Review Article
Volume 13:5, 2023

Journal of Civil & Environmental Engineering

ISSN: 2165-784X Open Access

Assessing the Environmental Sustainability of Walled City, Lahore

Ahmed Usman*

Department of Environmental Science, University of Engineering and Technology, Lahore, Pakistan

Abstract

Adequate knowledge of environmental sustainability is essential to the success of its global efforts. Thus, a study was conducted to investigate into the level of awareness of environmental sustainability in a developed city of Lahore, Punjab province, Pakistan. Data for the investigation was generated through the survey questionnaires across randomly selected adult inhabitants. Of the entire questionnaire, respondents responded according to their perceptions. Descriptive and inferential statistical analyses were conducted. Descriptive analysis showed that most of the respondents had the knowledge of environmental sustainability. It is recommended that information on environmental sustainability should be made available and be widely disseminated, especially its impacts and that international communities in conjunction with the national government should take charge of the control and of the associated risks. Further investigation is required to assess the strategies for coping and adapting to the effects of environmental sustainability in the area being studied.

Keywords: Environmental sustainability • Statistical analyses • Global efforts • Lahore

Introduction

In the current era, development is moving with immediate speed, technology advancement is no doubt a blessing, but there are some challenges that are associated with unstable economic growth which influence well-being of people as well as environment. These issues are prevailing due to the dramatic urban development and knocking the doors of legislators, city planners and development specialist for the efficient management of city by adopting sustainable approaches. Much debates about the explanation of these terms likewise the rise of a surplus competing definitions for sustainability was observed. This absence of compromise on the definition leads to its unclear and intricate meaning of sustainability as it gave varied perception of sustainability to administrations and stakeholders. Though this ambiguity might look negative, Robinson. The term sustainability has been questioned many times on different platforms. Subsequently, nowadays, the definition of Brundtland report on "our common future" have been extensively hugged by both public and private sectors.

Environmental Impact Assessment (EIA) tools which are at project scale were the 1st generation which commenced in the United States afterwards, the National Environmental Policy Act (NEPA) in 1969 was adopted. EIA was established to discourse the growing pressure on environment, ensuing the economic and social revolution of the 20th century, which was augmented in scale and intensity right after world war II. Moreover, the new concepts like strategic environmental assessment for evaluation of strategies, plans and programs as well as sustainability assessment for evaluation of PPPs were introduced according to in 1990's. Similarly, building assessment tool introduced by UK that is "Building Research Establishment Environmental Assessment Method" (BREEAM).

The above illustrations specify that there are countless assessment techniques that focus on urban, regional development and even single building, though there is a deficiency of devotion, involvement and knowledge on the transitional level of city's neighborhoods argued by "no single city can contribute to overall sustainability if its own component parts are found not to be sustainable". In the current years, it has been admitted that the neighborhood is the scale at which land is developed by proposing new buildings, constructing and providing facilities.

***Address for Correspondence:** Ahmed Usman, Department of Environmental Science, University of Engineering and Technology, Lahore, Pakistan; E-mail: ahmedusmandewan@gmail.com*

Received: 21 October, 2019; Manuscript No. jcde-23-3703; **Editor assigned:** 25 October, 2019, Pre QC No. P-3703; **Reviewed:** 08 November, 2019, QC No. Q-3703; **Revised:** 07 September, 2023, Manuscript No. R-3703; **Published:** 05 October, 2023, DOI: 10.37421/2165-784X.2023.13.518

Literature Review

Concept of environmental sustainability

Half of the humanity resides in urban settlements and this number will proliferate up to 70 percent by 2050, inserting extra burden on present social infrastructure. Subsequently, meteoric urbanization is a prime trepidation due to its deleterious impacts on natural environment vis-a-vis energy crises, water shortage, air pollution, deforestation, global warming and degradation of prime agricultural land. Presently, urbanization is contemplated as social dilemma, which is a menace for the sustainable development of human neighborhoods and districts. Likewise, rapid population growth coupled with an economic shift from agriculture to industrial sectors is major sources of inimical development.

