Research Paper: Analysis of Sustainable Development Indicators in the Green Spaces of Villages Surrounding Rasht City

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ABSTRACT

Purpose: Green spaces are indicators of societal development, encompassing environmental, social, cultural, economic, and physical dimensions. Their significance and role in the life and development of urban and rural areas make them considered key indicators of sustainable development. In this context, the main objective of this research is to analyze the presence of sustainable development indicators in the green spaces of villages surrounding Rasht city.

Methods: This study is applied in terms of its objective, descriptive-analytical in nature, and employs a survey method. Data collection was conducted using library research and fieldwork (questionnaires). To analyze the findings, SPSS software was utilized, applying t-tests and Pearson correlation tests.

Results: The results of the t-test indicated that the mean scores for all examined indicators were below the average value (3). Therefore, the presence of sustainability indicators (economic, social, physical, and environmental) in the green spaces of villages surrounding Rasht City is at an unfavorable level for both components. Additionally, the results of the correlation test revealed that there is no significant positive relationship between the rural green space variable and the dimensions of sustainability (economic sustainability with a coefficient of 0.118, social sustainability with 0.101, physical sustainability with 0.123, and environmental sustainability with 0.115) at a significant level greater than 0.05.

Conclusion: Planning and investment in the development and preservation of green spaces should be prioritized as a key focus in rural development policies. This approach is essential for achieving sustainability across all its dimensions in the villages under study.

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1. Introduction

Villages have been the driving forces of national engines and economic and social growth, providing the foundation for achieving national goals in economic, social, political, and cultural fields (Rigi Motlagh et al., 2024: 57). Achieving development in rural areas has always been a focus for researchers in developing countries. The most important pillar of development can be considered the management of communities to achieve progress (Hajarian, 2024: 3). A review of the transformations within rural society from the past to the present has shown that the rural sector has faced fundamental challenges in various dimensions of development (social-economic, physical, and ecological) at different levels. The persistence of this situation has led villages to confront issues such as the intensification of regional inequalities, mass rural depopulation of villages from skilled rural labor and material resources, the growing decline in per capita food production, food crises, urban population accumulation, the expansion of slums, unemployment, and social harms (Saedeh Zarabadi & Tabatabai, 2014: 445).

In other words, spatial inequalities, especially in developing countries, have resulted in a wide range of heterogeneous living conditions (Vlahov et al., 2005: 949-957; Martínez, 2009: 1). In these countries, development has not occurred uniformly across time and space, leading to regional inequalities on multiple scales (Ebrahimzadeh et al., 2013: 58).

Improving and modernizing infrastructure are sustainability strategies that can be realized through enhancing the quality of life, providing goods and services, ensuring access to welfare facilities, playing a key role in increasing living standards, as well as fostering rural growth and development (Badakhshan et al., 2018: 1). Therefore, recognizing and strengthening the existing service infrastructure in rural settlements and efficiently managing facilities and services, as part of rural development planning policies, not only helps in the optimal distribution of resources and facilities in rural areas but also promotes spatial justice and equitable settlement structure (Roumiani & Mahmoudi, 2020: 21). The scarcity of amenities and lower living standards compared to urban environments are the main drivers of rural-urban migration (Hosseinzadeh et al., 2020: 246). As a result, government initiatives to provide rural infrastructure in recent decades has become crucial for retaining the population in rural areas (Anabestani et al., 2016: 3).

The strategy of rural modernization and revitalization as a means of implementing and advancing rural development has consistently been of interest to planners (Khodabandehlo et al., 2024: 19). In this context, green spaces, as an essential and inseparable component of urban and rural systems, play a critical role in their environmental balance, with their absence potentially causing serious disruptions to ecological stability (Anabestani & Mousavi Noghli, 2022: 132). Moreover, the impact of green spaces on human health is undeniable (Zhang & Qian, 2024: 1). The establishment of green spaces, considering the numerous environmental challenges, is crucial for maintaining the security of rural ecosystems. The creation of a green network enhances the ecosystem's capacity to provide services and cope with environmental changes. Furthermore, careful consideration of green infrastructure preservation when planning land use strengthens sustainability (Bai & Guo, 2021: 43). Among the essential needs for achieving sustainable rural development, the protection of natural and green resources is of particular importance (Motamedirad & Rezaei, 2023: 137).

