

Towards Environmentally Sustainable Urban Regeneration: A Framework for Baghdad City Centre

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Received: January 23, 2012 Accepted: July 7, 2012 Online Published: August 24, 2012

doi:10.5539/jsd.v5n9p58

URL: <http://dx.doi.org/10.5539/jsd.v5n9p58>

Abstract

The urban regeneration of cities is a classical planning dilemma. Baghdad city centre is suffering from many problems such as environmental pollution, a low standard of infrastructure, functional disorder, traffic congestion, uncontrolled land use, and deteriorated physical conditions. A central objective of this investigation is to explore how the urban regeneration of Baghdad city centre could be carried out via the practice of urban development, in a way that promotes environmental sustainability. The findings illustrate a common phenomenon, which is that conservation-led regeneration for compact city centres is more environmentally relevant than a large scale development process. In order to reduce the risk factors connected to the destruction of urban heritage in city centres under the pressure of transformation, sustainable urban development should not be neutral. It should restrict the decision-making in environmentally urban regeneration through a multiple evaluation process, and should promote projects.

Keywords: Baghdad city centre, environmental sustainability, urban regeneration

1. Introduction

Agenda 21 (UNCED, 1992) recognises that urbanisation offers unique opportunities for the supply of a sustainable environment, and that the overall human settlement objective is to improve the social, economic and environmental quality of the living and working environment. Regeneration has become a major element of urban policy, especially for inner urban areas and it has recognised the importance of urban regeneration in contributing to a sustainable pattern of development (Department of the Environment, 1994). Despite the emergence of urban regeneration and sustainable development as parallel strands of urban policy, there has been little co-ordination between them and an imbalance in action, with greater emphasis given to achieving urban regeneration (Couch & Dennemann, 2000).

The city centre represents the main location for most basic activities and intensive land use. The existing city centre of Baghdad includes the civic centre, the central business district (CBD), the old city, and activities in non-central areas. The study of Baghdad city's comprehensive urban development (2003) demonstrates the importance of river banks, the heritage concentrated in deteriorated areas, and the need for land use and advanced transportation systems for Baghdad city centre development. The State of Iraq Cities Report (SICR) (2006-2007) noted that there is an increasing awareness internationally and in Iraq that the world is a fragile system to be used carefully and sustainably. Environmental issues are important in the future development of Iraqi cities. Thus, the priority is environmental issues in urban Iraq. Since 2003, the Municipality of Baghdad (2011) has invited many architectural and planning bureaux to develop some areas and has presented many investment opportunities in the city centre. Unfortunately, the excessive involvement of the central government in the urban development process, and the absence of regulations for initiatives or environmental impact assessments for these projects, was obvious. Accordingly, this preliminary research aims to explore how the urban regeneration of Baghdad city centre could be conducted through the practices of urban development while also promoting environmental sustainability.

2. Conceptual Framework

2.1 Urban Regeneration

The term 'urban regeneration', widely used in recent decades, means "the revival, renaissance or reconstitution on a higher level, pertaining to, situated or occurring in a city or town" (Oxford English Dictionary, 1997). From this

definition, it can immediately be seen that a wide spectrum of interests and activities may fall into the ambit of *urban regeneration*. So, initially, urban regeneration seeks to revitalise areas of cities and towns which stand out due to some deficiency (Lang, 1999). This urban regeneration is a comprehensive integrated vision and action leading to the resolution of urban problems and seeking to create a lasting improvement in the economic, social and environmental conditions of an area that is changeable (Roberts & Sykes, 2000). The object of regeneration is to be achieved in particular by the following means: bringing land and buildings into effective use; encouraging the development of existing and new industry and commerce; creating an attractive environment and ensuring that housing and social facilities are available to encourage people to live and work in the area (Department of the Environment, 1980).

It can be argued that the goal of urban regeneration is achieved when the aspect of the city upon which the initiatives and projects have been enacted is no longer seen as requiring special attention as it is of the same standard, or better, as the rest of the urban whole. The statutory development plan, as an official document, could affect the goal of urban regeneration in any of three ways: promotion, restriction, or neutrality. The development plan could be described as promotional in that respect (Lang, 1999). Urban regeneration theory is principally concerned with: the institutional and organisational dynamics of the management of urban change; the functioning of the urban system as a whole; the operation of the economic, social, physical and environmental process, and integration, which is a central feature of urban regeneration. In addition to economic and social analysis, the urban regeneration process includes environmental analysis, which includes urban physical quality, environmental resource use, waste management, pollution, designed features, and landscape. One of the inputs is the physical improvement, including city centre improvement, housing improvement, enhanced urban design and quality, and heritage. Regarding outputs, there is environmental action, for example waste management, energy efficiency, and urban greening Robert (2000). Urban regeneration can be seen as a process, as it is a *goal* at which a variety of projects and activities are aimed. Projects and activities should be described as urban regenerative, as they do not supply urban regeneration in themselves, but help to reach the goal of urban regeneration (Parkinson, 1989). The term "regeneration initiative" means a project, programme or scheme which is based on the design and management of the "physical and environmental: housing; transport; environment; improving/developing business premises" (Sesnan, 2006).

A study by Couch and Dennemann (2000) referred to aspects of urban regeneration. At the strategic level of *transportation*, it can be argued that the very concept of urban regeneration creates a more compact city and that this, therefore, reduces car use and increases the attractiveness of public transport; in addition, cycling and walking are national policies. The main planned reductions in pollution in the area will be in the removal of dereliction and contamination. There are no local policies to maximise energy efficiency or to generate energy from renewable resources. The strategy of *Buildings and Land Use* emphasises the protection of the built heritage, historic townscapes and cultural links and makes a major contribution to recycling through its proposals for building refurbishment, the re-use of derelict sites, and to provide local amenities and improve access for the disabled.

