



# Any chance of employing sustainable neighborhood plans in Iraq? A critical review of current urbanism practices.

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## Abstract

Environmental-friendly urbanism and sustainable masterplan have long been appreciated as essential tools and practices for mitigating environmental threats posed by climate change. Highly fossil-fuel dependent space-making and conventional-functionalistic urban planning that paid little attention to community engagement and environmentally sustainable arrangement have revealed to be very inefficient in terms of making effective use of resources. Yet, in Iraq and KRG, the urban development policy is not very much connected to this crucial international debates and practices. Housing and urban planning sectors have not received enough attention from the environmental perspective. The local urbanism model and urban sprawl phenomena, originated from rapid urbanization, are socio-environmentally unsustainable for they often inspired by abstract and alienated urban-architectural model, which are energy inefficient and very little related to local socio-environmental conditions. The paper carries out a critical examination of the current urbanism and masterplan making practices in Iraq, and underline their inconsistency and incompatibility with the globally consolidated approaches and principles concerning the need for sustainable neighborhood and urban quality that emphasizes inclusive, resilient and sustainable development. The paper interrogates the extent to which environmental sustainability principles, as well as global innovative experiences are locally observed. The research recommends the need for sustainable and innovative approaches in the realm of local urbanism practices.

**Keywords:** Sustainable development, sustainable masterplan, Climate change, Sustainable urbanism, Sustainable Neighborhood.

## 1. Introduction

Sustainable urbanism and environmentally friendly masterplans have long been appreciated as essential tools and practices for mitigating environmental threats posed by climate change. The Intergovernmental Panel on Climate Change (IPCC) has warned that a global temperature rise of 2-degree Celsius will “significantly increase the risk of drought, floods, extreme heat and poverty for hundreds of millions of people. “The challenge of avoiding catastrophic climate breakdown requires rapid, far-reaching and unprecedented changes in all aspects of society” (IPCC, 2019). According to the United Nations Environment Program (2021) “responding to global climate change is all the more relevant in urban areas where demand for resources is very high (driving production and related environmental impacts elsewhere), and where citizens’ health and urban infrastructure is increasingly vulnerable. An integrated and sustainable approach in cities will be key in alleviating negative effects from urbanization, and its consequent implication on resource use, biodiversity and climate. UNEP (2021) maintains that “sustainable cities and communities start with sustainable neighborhoods”. And it is at the neighborhood level we can effectively intervene to alleviate the negative impact of urbanization; innovation must primarily be focused on the building sector, as it is responsible for 39% of climate change (Hopkins, 2024)

Sustainable urbanism was emerged as a reaction to the urban sprawl and fossil-fuel dependent urbanism model that adversely affected the quality of urban life all over the world. Within the new-liberalistic economic model, urban spaces have more and more lost their social value and gradually being subjected to land commodification process. The environmental crisis emerged from the conventional way of space-making prompted the need for a sustainable urbanism. Conventional urban planning demonstrated their inability to tackle the urban complexities at a larger scale. As an alternative, Sustainable Neighborhood Planning has recently become socially and environmentally more responsive and effective than conventional comprehensive planning.

Dilani (2021) maintains that “architecture and urban design have been influenced by industrial societies for decades”, as a result, residential neighborhoods and early urbanism experiences, emerged from the modern paradigm, have often been designed to function as if they are dormitories separated from work places and entertainment zones; conventional masterplans focused primarily on functional aspects of the residential buildings, whilst neglecting people’s wellbeing, environmental and daily needs.



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### 2. Research Aim & Objective and methodology

This research aims at reviewing synthetically the debate over sustainable urbanism at the international level and strives to draw lessons from innovative and sustainable case of urbanism with the aim of integrating them into local urbanism.

The research uses an analytical approach by reviewing the literature on sustainable neighborhoods urbanism and discusses how a paradigm shift has occurred after the 1970's in the field of urban planning to keep up with challenged posed by environmental crisis. The research also reviews the Iraqi urban planning orientation in the last decades and discusses how its core principles overlooked the most innovative and sustainable in the practice urbanism and space making. Most importantly, a geographical survey has been conducted analyzing and observing the physical feature of the most representative local neighborhoods in Sulaymaniyah, such as Awal, Kana Sura, Raparen, Kurdsat, as well as gated cities such as Pak city, Garden city, Kurd city, including interviews with key decision makers, to determine their morphological pattern and identifying their unsustainable elements.