Therefore, the importance and role of green spaces in enhancing the life and sustainability of rural areas, as well as their physical and natural impacts on rural systems and the various ecological, economic, and social benefits they provide, cannot be overlooked (Jim & Chen, 2003: 25). In today's rural areas across the country, the creation of green spaces, especially parks, is often unplanned and sporadic. However, when parks are purposefully located and organized, they become the most suitable spaces for residents to spend their leisure time. In a country like Iran, where much of its land is situated in arid regions, the need for green spaces is more critical than ever to combat air and noise pollution, as well as to reduce environmental stress. With the physical growth and development of villages, the need for different types of rural green spaces has also increased. This is because enhancing the attractiveness of rural areas through the strategic development of visual spaces, creating recreational centers, and establishing tourist and accommodation facilities will lead to the sustainable growth and development of rural areas, making them more livable.

Nowadays, with the increasing population of Rasht City and its surrounding villages, as well as the rapid and unplanned construction boom, we are witnessing a reduction in per capita green space and its associated challenges. The current distribution and spread of rural green spaces indicate that their allocation is not based on comprehensive planning and land-use goals of planning. If left unaddressed, this trend will not only lead to public

dissatisfaction but also will pose future challenges for sustainable planning and management. Therefore, the main issue addressed in this research is to examine the extent to which the indicators of sustainable development have been incorporated into the green spaces of the villages surrounding Rasht. After implementing the plan in the settlements studied, the research seeks to determine the level to which the sustainability aspects of the villages have improved, and how much these changes have benefited to the villagers and contributed to the overall enhancement of their quality of life.

2. Literature Review

Nowadays, development refers to enhancing the level and quality of life for individuals and enhancing community welfare (Rabieifar & Hazrati, 2015: 124), and its sustainability ensures the continuity of this process across generations (Kalantari et al., 2009: 72). In rural development, the concept of development is closely linked to structural processes such as socioeconomic, physical, and environmental processes (Herrmann & Osinski, 1999: 95). Sustainable territorial development depends on the growth and stability of rural settlements as subsystems that form part of the overall territorial system (Rezvani & Mansourian, 2018: 2). Therefore, planning in rural areas and the physical development of rural settlements requires consideration of structural and spatial approaches in these regions (Râmniceanu & Ackrill, 2007: 417). In this context, providing various facilities and infrastructure, and developing rural settlements, is a critical component of rural development planning (Liu, 2007: 564). Equitable and appropriate access to public services for all residents is a fundamental principle of planning, which has gained significant importance with the emergence of justice-based approaches in recent decades. Achieving this in rural communities requires examining and understanding the resources and facilities in these areas (Imani & Jafari, 2024: 149).

Nowadays, public green spaces have become increasingly important considering the growth and physical development of the villages. This demand is partially met by rural green spaces. However, given the differences between urban and rural communities, rural green spaces must possess unique characteristics in terms of functionality, aesthetics, and landscape design (Sadeghi & Hedayee, 2010: 1). Rural green spaces, as a key indicator of the development of communities, have environmental, social, cultural, economic, and physical dimensions (Hosseinabadi & Khanmohammadian, 2018: 3).

Regarding this research topic, several studies have been conducted, some of which are mentioned below:

Zhang and Qian (2024), conducted a comprehensive study on the environmental benefits of green spaces and demonstrated that green spaces play a vital role in urban ecology by significantly reducing environmental challenges. Additionally, the study emphasizes how green spaces contribute to urban development by increasing property values, enhancing tourism, and creating job opportunities. This research also explores future possibilities, highlighting the integration of technology, advancements in natural solutions, and the importance of prioritizing health and well-being in green space design.

Sluis & Jongman (2019), explored green infrastructure in their research. The results highlighted the irreplaceable role of ecological networks in shaping the concept of green networks and viewed the process of networking and cohesion as originating from landscape ecology.

