Sustainable Urban & Regional Development Studies Quarterly

Volume 6, Issue 4 - Serial Number 22, Winter 2025 **Online ISSN: 2783-0764**
Journal Hompage https://www.srds.ir/
https://www.srds.ir/article_226790.html?lang=en

Analysis of Livability Indicators from the Physical-Spatial Dimension in the Neighborhoods of Bonab City and Prioritization of Interventions[1]

Ayoub Niknam[1], Ata Ghafari Gilandeh*[2]Alireza Mohammadi [3], Mansour Rahmati[4]
1.PhD student,Department of Geography and Urban Planning,Faculty of Social Sciences,University of Mohaghegh Ardabili,Ardabil, Iran.
2.Professor of Geography and Urban and rural Planning, Faculty of Social Sciences, University of Mohaghegh Ardabili, Ardabil, Iran.
3.Professor of Geography and Urban and rural Planning, Faculty of Social Sciences, University of Mohaghegh Ardabili, Ardabil, Iran.
4.Assistant Professor of Geography and Urban and rural Planning, Faculty of Social Sciences, University of Mohaghegh Ardabili, Ardabil, Iran.

Received Date: 07 May 2025 **Accepted Date:** 08 August 2025

Abstract

Background and Objective: Rapid population growth and urbanization have created multiple challenges for the quality of life and livability in cities, particularly in Iranian cities such as Bonab. These challenges manifest in deteriorated urban fabric, informal settlements, and spatial inequalities that adversely affect residents' well-being. This study aims to evaluate the physical-spatial livability status of Bonab's neighborhoods across different urban zones, focusing on deteriorated/informal and non-deteriorated areas, and to prioritize neighborhoods for targeted planning interventions.

Methodology: This descriptive-analytical research was conducted using documentary data and field surveys in 15 neighborhoods of Bonab. Data were collected via questionnaires distributed among residents and analyzed using SPSS software. The physical-spatial indicators included building quality, transportation networks, accessibility to services, street quality, and urban landscape. Neighborhoods were ranked based on the Integrated Development Index (DI) using the Morris method.

Findings and Results: Results indicate that deteriorated fabric and informal settlements are primarily concentrated in the southern and southeastern parts of Bonab, characterized by poor building materials and low physical quality. In contrast, northern and some central neighborhoods such as Kouy-e Shahrdari (DI=0.85), Shahrak-e Emam-Khanom Baghi (DI=0.79), and Farhangian 1 (DI=0.78) show better physical-spatial conditions. Neighborhoods including Aghdash (DI=0.15), Dizaj Shomali (DI=0.20), Dizaj Jonubi (DI=0.27), and Akbarabad (DI=0.31) rank lowest in livability and require urgent prioritized interventions. The study emphasizes the urgent need for planning and rehabilitation in Bonab's southern and southeastern neighborhoods to improve physical-spatial deficiencies and enhance urban livability.

Keywords: Livability, Physical-Spatial, Prioritization, Bonab City.

[1] This article is an extracted from a Ph.D Thesis titled " "An analysis of the duality of livability in the city of Bonab with a focus on the dilapidated urban fabric (Study area: neighborhoods of Bonab city)"first author, supervisor: second author, and advisors: third and fourth authors, University of Mohaghegh Ardabili, Ardabil, Iran.

***Corresponding Author:** Email: a_ghafarigilandeh@uma.ac.ir

Cite this article: Ghafari Gilandeh, A. , Niknam, A. , Mohammadi, A. and Rahmati, M. (2026). Analysis of Livability Indicators from the Physical-Spatial Dimension in the Neighborhoods of Bonab City and Prioritization of Interventions. Journal of Sustainable Urban & Regional Development Studies (JSURDS), 6(4), 251-270.

Extended Abstract

Introduction:

Global challenges such as population growth, urbanization, non-communicable diseases, and climate change emphasize the need for sustainable urban development. International initiatives like the SDGs and Healthy Cities Movement highlight the vital role of cities in promoting health and environmental adaptation. Urban livability, defined by residents' access to infrastructure, clean air, housing, employment, green spaces, and participation, seeks to balance economic, social, and environmental factors to ensure resilient and dignified urban life. In Bonab, significant spatial disparities exist between two main urban zones: deteriorated informal settlements in the southern and eastern neighborhoods and well-maintained formal areas in the north and center. The informal zones suffer from poor physical conditions, including degraded urban fabric, overcrowding, pollution, insufficient green spaces, limited access to education and healthcare, and inadequate services. These challenges contribute to spatial fragmentation and reduced quality of life for a large portion of the population living in these neighborhoods. This study aims to analyze the factors and processes underlying Bonab's physical-spatial dichotomy, prioritizing neighborhoods based on livability conditions to guide effective urban planning interventions. The goal is to enhance physical-spatial quality and reduce disparities by proposing practical strategies that foster equitable and sustainable urban development in Bonab.