A comparison was also made between local neighborhoods urbanism and those designed by foreign companies to demonstrate the contrast between their urbanism practices.

### 3. Sustainable Neighborhoods Planning

Since 1970s, the environmental crisis and awareness have put the conventional way of making cities into discussion and gradually motivated urban planning doctrine to be more responsive to the need of people and environment. Greenberg K. (2009) suggests that the environmental thrust is gaining traction and broad popular appeal as a common ground that cuts across class, cultural, and political lines and is rapidly pushing urban design into new areas of investigation. In ways both superficial and profound, this desire for greener solutions is giving birth to lower-impact lifestyles and new design approaches for city districts as well as individual buildings and landscapes. It aims at a greater mix and proximity of daily life activities – living, working, shopping, culture, recreation – increased walkability, cycling, and less car-dependency; lower energy consumption and alternative energy sources. The climate change required scholars, policy-makers and practitioners to rethink everything they have previously taken for granted about how we conceived the built environment. From designing a comprehensive urban planning in the 1960s and 1970s, urban planning has gradually embarked on creating sustainable neighborhoods focusing on making a more environmental-friendly city: i.e. to enforce a sustainable neighborhood planning where people can easily meet their daily needs, work, socialize, and feel safe within their own neighborhoods. Yet, this requires designing high-quality urban landscapes and open spaces, sustainably designed housing, shopping and recreation, access to school, childcare facilities and other services within the neighborhood's settings. The UN-Habitat's five principles of Neighborhood (UN-Habitat 2014) claims that a good and sustainable neighborhood is the one that "contains adequate space for streets, high density, mixed land-use, social mix, and limited land-use specialization". The UNEP's Neighborhood guidelines have also set rules for residents' involvement in the planning and decision-making processes to ensure that neighborhoods are responsive to local needs and preferences.

Furthermore, the climate emergency and environmental challenges have led to questioning the highly-energy consuming architecture and urban planning models. New paths were set forward to attenuate the consequences of urbanization-led environmental challenges and the massive urban sprawl linked to it. New and more ecological urbanism have been advocated for by United nations: Compact city, mixed-used green density, Transit-oriented city, 15-minutes walking-city, Smart city, Sustainable neighborhood development plan is all urbanism models invented to reducing the buildings' carbon-footprint and mitigating threats posed by climate change.

Hugh Ellis (2020) maintains that climate change is single best threat to the future of our societies and dealing with its implications has to be at the heart of all neighborhood plans. Research has shown that well-designed and people and environment friendly spaces stimulate walking, cycling and the use of public transportation. High level of greenery also encourages physical activities, which lowers blood pressure, decreases the risk of heart disease, stroke and diabetes, and prevents falls in the elderly (Dilani A., 2018).

A shift of paradigm is undergoing in designing neighborhood plans. There is an urgency to creating neighborhoods that enhances the health and people's wellbeing, and creating a greater sense of connection with those who are living around through neighborhood participation methods. Numerous examples have been built around the world in which urban districts or neighborhood planning explore new self-sustaining models, making advances in generating their own energy, processing their own waste, and reducing auto-dependence with a greater mix of uses and more mobility alternative. Greenberg K. (2009) reports a number of cases of sustainable neighborhood models, including the case of Fribourg, Germany, where a derelict military zone has become a sustainable Model city



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district. After an intensive planning process and awareness campaign in the mid 1990's, implementation targeted the issues of mobility, energy, housing, and social life. The outcome was presented as a German Model of urban development to the HABITAT II conference in 1996 because of its inclusion of environmentally supportive elements and the close collaboration it fostered between the municipality, public utilities, project management, and local residents. Similar examples have been implemented in green design of Vikki residential and work zone in Finland-where the project integrates gardens and pathways, composting, recycling, solar panels, a 30 percent reduction in water consumption, and 25% less fossil fuel; and in the work-live project in Hammarby Sjostad in Sweden (1996), as well as in developing its Docklands "Bo01" site in Malmo. Other similar projects are Waterfront development in Toronto and Dockside Green in British Columbia, and the case of Dockland in London and Sesto San Giovanni regeneration project in Milan (2012). Examples can include many other similar environmental-friendly urbanism projects.