Motamedirad & Rezaei (2023), evaluated the factors influencing rural ecotourism in the sustainable development of villages in Gonbad-e Kavus County. The results indicated that since tourists visit various places for recreation and relaxation, there is a need to further develop green space infrastructure.

Abedi et al. (2022), investigated the approach of sense of place in designing educational spaces, focusing on green spaces in rural schools in Gonbad-e Kavus County. The results of the statistical tests in the study revealed a significant and direct relationship between the presence of green spaces and the increase in the sense of place among students in the schools within the study area.

Roumiani & Mahmoudi (2020), analyzed the spatial infrastructure of sustainable development in the villages of Kuhdasht County. The findings indicated that the rural districts of Northern Kuhdasht and Eastern Tarhan were at a more developed level compared to other districts. The Western Romeshgan was moderately developed, while other districts in the study area were considered underdeveloped.

Hosseinabadi & Khanmohammadian (2018), explored rural green spaces and their relationship to improving rural livability (case study: Bistun district, Harsin county). The research findings revealed a positive and significant relationship between the establishment, maintenance, and enhancement of rural green spaces and the enhance-

ment of livability in the Bisotun District of Kermanshah County.

Javani and Anabestani (2016), conducted a comparative analysis of AHP and ANP multi-criteria decision-making methods in determining the location of rural green spaces. Their research showed that the proposed location for green space in the village's master plan, according to the ANP model, was found to be 52% suitable in comparison with the AHP model, where the suitable area accounted for only 41%.

Anabestani & Javanshiri (2014), studied the optimal location of green spaces in rural settlements (case study: rural areas of Khav County). The results of integrating informational layers categorized the lands of each village into four categories for selecting suitable locations for green spaces. A comparative analysis with the proposed locations in the village master plan revealed that the proposed and existing green space locations in the sample villages largely matched the completely suitable areas.

A review of the sources showed that, unfortunately, there has been little to no specific research conducted regarding the importance of green spaces in rural areas, either domestically or internationally. Therefore, the present study aims to examine the role of green spaces in villages and their impact on sustainable development.

3. Methodology

This study is classified as applied in terms of its goal and descriptive-analytical in terms of the research method. The foundation of this research is based on field operations using a researcher-developed questionnaire with closed-ended questions. The research framework includes two dimensions: sustainable development and rural green spaces. Each of these dimensions comprises specific indicators and items. The sustainable development dimension consists of four indicators and 38 items, while the rural green space dimension has two indicators (manifestation in sustainable design of green spaces and manifestation in green space location), which are measured using the Likert scale in the questionnaire (Table 1).

The reliability of the questionnaire was confirmed using Cronbach's alpha coefficient yielding values of 0.79 for the economic dimension, 0.76 for the social dimension, 0.77 for physical dimension, and 0.73 for the environmental dimension.

The statistical population consists of residents of the villages surrounding Rasht city (Pirkolachah, Kizhdah, Komkal, and Siyah Estlakh), with a total of 2,492 households. Using simple random sampling and Cochran's formula, the sample size was determined to be 333 individuals. The data were analyzed using SPSS software applying t-tests and Spearman's correlation test.

Rasht City is situated at 49°36' east longitude and 37°16' north latitude, relative to the Greenwich meridian. Its total area is approximately 136 square kilometers. Rasht serves as the capital of both the district and the Gilan province. Located in the central part of the district, it is bordered to the north by the rural districts of Pasykhan and Houmeh, to the east by the rural districts of Sanger and Asalamabad and Saravan, to the west by the Shafat district, and to the south by the Rudbar district.

4. Findings

Relationship between Green Spaces in the Villages Surrounding Rasht City and Sustainable Development Approach

In order to assess the relationship between green spaces in the villages surrounding Rasht City and the sustainable development approach, it was necessary to examine the normality of sustainability dimensions. According to Table 2, the results obtained from the Kolmogorov-Smirnov test indicate that all sustainability dimensions follow a normal distribution. In this regard, the significance level for all dimensions is greater than the error value (0.05). Therefore, at a 95% significance level, the distribution of this sample is considered normal.