Neighborhoods are considered as main building blocks of urban settlements and attributed as primary unit of planning and designing sustainable cities and communities. Endorsing the significance of the neighborhood as battlegrounds to combat unsustainable practices. Across the world, several countries have initiated sustainable neighborhood drive to make their cities and urban settlements livable and sustainable by adapting to the environmentally friendly practices. Sustainable human settlements are those where socioeconomic gains are integrated with sustainable use of water, energy and other domains of natural environment. Presently, several assessment tools are developed to measure and gauge the sustainability of individual building and neighborhoods to large metropolitan cities. These assessment tools are created on the accreditation of the neighborhood buildings as smart, green and eco-friendly. Further, sustainability assessment tools measure sustainability of neighborhoods by evaluating the sustainability of the environment and sub sectors of environment like building designs, land use allocation system, transportation network, water usage, air quality, energy production and usage mechanism.

At the first outset, SA tools and methods are observant on environmental assessment of individual building. Initially, in 1990 the building research establishment environmental assessment method was introduced to measure and evaluate different environmental themes concerned with buildings and green buildings designs. The aforesaid sustainability assessment tool assesses the building functioning by using multivariate approach i.e. carbon footprint of buildings, air pollution level, energy usage, visual legibility, listening clarity, water quality and accessibility. In 2003, official version of Comprehensive Assessment System for Built Environment Efficiency (CASBEE) was unfolded in Japan under the direction of [1]MLIT for the evaluation and assessment of construction and development of new buildings in terms of environmental performance. The committee formed by the direction of MLIT devised the title CASBEE. The pivotal concern of CASBEE is to consider the political provisions along with market demands and needs to impart sustainable and livable societies. CABSEE includes the subsequent sustainability tools:

- Pre-design assessment tool device and assist property owners and urban planners in pinpointing the prime perspective and theme of the project. This tool also helps in suitable and compatible site for the desired land use.
- Design for environment tool provide basis for the development of self-evaluation monitoring and check for urban designers to ameliorate the BEE 2 of proposed building at planning and design phase to differentiates load of environment and quality is measured based on the performance of house structure or building.
- Eco-labelling tool is used to rank buildings based on BEE after the completion phase and suggests adaptation of a building design to eco-efficiency principles. This tool also helps to determine the basic market value of the property.
- Sustainable operation and renovation too support property owners and urban managers by providing information pertaining the methods of improving BEE of building at post design stage of the building. Furthermore, LEED that is leadership in energy and environmental design, is considered the most extensively rating system for evaluating green building all over the world. It is accessible for practically all structures, community as well as home projects. Leadership in energy and environmental design is a framework that creates fit, greatly efficient and cost effective and safer energy efficient buildings with less environmental loss. Certification of LEED is universally affiliated symbol of sustainability achievement. This research will use LEED and BREEAM for assessing environmental conditions of Walled city Lahore.

The study relies on qualitative and quantitative approaches in collection and analysis of data based on environmental sustainability assessment checklist, field inspections and review of past studies. The quantitative method was used to illustrate the results in figures/quantities whereas the qualitative method is espoused to define the thoughts of inhabitants of designated areas. Primary and subordinate sources were referred to assemble the relevant data. This research study follows a quantitative data collection mode to observe the resident's perspectives. Firstly, surveys by using questionnaires were carried out among the residents of selected areas by using checklists of BREEAM. The data collected from surveys were then inferred by using statistical and descriptive analysis. Lastly, experimental analysis techniques were applied to additionally analyze the facts and figures and summarizing the core features of the data set.

Data sources and analysis

Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and demonstrate, concentrate and evaluate data. The data that was collected from all the sources, primary and secondary, official or field survey and user's perception survey, is analyzed at this stage. In this step, all the data collected from different ways are

combined to show results. Following type of data analysis methods were used.

