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Urban environmental challenges in developing countries—A stakeholder perspective

Raed Fawzi Mohammed Ameen [a, b, *], Monjur Mourshed [a]

[a] BRE Trust Centre for Sustainable Construction, School of Engineering, Cardiff University, Cardiff CF24 3AA, United Kingdom
[b] Department of Architecture, College of Engineering, Karbala University, Iraq

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ABSTRACT

Developing countries face significant urban environmental challenges due to rapid urbanization, population growth, inability to effectively tackle climate and environmental risks, inefficient governance and environmental management, the prevalence of corruption and a chronic shortage of investment. Environmental degradation is often acute in politically unstable countries such as Iraq. Several post-war urban development and regeneration projects are currently underway in Iraq, but without evident participation from the wider public in decision-making. This study investigated stakeholders' perception of urban environmental challenges—their level of importance and priority in the Iraqi context. A nationwide survey (n = 643) was conducted using a 25-item structured questionnaire where respondents' views were gathered on a 5-point Likert-type scale, in addition to demographic information. Principal component analysis (PCA) and statistical tests were applied to investigate the relationship between the perceptions of urban environmental challenges and demographic factors. Five principal components were identified, namely: water, waste, and materials; environmental impact; natural hazard; personal mobility; and transport. The results showed that about 70% of the respondents considered 'water conservation' as the most important urban environmental challenge, followed by 'increase choice of transport modes'. 67.2% of the respondents rated 'efficient infrastructure and utilities' as a very important factor, and was ranked the third. All demographic characteristics except location showed statistically significant differences in perception. The relatively high importance placed by the respondents on infrastructure related items such as water, transport and utilities demonstrate a possible link between the perceptions and: (a) the citizens' day to day experience and hardship, and (b) the lack of adequate infrastructure and service provisions in Iraq, due to political instability in the recent decades.

1. Introduction

Cities are engines of economic prosperity and social development (Mourshed, Bucchiarone, & Khandokar, 2016). However, urban environmental challenges have become a pressing global issue due to the undesirable impacts on the environment caused by rapid urbanization (Komeily & Srinivasan, 2015), the use of non-renewable resources, and pollution (Ameen, Mourshed, & Li, 2015). Cities are growing, both in terms of both population and geographical spread, and have become the key determinant of environmental quality at local, regional and global scales. According to the United Nations Department of Economic and Social Affairs, in 2010, the global urban population had reached 3.5 billion, which is predicted to double by 2050 (UNDESA, 2010). Urban development factors such as land use changes, energy consumption and associated greenhouse gas emissions, water consumption and availability, waste generation and recycling, pollution, sanitation, and infrastructure are likely to become more challenging (Clarke & Ramalingam, 2012). In addition, local and global factors such as natural disasters, wars, corruption, and economic downturn can exacerbate the situation (Smith, 2013).

Cities in developing countries have been affected by unprecedented population growth and rapid urbanization (Wei & Ye, 2014), and most have transformed into a source of negative environmental impacts and a driver for the rapid depletion of natural resources. The scale of the challenge is such that some authors have gone as far as to label these factors uncontrollable and

* Corresponding author. BRE Trust Centre for Sustainable Construction, School of Engineering, Cardiff University, Cardiff CF24 3AA, United Kingdom.
E-mail addresses: raedf.ameen@yahoo.com, MohammedAmeenRF@cardiff.ac.uk (R.F.M. Ameen), MourshedM@cardiff.ac.uk (M. Mourshed).

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unpredictable, now and in the future (Rana, 2010). Furthermore, past research on urban development focused mostly on meeting the demands of policy-makers and planners without adequately addressing stakeholders' perceptions and their aspirations. Identifying urban environmental challenges is, therefore, important, especially from a stakeholder perspective, so that effective and widely-acceptable solutions and policies can be developed based on local priorities, which are often different from the global ones (Ameen & Mourshed, 2016).

The aspiration to create a globally applicable understanding of urban challenges can be seen in the development of urban sustainability assessment methods such as CASBEE-UD,[1] LEED-ND,[2] and BREEAM[3] Communities. Despite their adoption in many countries, global sustainability assessment tools have been found to be limited in the developing context (Ameen et al., 2015), which is characterised by different socio-economic trajectories than those found in the developed countries. Moreover, the existing sustainability assessment tools primarily focus on minimising resource consumption (e.g. energy, water, and materials) and often disregard the overarching sustainability goals such as healthy environment, and social cohesion and capital. The understanding of the country-specific contexts is, therefore, essential for achieving sustainable urban development (Kadhim, Mourshed, & Bray, 2016) and should begin with the identification of the local urban challenges and their deviations from the global, especially in the high-density cities in developing countries that face significant environmental challenges of varying magnitude.