Furthermore, it is argued that the principal advantage of the compact city rests in its contribution to sustainable urban development. Virtually all urban development concepts produced in recent years embody the aim of creating compact cities (Beatley, 2000). The physical compactness refers to the spatial configuration of land-use development within the city, the functional compactness to the density and the mix of daily activity (Couch & Dennemann, 2000).

2.2 Environmental Sustainability

The concept of environmental sustainability is characterised by issues such as the proper use of resources to guarantee a generational equity, protection of the natural environment, minimal use of non-renewable resources, economic vitality and diversity, community self-reliance, individual wellbeing, and satisfaction of basic human needs (Choguill, 1996). The horizon of innovation towards the environmentally sustainable city is a highly motivating approach through which innovative actions towards sustainable development in European cities can be achieved (Mega, 2000). Environmental sustainability includes landform/ microclimate, transportation, land-use, infrastructure efficiency, on-site energy resources, and site design. There are also five principles of a sustainable environment: healthy interior environment, energy efficiency, ecologically benign materials, environmental form, and good design (Couch & Dennemann, 2000).

This also includes actions to reduce the use of physical resources, recycling, the use of renewable resources, redesigned production processes, products to eliminate the production of toxic materials, and the protection and restoration of natural habitats and environments valued for their liveability or beauty (Commissioner for Environmental Sustainability Act, 2003). Environmental sustainability is related to the environment and deals with

the natural and built environment. Environmental Sustainability includes ecosystems, carrying capacity and biodiversity.

However, environmental sustainability dimensions can be framed in these areas: resource efficiency, energy efficiency, site conservation, environment conservation, indoor air quality, water treatment, and waste management. Achieving environmental sustainability requires carefully balancing human development activities while maintaining a stable environment that predictably and regularly provides resources. Achieving environmental sustainability requires dramatic change in the ways that societies and citizens manage biodiversity and the processes of production and consumption (Melnick et al., 2005).

Alshuwaikhat and Nkwenti (2002) attempted to highlight a framework of the practice of sustainable urban development for arid regions. The design approach, as is the case with most planning schemes, is conducted within a given set of parameters. These are as follows:

- Sustainable design objectives. The goals and objectives of the brief are checked vis-à-vis the desired outcome and how positively it is likely to affect end users, the environment and the resultant natural balance, both in the short and long term.
- Sustainable design guidelines. The sustainable design guidelines are comprised of a set of indicators specifically selected from the economic, social and environmental subsets to assist the refinement of a design brief (from step 1 above).
- Sustainable design statements. These are an amalgamation of the Design Guidelines with the scheme's design philosophy, to reflect a concretisation of the design with respect to the site, its environs and all its future interaction.
- Preliminary design. The preliminary design is a stage that determines the selection of alternative designs based on their compliance with the key elements of impact assessments.
- Sustainable design scheme. From stage 4 above, the design is assessed for sustainability and positive impact on the environment and end users. If necessary, it is looped back to the design objective phase and further filtered down the line until a satisfactory design is achieved.

The previous parameters of sustainable urban development may be modified and refined in terms of environmentally sustainable urban development.

2.3 Indicators and Techniques

Compact cities, characterised by relatively high density, mixed land-use and pedestrian-oriented habitation, have been proposed as one solution for sustainable urban planning. Many advantages of the compact city are recognised. These are:

- Limited travel distance, and reduced emissions and greenhouse gases.
- Less car dependence, less fuel consumption for traffic, and more public transport.
- Less material and energy use for infrastructure construction, reduced length and service run of pipe lines, roads, etc.
- More opportunities for people to walk, encouraging community life and better surveillance to improve public safety.
- Compact residential built form helps to reduce heating loads in winter.
- High density prevents urban encroachment into the countryside.
- Maintenance of bio-diversity (Chen et al., 2008).

Hui (1996) described the environmental dimensions of sustainability, including: reduced waste, effluent generation, and emissions to the environment; reduced impact on human health; use of renewable raw materials, and elimination of toxic substances. Shen et al. (2011) aimed to select urban sustainability indicators. These indicators are: geographically balanced settlement; freshwater; wastewater; quality of ambient air and atmosphere; noise pollution; sustainable land use; waste generation and management; effective and environmentally sound transportation systems; mechanisms to prepare and implement environmental plans, and biodiversity.

The qualitative assessment of sustainable development is expressed as a series of statements, aspects of which concern environmental sustainability. These are:

- the efficient use of resources and minimisation of waste by closing cycles;

- the limitation of pollution to levels at which natural systems can cope without damage;
- the diversity of nature being valued and protected;
- the creation of safe, clean, pleasant environments and health services (Liverpool City Council, 1997).

There are two main approaches to evaluation, and these are, first, goal evaluation, which includes the assessment of the effect of the project seen in relation to its given objectives and, second, process evaluation, which includes assessment of the way the project functions and its consequences in the widest sense. The evaluation indicators are numerous, and these are: efficiency; the productivity of the implementation process; effectiveness; the extent to which the objective has been achieved; impact; all other positive and negative changes and effects caused by the project; relevance, which is whether the objectives are still in keeping with valid priorities and user needs, and sustainability, or whether the positive effects of the project will be maintained after the project has been concluded. These are generally applicable analytical measures for projects, programmes, and processes (Samset, 2003). The UNDP (2004) presented a list of criteria based on environmental impact assessment (EIA) used for project evaluation. These criteria are: reducing the need for transportation; minimising external pollution and environmental damage; connecting with nature; concentrating activities; using a multimodal street network; mixing land uses; high occupancy rate; reducing energy and consumption; degree of flexibility for future expansion; degree of efficiency of performance, and highlighting the values of heritage and cultural features.

At the heart of this guide was the concept of a “policy impact matrix” in which each policy was to be tested against environmental criteria. A five point scale of impact assessment was suggested: no relationship or insignificant impact; likely but unpredictable impact; significant beneficial impact; significant adverse impact and uncertainty of prediction or knowledge (Department of the Environment, 1993).