Discussion

According to assessment tool BREEM

Three credits are available for each criterion. A panel of experts defines a minimum acceptable level of performance as a benchmark for comparison. Depending on the performance of the development against the defined benchmark(s), each criterion can receive one, two or three points. The corresponding regional weighing is applied to the acquired credit to yield the final score for that particular criterion. To determine the final score of each theme, the ratio of acquired to available credits is calculated. The arithmetic mean of the scores of all nine themes is calculated and multiplied by 100 to determine the final score. Bhatti gate area have achieved 51 credits and rated as "good" with 3 stars whereas, Shah Alam scores 46 credits out of 93 credits and rated as "pass" with 2 stars. Some of the assessment topics were excluded by the researcher as it doesn't apply on the selected area (stars are then given accordingly).

According to assessment tool LEED

LEED-ND assessment checklist consists of some parameters like building energy and water efficiency, energy production and supply, water and waste management systems, transportation solutions and footpaths that discourage personal car-use, promote walking and cycling, connectivity, urban density, site ecology, mixed use, health and well-being (e.g., quality of life of residents) and involvement of the public etc. All the parameters given in these checklists were studied and given appropriate points as per given criteria

An environmental building assessment method reflects the significance of the concept of sustainability in the context of building design. The primary role of an environmental building assessment method is to provide a comprehensive assessment of the environmental characteristics of a building. Bhatti gate achieved 40 points and rated as "certified" while Shah Alam scores 50 points and rated as "silver" according to prescribed criteria.

Residents perception surveys

Changes in the environment are not only recorded by advanced technology but also perceived by the individual. Environmental perception has been adopted as a diagnostic tool since the UNESCO's man and the biosphere program of 1968, which declared the study of environmental perception as a fundamental tool for the management of places and landscapes (UNESCO, 1968). It is an advantageous tool for diagnosing socio-environmental issues and inter-linkages. Studies have shown that perceived changes in the environment are instrumental in policy design and sustainable resource management. Even though environmental perceptions may be categorized as subjective judgments because they are not based on scientific quantitative methods. They are highly important due to the incorporation of factors other methods neglect. Individual characteristics affect perceptions, but they also affect the individual's actual food and water availability and consequently matter in terms of necessary political action. Following questions were asked.

- Availability of clean water
- Residence in the neighborhood
- Environment sustainability is necessary to achieve for development of city?
- Sewerage system of area
- Waste collection
- Cleanliness of septic tank
- Drainage system
- Traffic congestion in the area
- Uneven noises in surroundings
- Availability of neighborhood parks

Conclusion

Environmental sustainability is a concept based on a notion of ecosystem services both renewable and non-renewable resources and waste absorptive capacity that provide benefits to humans and thus improve their welfare. In order to enjoy and use services throughout the ages, humanity must learn to live within the limitations of the biophysical environment.

Many countries around the world have domestic methods that will remain the sole or dominant system within their respective markets, e.g. green star in Australia, New Zealand and South Africa, CASBEE in Japan, and green mark in Singapore. However, there are many other countries and regions where both BREEAM and LEED will expand their presence over the next decade as a result of both increased demand and active promotion. Market forces and 'branding' will, in the fullness of time, invariably play a role in dictating the extent to which voluntary systems become de facto international approaches and influence how domestic systems will evolve.

The analysis of the two databases has confirmed the increasing widespread use of BREEAM and LEED internationally. It is reasonable to speculate that the primary drivers for such developments are related to the perceived need for a common international vocabulary for building environmental assessment that can then facilitate communication between stakeholders and inter-building and inter-country comparisons.

The selected BREEAM community and LEED-ND tools include different parameters including building energy and water efficiency, energy production and supply, water and waste management systems, transportation solutions and footpaths that discourage personal car-use, promoting walking and cycling, connectivity, urban density, site ecology, mixed use, health and well- being (e.g., quality of life of residents) and involvement of the public. Each parameter can have one or more criteria to evaluate. The analysis shows that many parameters included in the environmental sustainability tools are completely

neglected while designing these neighborhoods; therefore, these parameters did not achieve any point resulting in low ratings of the neighborhoods. These parameters include the provision of network cycling, car clubs, flexible parking, proper facilities regarding public transport, electric vehicle charging points, business priorities sectors, light pollution etc.