The question here to ask: to what extent sustainable neighborhood have been practiced in Iraq and KRG? Does conventional master plan and old-fashioned neighborhood planning keep up with challenges posed by environmental and climate crisis? Is there any chance of integrating sustainable urbanism in the current local urbanism in Iraq?

#### 4. The context

To answer the above questions, it is worth to mark the character of the urbanization process currently undergoing in the context of our study. The research focused primarily on the case of urbanization in Sulaymaniyah in the last two decades, where it has been subjected to a heavy urban transformation. This resulted in doubling the boundary of the city with her outlook inevitably undergone a tremendous change. The phenomenon of urbanization is driven mainly by intensive real-estate investments in the urban area. The spatial distribution of new neighborhoods began to show a tendency towards suburbanization. Many surrounding towns have been coalesced into the city, including the town of Bakrajo, Awal, Kane speaka, Kane Kurda, Qulawaise, Kurdsat, Qirga, Kana Sura and many other areas located in the Eastern, Northern and Southern directions of the city have been subjected to a heavy sprawl phenomenon with neighborhoods barely equipped with public amenities.

The question is: to what extent local urbanism practices have reflected the UN-advocating sustainable development practices. How much of the international debate about sustainable planning has been observed in neighborhood making practices?

To answer these questions, it is worth to explain the content of urbanism and masterplan model practiced in Iraq. The research aimed at taking Sulaymaniyah' urbanism model as a case to bring up nodes and environmental challenges emerged from the context. The case of urbanism in Sulaymaniyah could act as a country representative of urbanism model, for it shares many of its characteristics with other KRG and Iraqi urbanism model. Through the survey of neighborhoods and discussion with the concerned authorities, the research, firstly, looked at the smallest units of urban configuration, a neighborhood plan of the city, both the municipal-sponsored land division and privately-sponsored neighborhood plans. The research also highlighted innovative way of urbanism recently designed by foreign companies with the aim of drawing some lessons and prospects for implementing sustainable neighborhood plan in the future.

Neighborhood planning and urban planning system in both Iraq and KRG did not seem to be fully engaged with new trends of environmental-friendly practices, for they still keep the old-fashioned way of making urbanism. The urban planning system was originally introduced in the country at the end of 1950's and beginning of the 1960's. Town planning has constituted the main activity through which the State, both local and central, has sought to exercise its plan-making role and impose its control functions. Both planning system are very centralized; the former is under the supervision of Ministry of public works; the latter is under the supervision of ministry of Municipalities & Tourism. This means any local planning initiatives are subjected to final approval by the central administration body. This provoked problems for the implementation of urban planning at the local level as often the central government is not aware of peculiarity and aspiration of local contexts for it acts according to its pre-established criteria. Most importantly, the dynamics of urban change in the last two decades are not reviewed and placed against the set of measures taken to deal with various environmental challenges, which from time to time assumed importance as issues to be addressed. Planning system in Iraq therefore did not set in the context of societal change (values, politics, governance, economics, demography and technology), and did not offer explanation as to how and why the direction of urban regulation has taken its particular course. The planning system both in Iraq and Kurdistan Region is mainly constituted of a set of planning regulation designed in the mid of 1970's by an International company, called Poly-service, who laid down rules for planning neighborhood units in Iraqi cities. Yet, the enforcement of poly-service planning package did not become compulsory and still has discretionary



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status, leaving the municipalities with no precise standards to follow. The poly-service planning system has reflected the years where there were not very much environmental challenges, and as a result it acted merely as a planning instrument to control the urban development. The country since then did not embrace any new instruments for tackling the environmental threats and did not consider the new urbanization-linked environmental challenges.

As a result, environmental challenges have not yet become imperative for the country's urban planning system. Our research analysis has demonstrated that the environmental problems emerged from Iraqi city planning, mostly due to their unlimited use of fossil fuels (with buildings containing high Carbon Dioxide footprints), as well as car dependent urban sprawl. The lack of environmental awareness led to climate crisis across the region.

### 5. Key characteristics of Local Urbanism

There exists two type of local urbanism model that shaped the form of the city in the last decades; the first type is the one that has been on place since the end of 1950's- which for conveniency we can called it "carpet-like" urbanism model, whilst the second type is being set off since 2006, conventionally called "Gated cities".