3. Case Study

3.1 Recent Urban History, Structure and Morphology

The Iraqi capital, Baghdad, is a large metropolitan city of 6.77 million people located on both sides of the river Tigris in an arid zone at 33°20'N latitude and 44°23'E longitude. The serious thinking of the urban planning of Baghdad city was started by Bereck and Bronoweinever of Berlin in 1936, and continued by the British firm Miniprio, Spencerly and Macfarlane in 1956. Their task focused on land use and transportation. The city continued its growth at a higher rate because of migration toward Baghdad, with the city expanding in all directions and on both sides of the Tigris. In other words, the 60 square kilometers in the early twentieth century increased to 255 square kilometres in 1970. The neighbourhoods which appeared in the early 1920s were simply row houses on both sides of wide streets, and then western suburban detached houses followed in later neighbourhood concepts.

The ministry of development asked Doxiadis, a Greek planning association, to complete the first master plan of the city in mid 1958. Doxiadis neglected the organic form of the city by proposing a grid-iron pattern, and emphasized the role of the river in the development plan. Moreover, Doxiadis proposed the digging of the army canal on the eastern bank of the Tigris to solve the flood problems and to be the new axis of residential development parallel to the river.

In the mid 1960s, Polservice, a Polish planning team, was asked to re-plan the city and to propose a Comprehensive Development Plan for Baghdad 2000. Three zones were established: Great Baghdad, composed of the inner city and Baghdad suburban zone; Baghdad metropolitan, which added to the previous item with a buffer zone and an outer zone; and the Central region of Iraq, which also included the previous item and added an outer regional zone. Polservice defined the city centre and proposed eight secondary sub-centres to give non-centralisation of distributing activities and services. Also, the hierarchy of the residential quarter, district, and neighbourhood were established. Polservice identified the area allocated for the civic centre and proposed an area between Kulafa Street to the west and King Ghazi to the east, Al-Kilani Street to the south, and Al Wathbah Square to the north. However, the proposals of a study (Comprehensive Development Plan of Polservice, 1973) pointed to complaints about the city centre in terms of a lack of commercial, cultural and recreational opportunities.

This developmental study divided the structure of the centre of the city into the central business district (CBD) and the central region (central area). The study considered the first ring road, RDX, as the boundary of the city centre, meaning from the north side of 14th July Road and Muhammad Qasim Freeway. The study, suggesting that the designated centre of Baghdad would be about 1,700 hectares, relied on the stage method as the model to test the development plan.

A transportation study of the city of Baghdad (Wilson et al., 1983) addressed the issue of traffic in Baghdad elaborately. This study proposed four alternatives for public transportation throughout the city, with an emphasis on the central region. The first alternative emphasised a bus transportation network, while the second emphasised

metro lines only. The third and fourth proposals provided a mix between the previous alternatives. A study of an integrated development plan (1987) noted that the centre of the city was not to exceed the old, traditional area in the Rusafa and Karkh areas. However, the pressure of population increases caused the city to expand parallel to the Tigris River. The achievement of Damascus Street on the Karkh side provided a new dimension with the orthogonal direction of the river belt, as well as the establishment of Embankment Street as the growth expanded eastward.

In spite of the Iran-Iraq War (1980-1988) which slowed progress, large, state-sponsored building projects continued in Baghdad city centre, such as the development of Haifa Street on the Karkh side (1981-1985). One local study (Integrated Development Plan, 1987) proposed that the centre of the city was not to exceed the old, traditional area in each of the Rusafa and Karkh areas. The pressure of population increases caused the city to expand parallel to the Tigris River. The achievement of Damascus Street on the Karkh side provided a new dimension with the orthogonal direction of the river belt, as well as the establishment of Embankment Street as the growth expanded eastward. The predominant urban structure in Baghdad city centre is compact, especially in the historic areas that have a largely organic pattern, while the urban structure of the outer districts is less compact on the peripheries. The tendency towards excessive involvement of the central government reflected by the predominance of a top-down approach to the whole development process is obvious. Almost all the previous experience of urban development in the 1980s and before depended on foreign consultant firms. Also, almost all the methodologies of urban development relied on three stages of analysis: synthesis via building alternatives, and evaluation.

The sanctions against Iraq (1990-2003) increased the problem of urban development and further crippled Baghdad, virtually eliminating the middle class in the process, with almost all the budget being directed to the army. Because of the suffering caused by war and isolation since 1980, the concept of urban regeneration in Iraq is likely to be absent; indeed Baghdad, like other Iraqi cities, also suffered years of serious conflict and violence after 2003. Moreover, no significant urban development in Baghdad city centre has occurred since the 1980s, and the investment law of 2003 still has its deficiencies and challenges.

It is obvious that Baghdad has experienced a great deal, leading to the city having different shapes and structures throughout its evolution. At present, almost all the development follows the concepts and plans stated by the Polservice team.

3.2 Description of Baghdad City Centre

Baghdad city centre consists of many functional, physical, and spatial considerations, including boundaries and extensions, land use and transportation, cultural identity, architectural heritage, and the river front. However, this section describes the structure and problems of the existing city centre with respect to the previous considerations, using the wealth of available written 'grey' material, such as consultancy reports. Tables 1, 2, and 3 show the significant surveys. Baghdad city centre is comprised of a Central Business District (CBD), which includes a wide strip of important sites of activity. The central area has three levels: global, national, and local. The CBD is divided into two areas, the Rusafa and the Karkh.