Following the Kolmogorov-Smirnov test results, which confirmed the normal distribution of data in the studied dimensions, one-sample T-tests and Pearson correlation tests were used to examine the indicators of sustainable development in the green spaces of the villages surrounding Rasht, The results obtained from these tests are as follows:

The economic sustainability in the green spaces of the villages surrounding Rasht reflects the preservation and enhancement of the current economic state of the green space without causing environmental harm. Therefore, one of the most important goals of green spaces is attracting tourists and promoting economic growth, which in turn increases land and property values and ultimately prevents land use changes in economically valuable areas. Thus, considering the efficiency and specific use of green spaces contributes to economic sustainability.

Table 1. Dimensions and Indicators Examined in the Research

Row	Indicator	Dimension
1	"Preserving and enhancing the current economic green space status without depleting natural resources."	Economic
2	"Replication basic needs of the village."	Economic
3	"Equitable distribution"	Economic
4	"Attracting tourists"	Economic
5	"Economic prosperity"	Economic
6	"Increase in land, property, and real estate prices"	Economic
7	"Non-conversion of economically valuable land use"	Economic
8	"Green space location planning in alignment with specific goals"	Economic
9	"Attention to land efficiency and productivity"	Economic
10	"Increase in solidarity"	Social
11	"Increase in participation"	Social
12	"Attention to the cultural identity of the village"	Social
13	"Enhancing the quality of communal spaces"	Social
14	"Creating mixed-use areas to strengthen connections"	Social
15	"Creating a suitable environment"	Social
16	"Creating a suitable environment"	Social
17	"Creating suitable recreational spaces for children"	Social
18	"Helping to improve the physical and mental health of residents"	Social
19	"Attention to demographic criteria (population, household density, household size)"	Social
20	"Appropriate gender-specific space for women"	Social
21	"Attention to the density of the fabric (considering land slope, vegetation cover, climate)"	Physical
22	"Attention to vacant lands and abandoned buildings"	Physical
23	"Improving the quality of village spaces"	Physical
24	"Land use design for creating green spaces"	Physical
25	"Attention to the historical fabric of the village area"	Physical
26	"Proper utilization of aesthetic principles"	Physical
27	"Completion and improvement of the functions of educational, cultural, residential, and sports use alongside green spaces"	Physical
28	"Compatibility of green space usage with other land uses in the village"	Physical
29	"Reducing the use of natural resources and non-renewable energy sources"	Environmental
30	"Reducing pollution production"	Environmental
31	"Preventing energy resource wastage"	Environmental
32	"Balancing the metabolism of the village"	Environmental
33	"Enhancing the aesthetic level of the village"	Environmental
34	"Improving the quality of life in the village"	Environmental
35	"Development of green spaces"	Environmental
36	"Increase in per capita green space"	Environmental
37	"Efforts to preserve and maintain natural elements by creating connections between green spaces and other land uses in the village."	Environmental
38	"Implementing environmental and health regulations to reduce pollution resulting from other land uses."	Environmental

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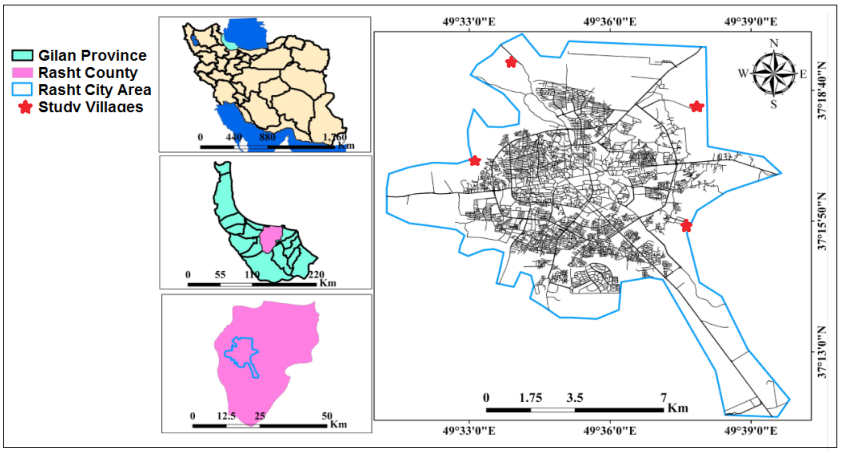