The assumption of our research is that the overwhelming majority of both types of neighborhoods' plan in Sulaymaniyah simply does not consider sustainable development principles in a meaningful manner. The idea of sustainable neighborhood plan, or low carbon neighborhood plan, is still far from being locally implemented in the process of masterplan makings; in the sense that there isn't any separated neighborhood plan from the conventional-comprehensive urban planning. Conceived primarily as an instrument to control urban land use, the national and regional masterplans draw the functions and land-uses in a single comprehensive plan with no regards for imperatives such as public engagement in the planning process, sustainable planning solutions, such as designed mixed-use green density, environmentally-resilient solutions, energy-efficiency neighborhood' layouts and mixed transit-oriented development.

From our analysis of "carpet-like" Residential Urbanism model, we have revealed that the design of this model is chiefly drafted by local municipalities' engineers or surveyors for mono-functionalistic residential purposes with no regards for the dynamics of urban change in the last two decades. In the sense that the set of rules governing the local urban planning have not reviewed and placed against the new trends of urbanization and various environmental challenges.

From a close examination of the land-use of this type of neighborhood, we have revealed that it is very mono-functionalistic residential areas: the morphologic layout of the neighborhoods is made of "carpet-like" paralleled residential sticks. They do not include basic public amenities, and even if they have, they did not follow the rule of catchment-area. There is no exact boundary of the neighborhoods as all are coalesced together to seem like one. Shops and markets are randomly placed, by households themselves, around the neighborhood's corners with very limited equipment and choices; no public transportation is available to connect the residents to the rest of the city, except the availability of semi-public collective taxis. Social and community facilities as well as job opportunities are almost inexistant; green areas are placed in a scattered way within neighborhoods in small dimensions and without following green connectivity principles and without providing any reasonable walking areas.

From analyzing the typo-morphology of this urbanism model, we have revealed the city's suburbs' "carpet-like" neighborhood plans have a very low-density character. There is an average of 150 people per hectare, which is far below sustainable neighborhood plans principles. Basically, they are made of numerous low-density buildings of one- or two-floors. The size of plots is mainly varying from 150 to 200 Square meters. In this type of urbanism, the house units are wedged tightly together with often no front or backyard garden. Houses in this "carpet-like urbanism" are packed back-to-back. They have only front side opened, usually with an average width of 7.5-10 meters and 20 meters long. Therefore, three sides of the houses are walled by other houses. The layout arrangement of these neighborhoods are all very fossil-fuel dependents, for they don't allow residential lots to be arranged according to passive design principles: i.e. the layout arrangement doesn't allow back rooms to get solar radiation during the winter time, and there is hardly possibility to arrange spaces for getting natural ventilation. Therefore, they are heavily depending on artificial lighting during the day and night time alike. Neither the master plan nor the municipality haven't made provision for defining ratio between open and built-up areas; there isn't available any national or regional urban standard to define the share of inhabitant per public amenities; no Floor Area Ratio (FAR) is applied in designing neighborhoods. There are only few rules provided such as the 2008's regulation that oblige houses to have at least an open-area equivalent to 20% of the total floor plan of the house, as well as some rules for defining buildings' setback from pubic roads.

The ill-arrangement of neighborhoods' layout doesn't make any surprise for they are chiefly designed by surveyors

and/or civil engineers working for local municipalities, whose technical knowledge about sustainable design is very limited and shorthanded. In addition, neighborhoods are designed in an abstract and standard fashion to be replicated anywhere in the city regardless of the site topography and landscape characteristics. This makes the suburban areas look very uniform, un-identifiable houses, lined up inflexibly, at uniform distances, in a treeless communal area.



**Figure 1.** Configuration of lots in the carpet-like neighborhood plan

As we mentioned beforehand, there is no urban standard at the regional or local level to be applied neither at the neighborhood level nor at the urban level, except the Poly-service planning rules, which has a discretionary status. This means that no clear policy exists concerning the share of citizens of green area, education, health, market and parking areas within the neighborhood or city level. This is a challenge that faces all other Iraqi cities, as the country and municipalities are still lacking the adoption of clear national, regional or urban planning regulation. Nevertheless, the neighborhoods design incorporates sometimes local parks, or open/green areas which often are just leftover space with very little dimensions: their size varies from 8000 to 10,000 square meters per a cluster of a neighborhood of 9000 inhabitants, which means the share of a citizen for green area is less than 1 square meter at the neighborhood level. Just for comparative purposes, the UN's (World Health Organization) recommends a minimum of 9 square meters of green space per person within a 15-minutes walking distance (UN-Habitat, 2018).