Table 1. Survey of land use for Baghdad C. B. D

Type of land use	Area per hectare / 1995	Area per hectare/ 2000
Administration	354.2	319.7
Commerce	266.8	408.7
Housing	634.2	519.9
Public facilities	133.9	291
Industry	83.9	57.3
Transportations	66.5	453.8
Public utilities	7.2	5.6
Open areas	109.5	128.6
Forests	14.9	41.4
Water planes	245.5	345.5
Military area	15.2	-
Temporary sites	3.1	-
Vacant area	82.1	467.1
Total	2016.4	3038.6

Table 2. Land use criteria in central area C. B. D

Type of land use	Current criteria 1000 person/hectare	Planned criteria by comprehensive development 1000 person/hectare	The difference 1000 person/hectare
Administration	1.2	1.1	-0.1
Commerce	0.9	1.5	0.6
Housing	2.1	1.9	-0.2
Public facilities	0.4	1.07	0.6
Industry	28	0.21	-0.07
Transportations	2.3	0.2	-0.3
Public utilities	0.024	0.02	-0.004
Open areas	0.37	0.6	0.23
Forests	0.05	0.15	0.1
Water planes	0.8	0.8	Zero

Table 3. Output and planned Criteria (Intensity of use) - (Person/Hectare)

Type of Land Use	Existing Criteria 2000 Person/ Hectare	Criteria of Comprehensive Development Plan 2000 Person/ Hectare	Existing Criteria Person/Hectare		Criteria of Comprehensive Development Plan 2000 Person/ Hectare	
			Karkh	Rusafa	Karkh	Rusafa
Administration	751	847	368	2460	409	3833
Commerce	997	662	1794	769	855	576
Housing	419	521	305	559	383	684
Public facilities	1987	931	3265	1576	604	1455
Industry	3172	4727	24753	2005	11527	3393
Transportation	400	498	259	625	366	654
Public utilities	36958	48375	354803	23139	1083600	29025
Open areas	2430	1483	2516	2376	1206	1751
Forest	17859	6543	8447	69418	10127	5294
Lacks/Water plan	1084	1103	717	1644	730	167

- The Rusafa area is characterised by the following uses:

- Commerce and business.
- Hotels and restaurants with tourist and entertainment facilities.
- A civic centre, including the headquarters of the Baghdad municipality.
- Supplies and technical services.

- The Karkh area is characterised by the following uses:

- A residential area on Haifa Street.
- A developmental area behind Haifa Street and at Muthana Airport.
- Shaljahia Railway Station.

The land use includes the following activities:

3.2.1 Industry

The Rusafa area includes two types of activities. One is related to large-scale car maintenance in the Sheikh Omar area, whereas the other is traditional crafts. The old housing includes the textile, printing, and wood- and metal-working industries. Industrial activities concentrated in the Karkh area include a specialised furniture industry and metallurgy, auto repair, and weaving.

3.2.2 Commerce and Business

The Rusafa area includes Al-Rashid Street, which is characterised by one of the highest concentrations of commercial and business activities. The city centre specialties in Rusafa are the Alcheorgh Market, which excels in the distribution of goods and services. The concentrated area of commerce and business in the Karkh area is along Cairo Street to the bridge. It specialises in commercial buildings east of Haifa Street where, in the multi-storey buildings, the ground floor is typically commercial, and the upper floors contain offices for lawyers and doctors, with some popular hotels.

3.2.3 Public Buildings and Governmental Offices

Some governmental buildings were constructed between the West Bank and Canal Street between Port Said Street and Muthana bin Harith Shaibani in the Rusafa. Some of the government buildings were built near the green zone in the Karkh.

3.2.4 Housing

Most of the residential use is concentrated at the centre of the Kulafa/Sadoun in Rusafa, the area of Haifa Street, the residential compound of April 28, and the Shawakah in Karkh. These areas represent 60% of the total residential use in the city centre.

3.2.5 Areas of Heritage Value

The city of Baghdad possesses distinctive cultural patrimony, historically and religiously concentrated mostly in the heart of the city centre on both sides of the Tigris River in the area between the Bridge of Bab Al-Mudtham to the north and Al-Jumhoria Bridge to the south, and between Ghazi Street to the east and Haifa Street to the west, with a high concentration in the Rusafa. The urban fabric of the traditional areas is characterised by the old fabric being generally organic and compact. It contains a large number of old buildings and small houses.

3.2.6 Riverfront

Adjacent to the Tigris River are a number of monumental buildings, mosques, and traditional markets plus private housing units. The riverfront is continuous, but is divided into separate areas of various architectural features. Figure 1 shows Baghdad city.