Figure 1. Geographical location of the study area

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Table 2. Results of the Kolmogorov-Smirnov Test for the Dependent Component of Sustainable Development

Sustainability Dimensions	Significance Level	Error Value	Kolmogorov-Smirnov Statistic	Conclusion
Economic	0.334	0.05	1.331	Normal
Social	0.346	0.05	1.359	Normal
Environmental	0.315	0.05	1.300	Normal
Physical	0.342	0.05	1.352	Normal

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According to Table 3, economic sustainability in the green spaces of the villages surrounding Rasht was examined through two components (sustainable design of green spaces and green space location). In the sustainable design component, attracting tourists had the highest average score (2.10) while preserving and enhancing the current economic status without degrading natural resources had the lowest average (1.68). Since the average value for the examined indicators is below the neutral value of 3, economic sustainability in the sustainable design component is considered undesirable.

In the green space location component, locating green spaces with specific goals, had the lowest average (1.88), while considering land efficiency and productivity had the highest average (1.95). These findings indicate that green space sustainability in the villages surrounding Rasht remains at an undesirable level in this component as well.

Table 3. Examining the Economic Sustainability in the Green Spaces of the Villages Surrounding the City of Rasht

Component	Items	Mean	T	Significance Level (2-tailed)	Confidence Interval Difference (95%)	
					Upper	Lower
In Sustainable Green Space Design	Preserving and enhancing the current economic status of green spaces without degrading natural resources	1.68	43.99	0.000	1.76	1.60
	Responding to the basic needs of the village	1.72	48.20	0.000	1.66	1.78
	Equitable distribution	1.89	50.30	0.000	1.81	1.96
	Attracting tourists	2.10	52.84	0.000	2.19	2.02
	Economic prosperity	1.89	50.30	0.000	1.96	1.81
	Increase in land, property, and real estate prices	1.99	51.31	0.000	2.07	1.91
	No change in the land use of valuable economic lands	1.74	48.72	0.000	1.82	1.66
In Green Space Location	Location of green spaces according to specific goals	1.88	50.38	0.000	1.95	1.81
	Attention to land efficiency and yield	1.95	50.86	0.000	2.06	1.84

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Human beings and human societies are among the most significant variables in sustainable development. The primary of sustainable development is comprehensive progress with the social dimension being a fundamental component. The effectiveness of sustainable development in green spaces is maximized when key social objectives—such as public participation, social solidarity, cultural identity, and social connections—are fostered. Green spaces contribute to social and psychological well-being by providing suitable environments for youth and adolescents to engage in recreational and social activities.

According to the findings presented in Table 4, the social sustainability of the green spaces in the villages surrounding Rasht City was evaluated in two components:

1. Sustainable design of green spaces

The highest-scoring indicator was "increasing public participation" with a mean score of 2.96.

The lowest-scoring indicator was "strengthening social relationships" with a mean score of 2.13.

These results suggest that social sustainability in the sustainable design component is at an undesirable level in the green spaces of the villages surrounding Rasht.

2. Green space location

The highest-scoring indicator was "gender-appropriate spaces for women" with a mean score of 2.02.

The lowest-scoring indicator was "attention to demographic criteria (population, household density, household size)" with a mean score of 1.93.

These findings indicate that the spatial planning of green spaces does not adequately consider social inclusivity and demographic characteristics, contributing to an undesirable level of social sustainability in the studied villages.

The following table represents an assessment of social sustainability in the green spaces of villages surrounding Rasht City, focusing on two key components: Sustainable Design and Green Space Location.

As shown in Table 5, the mean values for all indicators across both components fall below the threshold of 3, indicating that the environmental sustainability of green spaces in these villages remains at an undesirable level. This suggests that existing green space designs and spatial planning do not sufficiently support the principles of social sustainability, highlighting the need for improved planning and development strategies to enhance the quality, accessibility, and inclusivity of these spaces.