As to community engagement, the residents of these neighborhoods are not involved in the planning and decision-making processes. Therefore, there needs and preferences are overlooked because designs are pre-fabricated in the municipalities' offices. The house-building process is usually of beneficiary's responsibility who takes skill worker to build all stages of the houses from first to last stage of housing process. The use of building materials is discretionary for inhabitants, yet it doesn't exist any incentives by public authorities to use sustainable materials such as those with low-carbon emission materials and help to reduce energy consumption in buildings by improving insulation, reducing heat transfer, and utilizing renewable energy sources.

### 6. The "Gated cities" urbanism model

While "carpet-like" urbanism has lost its popularity after 2006, a new urbanism came to existence afterwards, conventionally called "Gated city" urbanism, mainly promoted by the Regional Board of Investment. The Gated cities have been springing up like mushrooms across all over the three main cities of Kurdistan region (Sulaymaniyah, Erbil and Duhok), and features as the main urbanism model currently practiced across the region. Data from Regional Investment Board (2021) shows that, from 2006 to 2021 around 54 Gated cities have been built in Sulaymaniyah, 90 in Erbil and 38 in Duhok for a total investment of 17, 253,129, 138 US dollars. The housing sector occupied 21% the Investment Board in Sulaymaniyah for a total of 4,075,291,415 dollars (Sulaymaniyah investment Directorate, 2024).

The gated cities are spread all around the city of Sulaymaniyah's outskirts. Their names evocate the will for modernization and westernization type of urbanism, with names such as German city, Garden city, Mayorkas city, Pavillion city, Titanic city, Boulevard city, Pak city, etc.

They are called gated cities for all of them are walled cities with security-surveillance entrance. Access is allowed exclusively to the those who are living within. The gated cities have exacerbated the social polarization and have created multiple walls within the same urban area. The house price in gated cities is varying from one to another; this makes people to be socially stigmatized according to the fame the gated city is possessing. Instead of being utopic cities, scholars call the gated city as "privatopia", (McKenzie M. 1996) for their residents pay privately, to the management companies, all public utilities, such as water and electricity charges, solid-waste collection and community-garden maintenance.



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In order to better understand the character of this type of urbanism, it is worth to ask: what is the root of this urbanism model? Tulumello S. (2013) maintains that Gated cities are originated from the US cities more than a half-century ago and they acted as enclave to protect the white high-income class from the intrusion of black or low-income groups. Gated cities constituted a physical barrier between ethnic groups or social classes, through the construction of gated walls with security arrangement placed at neighborhoods gate. This urbanism model, however, has gradually been welcomed by some oil-rich Gulf countries and most pronouncedly, Dubai. Since 2006, the KRG cities have also embraced this urbanism model as the Region is very much attracted by Dubai's urbanism experience and have incontrovertibly replicated their experience, including the practice of gated city, and the copying of some Dubai's iconic buildings in both Erbil and Sulaymaniyah, such as Rotana Brand, Empire Building, Pavilions, Marina, etc.

The real-estate production of Gated cities corresponds to a strong social production of a sense of community as a system for isolating oneself from the surrounding world and excluding populations deemed "stranger" from one's urban space. Raposo (2008) maintains that "the emergence of Gated cities is strongly connected to the socio-spatial transformation linked to the transition towards post-modernism", whilst Low (2003) claims that the gated cities are made of a homogeneous space for medium-high population who finds social differences as a kind of threat.

Unlike the "carpet-like" urbanism, most of the gated-cities are made of high-density vertical towers, whilst some of them are made of mixed towers and villas. The population density of the gated cities is usually very high, with densities varying from 500 people to 2000 people per hectare. Neither the Regional Board nor the municipality did not specify any standard to follow for urban density, as a result the population densities in the gated cities is discretionary, and is mainly depending on the will of real-estate developer. Yet, the Regional Board has made imperative for real-estate developer to allocate at least 25% of the Gated cities land for greenery. For instance, our analysis has demonstrated that the density of Pak city is above 1300 people per hectare which is considered to be very high, whilst UNEP (2021) estimates a density of 13.000 inhabitants per square kilometer as medium-high density, which characterizes the most livable cities and neighborhoods. Also, this ratio features a good balance of residents and jobs, retail, education and health, and up to 35% to 50% green open areas. Contrary to the recommendation of Board of Investment, (which oblige gated cities to include at least 25% of the developed land for green area), Pak city has barely got 5% for green area, and no public facilities are built, except some playground. In addition, although article 15 of the Board of Investment clearly states that the use of renewable energy is mandatory in the residential settlements, our analysis has revealed that none of the real-estate developers have observed this prescriptive regulation. This is widely because a weak system of monitoring on place. However, one of the constructive regulations dictated by local Environment' Directorate is to carry out Environmental Assessment Appraisal (EIA) by real-state investors in order to get final development works approval; and this part of regulation has been adequately observed by the investors.