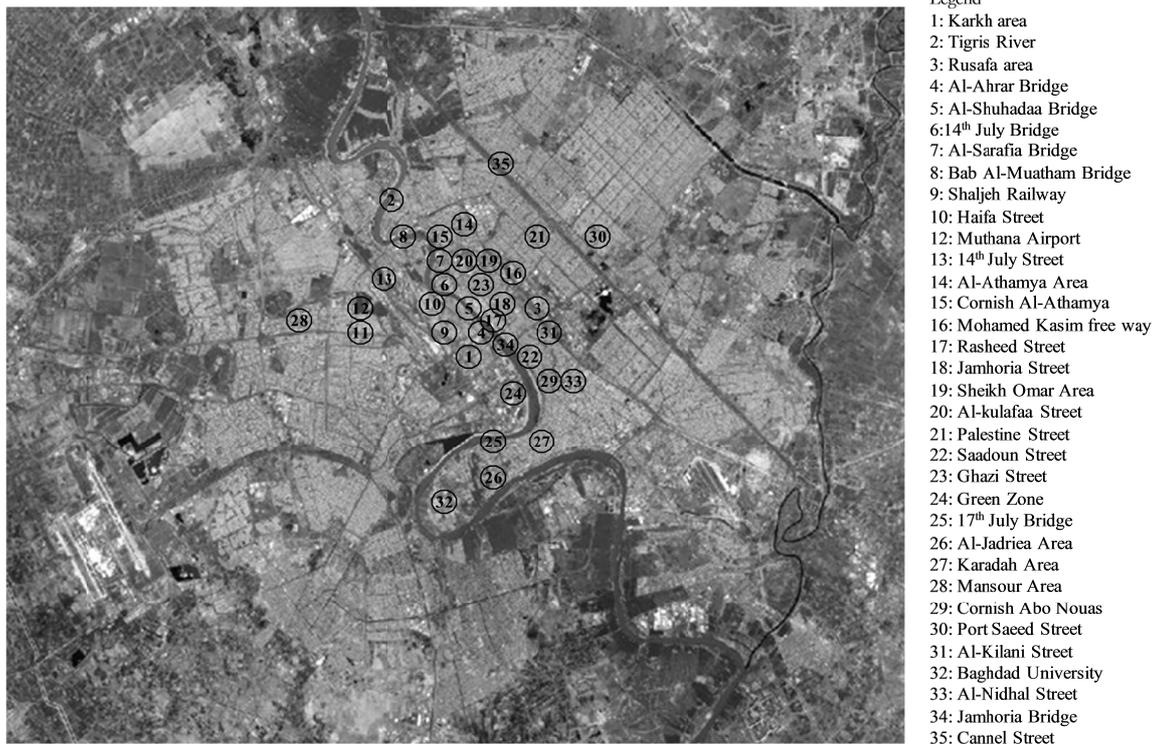


Figure 1. Baghdad City

3.3 Identification of Problems in Baghdad City Centre

3.3.1 Boundaries and Expansion Problems

There is no clear spatial definition for the city centre, a lack of a clear vision for future growth and expansion, and no effective ties of an main city centre with some secondary centres. This is especially true of the Karkh area because of the presence of large areas of vacant land, which interrupt the continuity and communication between these various functions, such as the Shaljah Railway and Muthana Airport, in addition to weak links to the east-west and north-south motorways.

3.3.2 Land-use Problems

There are differences in: the areas of land use, expected criteria, and the percentages of current and planned land use. Besides, there are vast differences of land use in the Karkh and Rusafa, an increase in the undesirable spatial concentration of some activities in the city centre, and overlap and opposition in the nature of some of the land uses with each other in certain localities such as the industrial, residential, and commercial areas in the Sheikh Omar area. The imbalance in the distribution of the CBD, some of which is concentrated in the Rusafa, such as on Sadoun, Rasheed, and Nedhal Streets, is reflected in delayed traffic, prolonged flights, few pedestrian walkways, imbalance in standards of land use, including the locations of various activities such as cultural and recreational uses, and the stagnation of river traffic at night. The encroachment of some uses upon others is obvious. Finally, there are low environmental standards because of the few green open areas, noise, visual pollution, and negative property effects, especially in residential areas. See Tables 1 and 2 for the survey of land use for Baghdad CBD and Table 3 for the differences in land use in the Karkh and Rusafa. Detailed problems of land use are as follows:

- Housing: There are high-density and high-occupancy rates, poor environmental standards, including low levels of infrastructure, old and neglected housing, and inadequate levels of maintenance, and harassment of residential use.
- Industry: Traffic congestion is caused by industrial sites and a lack of clarity in planning and environmental standards.
- Infrastructure: There are serious negative effects from inadequate systems of services at the centre such as electricity, water supply, sewage, etc.
- Commerce and business: There is a lack of a clear system for efficient traffic movement, limited spaces for sale in terms of expansion and storage, difficult access by freight vehicles with inadequate parking for consumers, use of primitive systems, cyclists and the loading and unloading of animals. Also, there are weak environmental standards for services, such as the disposal of sewage and the general deterioration of buildings, shops, and commercial areas.
- Public and governmental buildings: There are small offices and administrative institutions of the private sector, dispersed in an interdependent world in scattered locations overlapping with other uses, and the loss of the city centre to the urban-scale plaza for such uses.

3.3.3 Transportation Problems and Organisation of Movement

There is a lack of a clear organisational policy on public transportation within the centre, use of the centre by through traffic, crowds of vehicular traffic on the streets of the centre, especially in the old part at peak hours, and a lack of control over traffic. Several additional negative points have been observed, such as modes of transportation being the main air polluters in the city, lack of safe areas for pedestrian access for moving freely, competition between vehicles and pedestrians and an overlap in the types of vehicle that carry passengers, and limited spaces for car parking facilities for loading and off-loading.

3.3.4 Problems in the Old Heritage Areas

Housing is below acceptable environmental standards, as dense occupation rates have resulted in a significant deterioration in housing units and an increasing pressure on the infrastructure, contradiction in architectural solutions between conservative traditional fabric and contemporary urban use, and increasing numbers of new motor vehicles, which have created traffic congestion, noise, and visual pollution.

3.3.5 Problems at the Riverfront

The scene at the riverfront fails to integrate with the general urban fabric in the centre, especially in the old city, because of the lack of openness toward the river. This has resulted in the absence of an influential, distinguishing urban scene. Moreover, there is a lack of open green spaces and recreational areas on both sides of the river that

could be exploited by tourists, a lack of clear axes of pedestrian movement parallel to the river, and inefficiency in the links between the two sides of the river. Figure 2 shows selected problems of Baghdad City Centre.



Transportation Problems in Hafeth Al Kadi and Al Rusafi Square



Deteriorated Structures in Rashied Street



Neglected River Front



Visual Pollution in Historic Area

Figure 2. Selected photos of problems in Baghdad city centre



River Front of Baghdad City Centre



Deteriorated Structures of Architectural Heritage

Figure 2. Selected photos of problems in Baghdad city centre (to be continued)

4. Proposed Sustainable Framework

4.1 Main Theme

The strategic themes of the urban development of the centre are that Baghdad is a historic city that extends back to the Abbasid period. It is a river city, and the importance of the Tigris River is essential to the life of the city. The city centre must be a modern or knowledge city centre, keeping pace with the progress of the age. It is an Iraqi and Arab capital and is the home of well-known international dignitaries of good standing.

As a compact centre, the major strategy should be to move towards a more comprehensive form of policy and practice. The spatial dimensions of activities have to focus on the growth of whole Baghdad activities, while the physical dimension should emphasise heritage and its retention. The environmental approach has to introduce a broader idea of environmental sustainability in respect of the urban regeneration of a compact city centre, divided into physical and functional aspects with respect to culture.