Methodology:

This applied study uses a descriptive-analytical approach to assess the environmental livability of 15 neighborhoods in Bonab. Data collection was conducted in two phases: first, a literature review and document analysis established the theoretical framework and identified key livability components; then, structured questionnaires were administered to residents to capture various urban livability indicators. The statistical population consisted of approximately 85,000 residents, from which a sample of 382 individuals was randomly selected using the Cochran formula. The questionnaire's validity was confirmed by expert review, reliability measured by Cronbach's alpha, and data normality verified through the Kolmogorov-Smirnov test. For prioritizing neighborhoods in terms of livability improvement, the Morris multi-criteria decision-making method—endorsed by the United Nations for assessing physical-human development—was applied. This method weights multiple indicators to rank and prioritize areas for sustainable urban planning. Spatial data visualization and analysis were performed using ArcGIS. Livability indicators were chosen based on literature and theory, categorized into five key physical-spatial dimensions: building quality, transportation network, service accessibility, quality of urban pathways, and urban landscape design. Each dimension included specific measurable criteria, facilitating a comprehensive neighborhood-level assessment of physical-spatial livability.

Results and Discussion:

Analysis of the Physical-Spatial Dimension of Urban Livability in Bonab

The physical-spatial dimension plays a fundamental role in urban livability by shaping residents' quality of life and environmental sustainability. A key factor within this dimension is the condition of deteriorated and disorganized urban fabrics, which reflect structural deficiencies and highlight vulnerable areas requiring urgent urban improvement.

In Bonab, rapid population growth combined with uneven urban development has increased the prevalence of such deteriorated zones, predominantly located along the city's eastern, southern, and western peripheries, with some scattered centrally. These areas—covering approximately 40–47% (about 470 hectares) of the city and housing over 40% of its population—face serious deficits in building quality, infrastructure, and environmental services. Construction mainly utilizes traditional, low-cost materials such as brick, cement, and gypsum (60–70%), with modern reinforcements constituting 30–40%. Neighborhoods like Dizaj North and South, Aghdash, and Akbarabad represent

the worst conditions in terms of material durability and structural integrity, necessitating urgent renovation.

This concentration of deteriorated fabric in southern and southeastern parts has generated significant physical and spatial divides compared to the more formal and developed northern and central zones, resulting in pronounced urban duality.

The city's street network, a critical framework for connectivity and livability, varies considerably: the central and northern neighborhoods enjoy dense and well-connected networks ranging from wide streets (>12 m) to alleys (<6 m), while southern deteriorated neighborhoods have sparse, fragmented, and irregular street layouts. This disparity limits access to essential services in deteriorated areas and worsens spatial inequalities.

Furthermore, land use diversity and functional integration—which are essential for facilitating service accessibility, social interaction, and reducing reliance on motorized travel—are pronounced in Bonab's central core around Imam Hossein Square, where mixed residential, commercial, and administrative uses prevail. Northern neighborhoods show moderate diversity, but this sharply declines in southern deteriorated zones that remain predominantly residential with few commercial or service functions, reinforcing spatial and functional segregation.

Employing the Morris multi-criteria approach, neighborhoods were assessed based on five physical-spatial livability indicators, normalized via Min-Max scaling and combined into a Development Index (DI) ranging from 0 (lowest livability) to 1 (highest livability). The results divide Bonab's neighborhoods into three categories:

- Suitable Livability (DI 0.74–0.85): Includes Kouye Shahrdari, Shahrak Emam Khanom Bagi, Farhangian 1, and areas near Imam Square, which exhibit good physical-spatial conditions and require minimal intervention.
- Moderate Livability (DI ~0.53–0.55): Covers Farhangian 2 and 4 and Kouye Janbazan, indicating moderate conditions needing targeted improvements.
- Unsuitable Livability (DI < 0.40): Predominantly southern and southeastern neighborhoods such as Aghdash, Dizaj North and South, and Akbarabad, which face urgent challenges demanding immediate urban renewal.

