strategies using participatory planning approaches. In particular, there should be an open venue where the experts and decision-makers in Dubai can discuss with and educate the public about future forms of neighborhoods.

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