4.2 Setting Objectives and Goals

In relation to the development of a sustainable urban regeneration process, it is argued that the vision of a plan-led environmentally-friendly city centre should have the following objectives:

- A spatially compact form
- A balance of land use structures
- An energy-conscious public transportation network
- High levels of infrastructure and shared service provision
- A distinctive urban culture
- A strong landscape framework

In order to create a preliminary plan for urban regeneration for a compact city centre, this item attempts to present the following important goals:

- The identification of the spatial dimensions of the city centre and future expansions.
- The location of efficient and balanced distribution of land use.
- The transportation and organisation of a network of movement and enhanced accessibility.
- The formation of a distinctive urban scene in the city centre and riverfront.
- The regeneration of the historic fabric in the heritage centre.
- The promotion and highlighting of distinguished architectural and historical features.

4.3 Sustainable Guidelines

The overall guidelines of the sustainable development of the centre of Baghdad include:

4.3.1 Land Use

- Draw a clear framework for future expansion, provide clear spatial identification for the activities, and minimise the horizontal expansion of the centre.
- Efficiently organise all strategies of land use within the framework of metropolitan Baghdad, transfer functions and activities that oppose the basic role of the centre, and attract specialised high-level activities and the reorganisation of land use on this basis.
- Create a more functional compactness to the relative high density, mix land use of daily activity, and the spatial configuration of land-use development.
- Correct the balance of spatial distribution in Karkh and Rusafa, as needed.
- Establish a hierarchy of density and rises by increasing the rise of buildings in some areas on the peripheries of the city centre.
- Dispose of conflicting land use or modify the intensities and take into account the mixed use as a matrix and attempt to limit the excesses of other activities.

4.3.2 Transportation

- Formulate effective and environmentally sound transportation systems, and increased movement and functional links with the secondary centres.
- Reduce the demand for transport and give major priority to pedestrian dominance over a wide range of the city centre. Provide more opportunities for people to walk, encourage community life, and have better surveillance to improve public safety.
- Provide easy access to the centre and secondary centres, strengthen transportation services and traffic management, and increase the efficiency and organisation of transportation systems inside the centre.
- Enhance movement linkages between the two sides of the centre, and separate the types of movements.
- Promote public transportation lines that are clean, attractive and unpolluted and reduce car usage; cycling and walking are reasonable, with controlled vehicular access reserved for emergency cases.

4.3.3 Housing, Commerce and Business, Public Government Building

- Depend upon higher density with fewer spatial standards in the area of the centre to enhance the quality of life, and provide local amenities.
- Improve access for the disabled and re-use/conservate buildings.
- Use compact residential built forms to help to reduce heating and cooling loads because of the reduction in exposed wall area, and promote interaction between the old urban fabric of neighbourhoods and the new ones, and achieve formal functions between the various housing policies.

4.3.4 Conservation Areas

- Rescue the old city by providing a safe haven for pedestrian access; conserve archaeological and cultural features and architectural values.
- Give priority to the maintenance and rehabilitation of characterised heritage neighbourhoods.
- Highlight and identify historical foci and emphasise the regeneration of Rashied Street and help to encourage rich and satisfying lives.
- Conserve parts of the heritage of Baghdad centre, including the old fence and known historical gates of Baghdad and axes of movement in the old urban fabric.

4.3.5 Riverfront

-Re-link the historic city centre and the river to try to create a special urban form and create a lovely urban image of the river, reflecting the close interconnection of its two sides and emphasising the continuity of pedestrian paths parallel to the river on both sides.

- Articulate interaction focused on a strong attraction on both sides of the river and recreate cultural activities within pedestrian walkways.

- Prepare mechanisms for environmental plans that achieve biodiversity and cultivate strips of green areas around the river, and relocate polluting industries.

- Lengthen Abe Nuas Street and link Cornich Al-Athamia, where the openness of the various areas is present, and facilitate the transportation of renewable energy along the both sides of river.

4.3.6 Local Environment and Infrastructure

- Improve overall urban infrastructure, and the environmental standard, following safety requirements.

- Coordinate the activities of bodies concerned with the protection and improvement of the environment; keep the balance between efficiency of functions and environmental improvement, and raise environmental consciousness and health standards.

- Generate energy from renewable resources or waste, create an administrative self-sufficient environmental system, and reduce waste, encourage reuse and/or repair, encourage recycling or recycled products, and reduce local pollution (noise, air, water, land).

- Provide greater capabilities and means of local micro-climates and adopt local building materials.

4.4 Key Elements of Alternatives

The following three suggested objectives could be used to guide and justify the alternatives:

- Increased cultural activities in the city centre, with the idea being that the conservation would be a locomotive for cultural development supported by the revitalisation of river banks, which would in turn increase tourism to the city centre. This urban regeneration process would move gradually from inside the city centre outwards.
- Large scale urban development of neglected or deteriorated parts of the city centre, so that the existence of new activities of commercial and office building such as in the Karkh area, and housing such as Sheikh Omer in Rusafa, would attract investors to modernise and reconstruct the area. Relatively, this urban regeneration process would move from intermediate parts of the city centre.
- Distributed small spots for urban development, with the idea being that qualitative distributed spots according to varied land uses would increase attention on urban regeneration and may accelerate urban regeneration. This urban regeneration process moves in different areas from the outer city centre inwards. Table 4 shows these alternatives and Figure 3 shows the spatial dimensions of Baghdad city centre.