The gated cities morphological layout is very similar to each other. They are usually made of single towers aligned parallelly in a grid-system with spots of green areas and parking lots placed between residential towers. The projects layout did not promote any social interaction, and have no provision for job opportunities, cycling, insulated building materials or other sustainable solutions for reducing the rely on fossil-fuel.

Yet, the investment Board, as well as the Environment's directorate imperatives are often breached by the real-estate investor and, due to lack of monitoring process, the lands destined to public amenities are turned into residential towers as a result or the land allocated for greenery has been reduced.

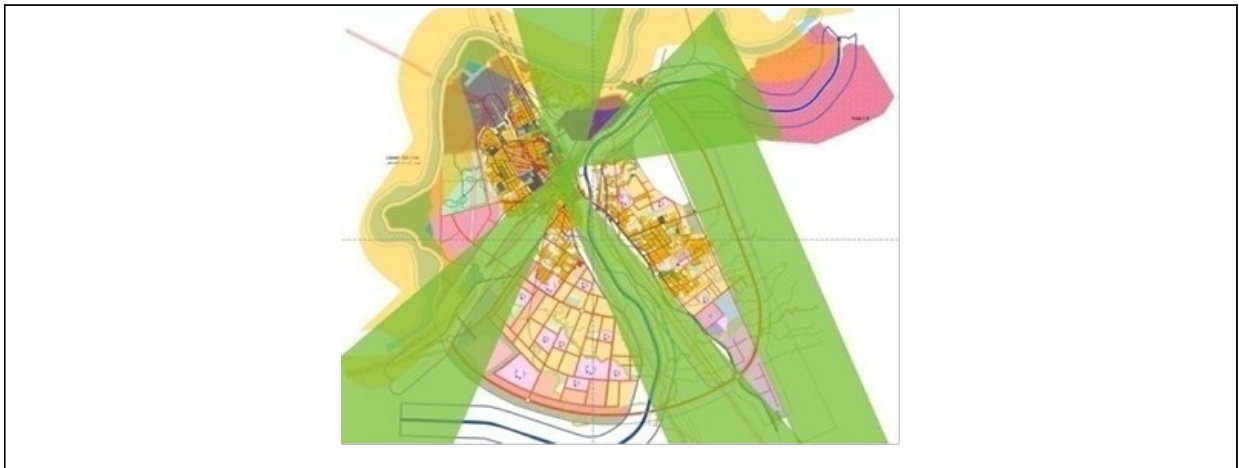
### **7. Towards a new Urbanism model: learning from sustainable urbanism experience**

From the two types of local urbanism model we have put on view, there seemed to exist not few challenged that need to be addressed at the national/regional and local level. Yet, moment of crisis and transformation as Hopkins (2024) claims, are also opportunities for overturning conventions and forcing disciplinary and societal reset. In this regard, the post-war has offered some opportunities, especially in light of globalization process, that led the country to involve specialized foreign companies for designing innovative and sustainable urban planning approach at the local context.

Masterplan designing, thus, was handed over to foreign studios/companies, because neither municipality technicians nor local private studios are trained or updated their planning skills to tackle with complex urban planning challenges emerged from the ongoing rapid urbanization and environmental challenges. Despite having some shortages (which we do not aim to investigate in this article), the foreign planning studios have contributed in bringing about some sustainable solutions, especially those linked to environmental challenges.

This part of the research focuses on three cases of masterplan designed by foreign companies: The first is the Masterplan of Dibil, the second is the Masterplan of Daquq, both made by an Italian Studio, SGI, and the third case is the Masterplan of Erbil designed by a Japanese company, JICA; We illustrate these three cases with the aim of learning lessons from these experiences and to scale up their innovative solutions in the national and local levels.