Realising the gap in the literature, this research investigated stakeholders' views on urban environmental challenges in Iraqi cities with a view to identify their importance and priorities for implementation.

The rest of the paper is organised as follows. Urban environmental challenges in Iraq and other similar developing countries are reviewed next; the outcome is a list of key environmental indicators on which the respondents' views are gathered. The development of the questionnaire is illustrated along with the discussion on analysis methods, followed by the interpretation of the results. The paper ends with concluding remarks on the environmental priorities for urban sustainable development in Iraq.

2. Review of urban environmental challenges

Iraq represents a unique context where cities have suffered from the destruction and degradation due to political instability for more than four decades—resulting in severe damages to infrastructure (MOE, 2013). Rebuilding and rehabilitation while establishing new urban regions and cities are the topmost priority for development stakeholders. There is also a societal aspiration for an improved standard of living because of the new oil boom and economic prosperity. The Iraq National Development Plan (2013–2017) has identified key urban environmental challenges that need to be addressed as a priority: air, water, and soil pollution; shortage of water resources; desertification; lack of waste recycling and reuse; untreated contaminated areas; and inefficient infrastructure (CSO, 2013). The significant environmental impacts in Iraq in the past four decades are summarised in Table 1, and the key challenges are discussed, as follows.

2.1. Environment

Vegetation cover has a significant effect on weather and climate variability. Increasing vegetation cover is considered an effective solution to stabilise dune areas and mitigate the impact of frequent sandstorms (Brovkin, 2002). There has been a decrease in vegetation cover in the central and southern of Iraq during 2000–2012 (Abbas, Ahmad, & Abbas, 2014). The successive wars in Iraq led to significant chemical pollution, exposing civilians to hazardous materials. **Tackling environmental pollution** is, therefore, the key to ensuring a sustainable future for Iraq. Despite being responsible for only 0.5% of global GHG emissions, Iraq plans to reduce its emissions to tackle global climate change (IG, 2015). Cities being the engine of economic prosperity and growth are the primary geographies that can help **reduce GHG emissions** and mitigate the impact of climate change.

2.2. Energy, utilities and infrastructure

Efficient infrastructure and utilities are essential to enable support and enhance a community's living conditions (Fulmer, 2009). Infrastructures in Iraqi cities have suffered severe damages because of the wars and the international sanctions, leading to the postponement of new and the upgrading of ageing infrastructure such as water distribution systems, sewage, roads, electricity generation plants and energy distribution systems (Foote, Block, Crane, & Gray, 2004). Secure, flexible, and economic production and distribution of energy while increasing the share of renewables and reducing the demand are essential for an environmentally resilient society (SWECO, 2015). **Smarter power systems** and the grid require significant investments and effective policies (Widergren et al., 2011). Increasing the share of renewable energy results in a cleaner and healthier environment, with improved local air quality and reduced GHG emissions (Siegel, McNulty, & Weingart, 2010). Iraq has significant potential for renewable energy resources such as solar and wind. **Diversification of energy mix** is, therefore, an essential component for the future development of Iraqi energy infrastructure to meet the growing demand for energy. **Minimising energy consumption** is the cornerstone of policies for energy security and climate impact mitigation (Omer, 2008). Energy conservation reduces the need for costly investments in energy infrastructure and delays investments needed for network upgrades.

2.3. Natural hazards

Iraq suffers from many natural hazards common to arid climates. **Desertification**—the transformation of fertile land into desert, is caused by the loss of green cover; drought and hardening of soil; increased salinity rates; and the extension of sand dunes (Geist, 2005). Desertification threatens food security and affects social and economic development (Reynolds et al., 2007). 39% of the Iraq's surface has been affected by desertification, and 54% is under threat (CSO, 2010). **Sandstorms** affect large areas and cause environmental pollution, economic losses and health problems (Liu & Diamond, 2005). Iraq is one of the countries most affected by sandstorms due to regional climatic changes such as decreasing annual rainfall, and environmental changes such as drying marshlands, and degrading land (Sissakian, Al-Ansari, & Knutsson, 2013). **Drought**, also, causes direct environmental damage to plants and forests; animal species; air and water quality (Ole-MoiYoi, 2013). Many of agricultural areas in southern Iraq are vulnerable to frequent drought. (Shean, 2008).

[1] CASBEE (Comprehensive Assessment System for Built Environment Efficiency). http://ibec.or.jp.

[2] LEED-ND (Leadership in Energy and Environment Design—Neighborhood Development). http://gbci.org.

[3] BREEAM (Building Research Establishment Environmental Assessment Method). http://breeam.com.