Alternative A



Historical areas in Alternative A

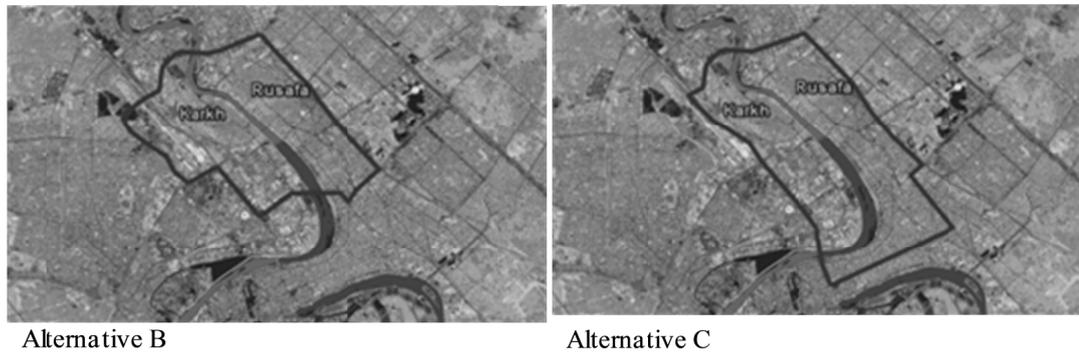


Figure 3. The spatial dimensions of the alternatives of Baghdad city centre

Table 4. The alternatives of urban regenerating city centre of Baghdad

Alternatives	Alternative A	Alternative B	Alternative C
Main concerning aspects	Increased cultural and tourism activities	Urban development of neglected areas and deteriorated structures	Distributed spots of urban regeneration
1. Identifying the spatial dimensions of the city centre and future expansions.	The boundaries of the city centre within the historical area only, whereas future expansion will be vertical.	The boundaries of the city centre would begin with the eastern station of Baghdad, and the Khermanh Square to the south, and to the north, the Door of the Great Expanse. Future expansion will be both horizontal and vertical.	The boundaries of the city centre beyond the first ring road extension southward to the Karadah outside street, whereas further future expansion will be horizontal.
2. Finding efficient and balanced distribution of land use.	Conserve historical neighbourhoods and Rashid street.	Establish a commercial area in Karhk, and maintain the use of administrative activities scattered across. Establish a residential complex in Sheik Omer street in Rusafa.	Increase the percentage of commercial use, social and cultural facilities, and communication to stress the importance of the central area of mixed uses.
3. Transportation, organising a network of movement and enhancing accessibility.	Emphasise light lines for fast transfers integrated with metro network with secondary centres.	Integrate bus transportation with the proposed metro network.	Emphasise bus transportation.
4. Forming a distinctive urban scene of the centre and the riverfront.	Develop the riverfront to enhance the ecosystem. Establish functional axes of movement for pedestrians through historic sites that link with the river.	Deal with the riverfront as an integrated part through establishing certain elements.	Divide the riverfront of the city centre into several areas with different mixed urban features and functions.
5. Regenerating the historic fabric in the heritage centre.	Conservation-led regeneration of major parts of the old historic area.	Conserve some neighbourhoods, upgrade the system of paths, and redevelop major parts of the old historic area.	Conserve memorial old buildings and develop majority of historic areas.

4.5 Three Alternatives Assessed

The alternative described in this section is used to illustrate how the evaluation methodology can be used for urban regeneration at city centre. The aim is to make a rough assessment of urban regeneration processes and projects seen from different perspectives. The evaluation is made essentially as a qualitative assessment based on available information from the previous studies. No attempt was made to verify information or ensure precision.

In order to identify evaluation criteria and establish a basis for comparison, two stages have been used. The first relied on EIA criteria for the process of urban regeneration, while the second assessed the projects resulting from previous processes dependent upon five criteria: efficiency, effectiveness, relevance, impact, and sustainability. Evaluation is based on what little factual information exists in the alternative preliminary phase. The assessments will be either negative or positive in varying degrees. For simplicity, the conclusions have only been marked with (+) (.) or (-).

First Stage:

In order to identify the spatial dimensions of the city centre, the alternative A of increased cultural activities is more compact and thus more identifiable than the alternative C of distributed spots. There are no limitations for city centre expansion for all alternatives. The alternative of large scale urban development on both sides of Karkh and Rusafa will definitely contribute to land use balance. Obviously, the urban renewal energy of light transportation lines which are integrated with the metro network in alternative A is more environmentally effective than the bus and metro network in other alternatives. Definitely, the most compact city centre in alternative A will reduce the need for transportation. It is likely that for alternatives A and B there are few concerns about using a multimodal street network. In order to promote a distinctive urban scene and strong landscape, the alternative A of increased cultural activities and developed river bank as recreation areas is the most successful. However, other alternatives focus on a modernising approach in terms of the common urban scene. In addition, alternative C may have the positive effect of developing the river bank of Abu Nuas. Finally, the implementation of alternative A will definitely achieve a high level of infrastructure, minimise pollution, and respect micro climate conditions. In spite of slight differences, other alternatives could not have such priorities toward environment and infrastructure issues.

Second Stage:**Alternative 1: Increased cultural activities**

Alternative *efficiency* can be established in terms of environmental efficiency. Efficiency would be measured according to conservation process, recreation of river front, high level of infrastructure and minimising of pollution. *Effectiveness* expresses the achievements of the alternative goal. In this case, it would depend on the activities' attraction for the public, and the extent to which the city centre performances would attract people from inside and outside the country. There could be many *impacts* from the alternatives, foreseen and unforeseen, positive and negative. A positive impact would be the share of cultural activities and tourism that could be attributed to the existence of the new city centre. A negative impact could be the adverse effect it could have of reduced attention to other parts of the city centre. The project's *relevance* is measured in terms of its political and public support, for instance as expressed in terms of the government's willingness to invest in conservation, recreation, and infrastructure. The project's *sustainability* would be the test of whether the city centre can operate in the future without external financial support for environmental issues.

With the amount of planning laid down in this alternative, we could assume that the alternative will be *efficient* both in terms of quality and progress.

In terms of effectiveness, it is likely that conservation and recreation will become a major attraction, while in terms of the project's *relevance* the majority of people are with conservation of the city centre. It follows from the above that the environmental *impact* will be positive. In terms of environmental sustainability, the positive effects are more likely to be maintained.