**Case study 1.** The masterplan of Dibil (Kirkuk Governorate) was assigned to an Italian Studio, SGI, to defining the future development of oil-pipe rich city of Dibil (2010 to 2035). After making a thorough data collection and urban analysis, the studio has proposed a very green design alternative to cope with the urban green area scarcity. The innovative idea was consisted of turning the oil-pipe line buffer zone, around 100 meter wide from each side, into a green area so that to act as a lung of the city. The masterplan has thus increased the green footprint per capita to beyond the World Health Organization's recommended 9 square meters by 2035. In addition, the masterplan has created around 5 km-long treelined Cornish-like walking area along the river of little Zab which crosses the western end of the city. It also provided required public services for each neighborhood plans across the city: mixed-used neighborhoods with basic amenities are planned with the aim of reducing the dependency on the urban services and reducing carbon footprint of the transportation services. Though the masterplan's design solutions have been approved by local authorities, especially with the consultation of governorate council, it seems not have yet got final approval by the Ministry of Oil and the Ministry of Public Works, for the country's planning system is still centralized. However, the contents of Dibil masterplan proved to be environmentally sustainable as it tackled core urban-environmental challenges.



**Figure 3.** Shows the green corridors along the city's pipelines (source: SGI project team)

**Case study 2.** In drafting the masterplan of Dakuk, Kirkuk Governorate (2010-2035), the Studio has introduced the concept of urban agriculture for a town which is historically of agriculture evocation. Considered as a sustainable solution for combating the Heat Island Effect, other than a tool for reducing carbon footprint of agriculture products, the urban agriculture is nowadays deemed to be very popular for cities with agriculture evocation. Peri-urban areas are the dynamic interface between the city and rural areas. These areas comprise a mix of urban and rural uses, such as residential dwellings (often on large rural lifestyle' blocks) where certain agriculture activities take place, such as horticultures which are linked around transportation hub. Peri-urban neighborhoods in Dakuk tends to share many characteristics with urban region; however, they serve distinct functions that support the urban area to which they are adjacent. Due to their close proximity to local market, peri-urban areas play an important role in providing food for urban populations- especially in supplying certain foods that easily perishable. The proposed plan of Dakuk was materialized through designing Peri-urban agriculture typology in neighborhoods located at the western outskirts of the city. To this end, SGI has designed neighborhoods with very low population density, with an average lots' size of 1500 square meters per family/farmer. The goal was to reduce farmers commuting trips to the field and contributing to local economy, as well as reducing the environmental impact of agriculture production. Again, although the master plan was formulated through the consultation with the city's Governing council and concerned stakeholders, it is still far from being approved because of disputes aroused between the farmers and local authorities from one side, and the central government and local authorities from the other. Yet, the masterplan's ideas remained very innovative as well as environmentally sustainable, hence, it could be replicated at regional or national scales when conditions are suitable.



**Figure 4.** Masterplan of Dakuk, the yellow color represents peri-urban typology in the west-side of the city. (Source: SGI' project team).

**Case study 3.** Erbil 2050 Masterplan, the goal consisted of updating Erbil masterplan under the supervision of the directorate of Urban planning of the ministry of Municipalities & Tourism with the support of Japan International Cooperation Agency. The masterplan provided some sustainable design solutions, including sustainable neighborhood plans, flood control, green belt with distinct agriculture function, whilst aiming at preserving Southern and Western areas for economic development, including agriculture and Industry, as well as designing the Eastern direction of the city for ground water recharge and afforestation. Erbil 2050 masterplan seeks to enhance accessibility of all citizens to essential services, including new health care centers, cultural and recreational facilities to foster community well-being, improving safety services, etc. the green belt plan focuses on enhancing urban livability and sustainability through spatial development and strategic management of green areas. The green belt aims to increase the green footprint per capita from current 4.35 square meter to beyond the World health Organization's recommended 9 square meters by 2050. According to the masterplan documentations, the plan prioritizes the development of accessible small-scale green spaces within the urban fabrics, alongside the development of new Gateway parks, the Qataw park as a renewable effort of illegal industries, a wetland park in the West, Agro-Nodes promoting agroforestry at key strategic points all around the green belt



**Figure 5.** The green belt solution around Erbil with parkways, agroforestry, and the Cornish walk-way along the river (Source: JICA project team)