Bhatti gate area have achieved 51 credits and rated as "good" with 3 stars whereas, Shah Alam scores 46 credits out of 93 credits and rated as "pass" with 2 stars. Some of the assessment topics were excluded by the researcher as it doesn't apply on the selected area (stars are then given accordingly) whereas, according to LEED rating Bhatti gate attained 40 points and rated as "certified" while Shah Alam scores 50 points and rated as "silver" according to prescribed criteria. The survey results regarding the residents' perception towards the community facilities show that the residents of both the areas whether residential or commercial are not satisfied with the community facilities and are correlated at the significance 0.05, such as law enforcement, neighborhood security, garbage collection, roads and streets, parks and recreation, sidewalks and pedestrian safety, storm drainage, street lighting, street and public signboards, outdoor activities and safety.

References

1. Alyami, Saleh H and Yacine Rezgui. "Sustainable Building Assessment Tool Development Approach." *Sustain Cities Soc* 5 (2012): 52-62.
2. Berardi, Umberto. "Sustainability Assessment in the Construction Sector: Rating Systems and Rated Buildings." *Sustain Deve* 20 (2012): 411-424.
3. Boeing, Geoff, Daniel Church, Haley Hubbard and Julie Mickens, et al. "LEED-ND and Livability Revisited." *Berkeley Plan J* 27 (2014): 31-55.
4. Cole, Raymond J and Maria Jose Valdebenito. "The Importation of Building Environmental Certification Systems: International Usages of BREEAM and LEED." *Build Res Inf* 41 (2013): 662-676.
5. Chegut, Andrea, Piet Eichholtz, Nils Kok and John M Quigley. "The Value of Green Buildings: New Evidence from the United Kingdom." *ERES* (2011).
6. Dakwale, Vaidehi A, Rahul V Ralegaonkar and Sachin Mandavgane. "Improving Environmental Performance of Building through Increased Energy Efficiency: A Review." *Sustain Cities Soc* 1 (2011): 211-218.
7. Fraser, Abigail, Kate Tilling, Corrie Macdonald-Wallis and Naveed Sattar, et al. "Association of Maternal Weight Gain in Pregnancy with Offspring Obesity and Metabolic and Vascular Traits in Childhood." *Circulation* 121 (2010): 2557-2564.
8. Fatone, S, Elisa Conticelli and Simona Tondelli. "Environmental Sustainability and Urban Densification." *Sustain Urban Regen Sustain* (2012): 217-228.
9. Nawaz, Minahil, Fariha Tariq, Areesha Gul and Nida Batool Sheikh. "Evaluation of Environmental and Physical Impacts of Mega Transportation Projects: A Case of Lahore." *Technical* 24 (2019): 8-14.
10. Majeed, Adil, Saman Shahid, Shahid Ali and Nida Firdous. "Safety Assessment of Water Purification Plants of Lahore." *J Pak Inst Chem Eng* 50 (2022).
11. Masood, Maryam, Claire Y Barlow and David C Wilson. "An Assessment of the Current Municipal Solid Waste Management System in Lahore, Pakistan." *Waste Manag Res* 32 (2014): 834-847. Nasar-u-
12. Minallah, Muhammad, Dagmar Haase, Salman Qureshi and Sahar Zia et al. "Ecological Monitoring of Urban Thermal Field Variance Index and Determining the Surface Urban Heat Island Effects in Lahore, Pakistan." *Environ Monit Assess* 195 (2023): 1212.

How to cite this article: Usman, Ahmed. "Assessing the Environmental Sustainability of Walled City, Lahore." *J Civil Environ Eng* 13 (2023): 518.