This analysis underscores the critical need for focused reconstruction and urban planning efforts in Bonab's disadvantaged southern and southeastern areas to reduce spatial inequalities and improve overall livability.

Conclusion:

This study systematically assessed the physical-spatial livability of Bonab's neighborhoods, revealing marked disparities between the northern and central zones and the southern and southeastern areas. These differences encompass building quality, transportation infrastructure, service accessibility, street conditions, and urban landscape, contributing to significant socio-spatial dualities. Over 40% of the population resides in deteriorated informal settlements located mainly in the south and southeast, which suffer from poor construction materials, inadequate street infrastructure, and limited land use diversity, underscoring the urgent need for targeted interventions. Conversely, northern and central neighborhoods demonstrate higher physical-spatial livability standards.

Using the Morris method and a composite Development Index (DI), neighborhoods were categorized into suitable, moderate, and unsuitable livability levels. Areas such as Kouye Shahrdari, Shahrak Emam Khanom Bagi, and Farhangian 1 showed suitable conditions requiring minimal intervention, while districts including Aghdash, Dizaj North and South, and Akbarabad were classified as unsuitable, necessitating urgent, comprehensive planning to improve urban fabric and infrastructure. This prioritization highlights the critical importance of focused renewal efforts in disadvantaged southern districts to mitigate spatial inequalities and enhance overall urban livability. The findings offer a practical framework for policymakers and planners to direct resources effectively toward reducing disparities and improving quality of life.

References

Amanpour, S. (2019). Recognition and analysis of differences in livability of rural areas surrounding urban Izheh. Environmental Science and Technology, 21(8) (Issue 87), 159-173. doi:10.22034/jest.2020.24757.3382 [in Persian]

Bargahi, R. (2013). An analysis of the sustainability of new towns. Master's thesis, Department of Geography and Urban Planning, Golestan University. [in Persian]

Jalili, M., Sasanpour, F., Shamaei, A., & Fasihi, H. (2021). Spatial duality of livability in district 7 of Tehran metropolis. Geography, 19(71), 61. http://dor.net/dor/20.1001.1.27833739.1400.19.71.3.43- [in Persian]

Hosseinzadeh Dalir, K. (2006). Regional Planning (5th ed.). Tehran: SAMT Publications. [in Persian]

Khorasani, M. A., & Rezvani, M. (2013). Recognition and analysis of differences in livability of rural areas surrounding urban areas in Varamin County. Journal of Space Economy and Rural Development, 2(2). http://serd.khu.ac.ir/article-1-1659-fa.html [in Persian]

Khatun Abadi, A., Saberi, Z., & Ebrahimi, M. S. (2011). Residents' satisfaction from housing environment quality: A case study of Asheqabad rural town. Rural and Development Quarterly, 14, doi:10.30490/RVT.2018.59172 [in Persian]

Ghadiri, M., Ghaffari Gilandeh, A., & Ahadi, M. (2011). Analysis of gaps in sustainable rural development process: Case study of Gorg Tappeh rural district, Bilehsavar County. Geographical Outlook (Human Studies), (17). https://ensani.ir/fa/article/543793/ [in Persian]

Rajabi Jorshari, M., Amirazdi, T., Sarv, R., & Tavakolnia, J. (2023). Assessment of smart city realization with an emphasis on urban quality of life approach: Case study of district 2, Tehran. Journal of Applied Geographical Sciences, 23(70), 487–504. doi:10.61186/jgs.23.70.487 [in Persian]

Aref Hosseini, S. A., Panahi, A., Azar, A., & Valizadeh, R. (2021). Measurement and evaluation of vitality dimensions in various public spaces of Tabriz metropolis. Sociological Studies, 13(5-2), 65-91. doi:10.30495/jss.2021.1925431.1312 [in Persian]

Banian Planning Consultants. (2003). Comprehensive plan of Benab city (Vol. 2). East Azerbaijan Housing and Urban Development Organization. [in Persian]

Mousavi, D., Nazarian, A., Ziari, Y., & Mahdavi, M. (2014). Measuring urban neighborhood sustainability using Morris zoning technique and HDI: Case study of Malayer city. Environmental Planning Quarterly, (25). https://sid.ir/paper/130613/fa [in Persian]