Alternative 2: Large scale urban development

As mentioned, our concern is to assess the city centre from a wider perspective, as it is thought that this will help boost activities in Baghdad. Efficiency is in terms of environmental productivity of the process urban regeneration. *Effectiveness* in this case is associated with a broader objective of the quality of new land use performances and the number of investors. A positive *impact* could be the alternative effect largely on business and housing activities. The *relevance* of the alternative would primarily be measured in terms of the added priority of the funds and users' need for these activities. Again, *sustainability* would be measured in terms of the long-term environmental and resources protection, including built environment.

We assume that *efficiency* is not acceptable. In terms of effectiveness, however, it will most probably be low, assuming that the long-term *impact* of the large scale development in general will be limited. Its short-term impact might rather be negative, since the huge investment for the commercial, office building, and housing is likely to have an adverse effect on funding to other activities like conservation. We will also assume that the *relevance* of the alternative is negative if we consider the redevelopment situation. In terms of sustainability the alternative will, as has already been mentioned, probably have an adverse effect on the environmental activities. In terms of efficiency, this would have to be measured in accordance the productivity of selected limited spots.

Alternative 3: Distributed spots of urban development

In this case, effectiveness would have to be measured in the wider and more long-term perspective of urban development in terms of infrastructure, pollution, commercial and residential land use, etc.

The main *impact* would be assessed in terms of the scope of changes and the effects of activities in the new city centre. The alternative would be *relevant* to the extent that one would also have to consider the need for the development of this particular spot as compared with its present use, as well as possible alternatives in other, more suitable, locations in the city centre. *Sustainability* would again be restricted to the environment in terms of its long-term protection.

Also in this case, *efficiency* will be negative. The effectiveness of the alternative is uncertain and difficult to associate with the city centre. An indirect impact of the alternative could be the less successful completion of these spots of urban development. Most probably, the *relevance* of the user would not need to be funded by the central government. Finally, environmental sustainability would be negative in terms of its protection. Table 5 shows the assessment of the alternatives as the process of urban regeneration and Table 6 shows the assessment of the alternative as projects resulting from urban regeneration.

Table 5. Assessment of the alternatives as process of urban regeneration

Alternatives	Alternative A	Alternative B	Alternative C
Assessment Criteria	Increased cultural activities	Urban development of neglected areas and deteriorated structures	Distributed spots of urban regeneration
1. Identifying the spatial dimensions and future expansions.			
- A spatially compact form.	(+)	(.)	(-)
- Degree of flexibility for future expansion.	(+)	(+)	(+)
2. Finding efficient distribution of land use.			
- A balance of land use structure.	(-)	(+)	(-)
- Concentrating activities.	(+)	(.)	(-)
- Mixing land uses.	(.)	(.)	(-)
- High occupancy rate.	(+)	(.)	(-)
3. Transportation, organising a network of movement and enhancing accessibility.			
- An energy-conscious public transportation network.	(+)	(.)	(-)
- Reducing the need for transportation.	(+)	(-)	(-)
- Using a multimodal street network.	(.)	(.)	(-)
4. Promotion of distinguished architectural and historical features.			
- A strong landscape framework and connecting with nature.	(+)	(.)	(.)
- Highlighting a distinctive urban scene and the values of cultural features.	(+)	(.)	(+)
5. Infrastructure and environmental issues.			
- High levels of infrastructure.	(+)	(-)	(-)
- Minimising pollution and damage.	(+)	(-)	(+)
- Appropriate climatic conditions.	(+)	(.)	(-)

Table 6. Assessment of the alternative as projects resulting from urban regeneration

Alternatives	Alternative A	Alternative B	Alternative C
Assessment Criteria	Increased cultural activities	Urban development of neglected areas and deteriorated structures	Distributed spots of urban regeneration
Efficiency	(+)	(.)	(-)
Effectiveness	(+)	(.)	(-)
Relevance	(+)	(-)	(.)
Impact	(+)	(+)	(+)
Environmental sustainability	(+)	(-)	(-)

It is important to discuss several issues concerning the applicability of the research outputs, such as whom the city centre will be rehabilitated by and where the money comes from. Obviously, Iraq is an oil country and therefore it is rich. Moreover, Iraq is experiencing an age of transformation toward decentralisation, while the current critical security situation is likely temporary. However, the research proposes to reduce the role of the central government, which might begin to fund such projects partially, and to be involved in short term building infrastructure projects and the required legislation. Moreover, the cooperation between global and local experience in urban planning, management, and other supports should become more long term. The proposed research themes are likely to be compatible with the previous guidelines of the Polservice team, as the compactness of historic city centre is largely continuous in its predominance. Accordingly, the potential impact of sustainable urban regeneration is likely to be more gentrification than segregation.

5. Conclusion

Baghdad city centre has been the focus of many consultations for planning studies. The issue of putting urban regeneration and environmental sustainability into practice in urban development has been a small subset of this study. In spite of this, it is not likely to become environmentally sustainable without taking into consideration economic and social issues. Urban development seems to be a vehicle for both urban regeneration and environmental sustainability. In spite of the deteriorated physical environment and infrastructure in the inner zone of the centre, the activities of urban regeneration have to start and be directed from the inside to the outside of the city centre to be more sustainable environmentally. The process and projects of urban regeneration are influenced mainly by environmental sustainability. The influences will most probably be positive as alternatives to increase cultural activity, and are likely to be negative for large scale development and spots development. Consensus regarding objectives should be definitively reached before the environmental evaluation of the developmental alternatives concentered by spatial dimension, as this represents a good opportunity to determine better projects, schemes, and programmes for urban regeneration. The conclusions above show that the cultural alternative is relevant as a significant element in fulfilling most of the criteria. These findings are indeed quite obvious; however, it has been demonstrated that conservation-led regeneration for a compact city centre is more environmentally relevant than large scale development process. Also, it illustrates a common phenomenon that in order to reduce the risk factor of destroying urban heritage in the city centre, which is under the pressure of transformation, we have to restrict the decision-making through a multi-evaluation process of alternatives, and the promoted projects must be extracted from alternatives. Finally, this paper has called on the central government to achieve vital parts of the cultural alternative.

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