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#### 8. Challenges raised from local neighborhoods and Masterplans

Our study has revealed that the environmental challenges linked to urbanization are not consciously considered. A lack of innovative regulations and outdated local urban planning system are noticed. There is little awareness about the innovative and sustainable Neighborhood planning that is widely practiced in the developed countries and is extensively advocated for by the United Nation and International conventions on climate change. Sustainable neighborhood planning and carbon-free solutions are still very far from being adopted locally. Also, mixed-used compact green city and other sustainable solutions are still not seen on the trajectory. No environmental imperatives are local applied on designing Gated cities. Private companies are still operating in a discretionary way, mostly to get maximum economic gains. The Regional Investment board, which assigns land to real-estate companies, are not dictating environmental rules and sustainable or less-carbon dependent solutions, nor they properly monitoring the projects, except for certain regulation such as the application of Environmental Impact Assessment and the rule of allocating 25% of the project area for green areas. There are not any initiatives so far, for instance, to apply certain environmental system such as BREAM or Leadership in Energy and Environmental Design (LEED), or any kind of locally tailored system of environmental assessment. For instance, local urban planning and Board of Investment regulations have not yet set imperatives for new projects, whether gated city or not, to meet a high level of sustainable design and construction and for adopting energy efficiency measures, including siting and building orientation to optimize passive solar gain, the use of high quality, thermally efficient building materials as well as incorporating on site energy generation from renewable sources such as solar panels. Also, no rules are set for companies to engage people in projects. Research has shown any project that misses people participation will results in being ineffective, especially when people's desires and preferences are not taken into considerations. Planning with social engagement requires the involvement of as many stakeholders as possible to get their voice in the project, including concerned public authorities, civil society organizations, general publics, building regulations monitoring agents. The culture of urban governance is still missing in the space-making process: new form of social engagement and mediation between plural parties are deemed to be necessary in providing public amenities, masterplan making or neighborhood planning.

#### Conclusion

From this case we can conclude that in order to create sustainable neighborhoods and masterplans, we need to fill gaps between the call for a sustainable space making and the overwhelming local planning system. We need to act from a national/regional level as well as from the neighborhood planning level. We can summarize the actions as the followings:

1. At the national or regional level, the national planning policy framework should set out government's sustainable planning policies for the country and how these are expected to be applied by local government. Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for water supply, flood risk, biodiversity and landscapes, and the risk of overheating from rising temperatures, in line with the UN's IPCC objectives to reducing the climate change.
2. Consequently, local plans must demonstrate how their policies are in line with the legally binding carbon emission reduction targets that should be set out in the national or regional urban planning framework and policy. Local plans should be based on understanding of both the baseline carbon dioxide emissions within the local municipalities, the emissions inherent in future development and growth within the plan period, and the actions and policies that will reduce emissions in line with the trajectory that should be set out in the climate action's national planning framework.
3. The research has shown the need of abandoning conventional neighborhood layouts and masterplans that highly depending on fossil-fuel; instead, sustainable neighborhoods must be created to include low-carbon dependent housing, car-free areas, locally-owned stores, and public service accessibility and walkable green areas.
4. Achieving this will require the vast majority of households, communities, business and local authorities to be fully engaged and aligned with the government policy. A participatory methodology should be set out to engage as many stakeholders as possible at all stages of the planning process, both at a masterplan level or neighborhood level. The public authorities should introduce the culture of urban governance, and this should be understood as a new form of involvement and mediation between plural interests in providing public amenities as well as in the development of residential compounds.
5. Urban Governance should be improved by establishing a legal framework that allows municipalities to enjoy more authority and representation in the planning process.



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### Track

6. The country requires a new paradigm, and the creation of a healthy and sustainable neighborhood is a vision that should be followed. Ecological and sustainable design deal with housing and infrastructure that creates clean air, clean water and clean land- and these goals are focused on achieving an ideal interaction between the built and natural environment.
7. Designing any new development, whether gated city or not, should aim to meet a high level of sustainable design and construction and be optimized for energy efficiency, including siting and orientation to optimize passive solar gain, the use of high quality, thermally efficient building materials, incorporating on site energy generation from renewable sources such as solar panels.
8. Universities and scholars should promote eco-designing, and the development of environmentally-friendly built environment must drive the policies and building practices of national and regional government, not least the application of environmental system such as LEED or BREEM or any locally tailored environmental system.

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