Statistical Center of Iran. (2017). Results of the 2016 National Population and Housing Census. [in Persian]:

Niknam, A., Ghyalari Gilandeh, A., Mohammadi, A., & Rahmati, M. (2025). Urban livability analysis from socio-cultural perspective in the neighborhoods of Bonab city with emphasis on spatial duality of livability in urban textures. *Quarterly Journal of Sustainable Urban and Regional Development Studies, 6*(3), 363-374. https://www.srds.ir/article_225265.html. [in Persian]:

Naderi, M., & Ranjbardar, M. A. (2062). Explanation of urban regeneration criteria aimed at achieving sustainable development (Case study: Briyank neighborhood, District 14, Tehran). *Quarterly Journal of Sustainable Urban and Regional Development Studies, 3*(2), 205-222. https://www.srds.ir/article_156303.html [in Persian]:

Chen, Y., Yuan, J., & Xu, R.-Y. (2025). Smart city construction and urban livability: Evidence from a quasi-natural experiment. Humanities and Social Sciences Communications, 12, Article 5096. https://doi.org/10.1057/s41599-025-05096-0

Altrock, U. (2021). Urban livability in socially disadvantaged neighborhoods: The experience of the German program 'socially integrative city'. Department of Urban Regeneration and Planning. https://doi.org/10.1016/j.foar.2021.12.006

Spiliotopoulou, M., & Roseland, M. (2020). Urban sustainability: From theory influences to practical agendas. Sustainability, 12(18), 7245. https://doi.org/10.1016/j.foar.2021.12.006

Higgs, C., Badland, H., Simons, K., Knibbs, L. D., & Giles-Corti, B. (2019). The Urban Liveability Index: Developing a policy-relevant urban liveability composite measure and evaluating associations with transport mode choice. International Journal of Health Geographics, 18(1), 14. https://doi.org/10.1186/s12942-019-0178-8

Alderton, J., et al. (2019). What is the meaning of urban liveability for a city in a low-to-middle-income country? Contextualising liveability for Bangkok, Thailand. Globalization and Health. https://doi.org/10.1186/s12992-019-0484-8

Zhan, D., Kwan, M.-P., Zhang, W., Fan, J., et al. (2018). Assessment and determinants of satisfaction with urban livability in China. Cities, 79, 92–101. https://doi.org/10.1016/j.cities.2018.02.025

Neumayer, E. (2001). The human development index and sustainability – a constructive proposal. Ecological Economics, 39(1), 101–114. https://doi.org/10.1016/S0921-8009(01)00201-4

Timmer, V., & Seymoar, N. K. (2005). The livable city. In Proceedings of The World Urban Forum 2006 (pp. 45–65). International Centre for Sustainable Cities. https://publications.gc.ca/pub?id=9.687683&sl=0

Hancock, T., Labonte, R., & Edwards, R. (1999). Indicators that count! Measuring population health at the community level. Canadian Journal of Public Health, [volume and pages if available]. https://doi.org/10.1007/BF0340357

Santos, L. D., & Martins, I. (2007). Monitoring urban quality of life: The Porto experience. Social Indicators Research, 80, 411–425. https://doi.org/10.1007/s11205-006-0002-2

Epley, R. D., & Menon, M. (2007). A method of assembling cross-sectional indicators into a community quality of life. Social Indicators Research, 88. https://doi.org/10.1007/s11205-007-9190-7

Radcliff, B. (2001). Politics, markets and life satisfaction: The political economy of human happiness. American Political Science Review. https://doi.org/10.1017/S0003055401004382

Song, Y. (2011). A livable city study in China: Using structural equation models (Master's thesis). Department of Statistics, Uppsala University. [URL if available]

Chiu, R. L. H. (2019). Liveable cities/urban liveability. In Wiley Encyclopedia of Urban and Regional Studies. https://doi.org/10.1002/9781118568453.wbeurs0123

Pinto, S., Fumincelli, L., Mazzo, A., Caldeira, S., & Martins, J. C. (2017). Comfort, well-being and quality of life: Discussion of the differences and similarities among the concepts. Porto Biomedical Journal, 2(1), 6– 12 https://doi.org/10.1016/j.pbj.2016.11.003