Table 4. Analysis of Social Sustainability in Green Spaces of Villages Surrounding Rasht City

Component	Items	Mean	T	Significance Level (2-tailed)	Confidence Interval Difference (95%)	
					Upper	Lower
In Sustainable Green Space Design	Increased solidarity	2.88	51.441	0.000	3.05	2.65
	Increased participation	2.96	52.793	0.000	3.08	2.85
	Attention to the cultural identity of the village	2.45	54.737	0.000	2.57	2.32
	Improving communal spaces	2.47	52.422	0.000	2.60	2.34
	Creating mixed-use developments to enhance communications	2.54	57.328	0.000	2.66	2.41
	Creating a suitable environment	2.44	52.018	0.000	2.57	2.31
	Strengthening social relationships	2.13	37.158	0.000	2.25	2.02
	Creating appropriate recreational spaces for children	1.93	37.339	0.000	2.03	1.84
	Helping improve the physical and mental health of residents	2.44	52.018	0.000	2.57	2.31
In Green Space Location	Attention to demographic criteria (population, household density, household size)	1.93	37.339	0.000	2.03	1.84
	Gender-appropriate spaces for women	2.02	36.437	0.000	2.13	1.91

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Table 5. Examination of Environmental Sustainability in Green Spaces of Villages Surrounding Rasht City

Component	Items	Mean	T	Significance Level (2-tailed)	Confidence Interval Difference (95%)	
					Upper	Lower
In Sustainable Green Space Design	Reducing the use of natural resources and non-renewable energies	1.68	43.99	0.000	1.76	1.60
	Reducing pollution production	1.96	37.93	0.000	2.08	1.85
	Preventing energy waste	1.40	35.31	0.000	1.59	1.21
	Balancing the metabolism of the village	1.47	35.24	0.000	1.56	1.30
	Increasing the beauty level of the village	2.44	57.31	0.000	2.61	2.31
	Improving the quality of life in the village	2.50	57.29	0.000	2.65	2.41
In Green Space Location	Developing green spaces	1.88	37.93	0.000	2.08	1.60
	Increasing the green space per capita	1.95	37.91	0.000	2.06	1.84
	Efforts to preserve and maintain natural elements by linking green spaces and other village functions	2.02	49.63	0.000	2.10	1.94
	Implementing environmental and health regulations to reduce pollution from other land uses	1.90	37.37	0.000	2.13	1.73

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Table 6 highlights the environmental sustainability indicators in the green spaces of the villages surrounding Rasht, showing a need for improvement in both sustainable design and spatial planning.

In the sustainable green space design component, only two indicators—enhancing the quality of village spaces (mean = 3.08) and appropriate use of aesthetic principles (mean = 3.98)—were rated above average, indicating a favorable condition. However, all other indicators within this component were evaluated as unfavorable, suggesting deficiencies in environmental sustainability.

Similarly, in the green space location component, the indicators "completing and improving the function of educational, cultural, residential, and sports uses alongside green spaces" (mean = 2.03) and "compatibility of green space use with other land uses in the village" (mean = 2.13) were assessed as below average, further emphasizing the need for strategic planning and intervention to enhance the environmental sustainability of green spaces in these villages..

Tor evaluate the relationship between green space with sustainability indicators, Pearson correlation tests were used to examine the relationship between the green spaces of villages surrounding the city of Rasht and the dimensions of sustainability (economic, social, physical, and environmental).

Table 6. Examination of Physical Sustainability Indicators in Urban Green Spaces of Rasht

Component	Items	Mean	T	Significance Level (2-tailed)	Confidence Interval Difference (95%)	
					Upper	Lower
In Sustainable Green Space Design	Enhancing the quality of village spaces	3.08	70.88	0.000	3.15	3.00
	Attention to vacant lands and derelict buildings	1.41	35.32	0.000	1.60	1.22
	Attention to spatial density (considering land slope, vegetation, climate)	2.50	52.42	0.000	2.62	2.37
	Land-use design for creating green spaces	1.94	37.85	0.000	2.03	1.81
	Attention to the historical fabric of the village area	2.14	37.15	0.000	2.26	2.04
	Appropriate use of aesthetic principles	3.93	78.74	0.000	4.01	3.86
In Green Space Location	Completing and improving the functionality of educational, cultural, residential, and sports uses alongside green spaces	2.03	49.63	0.000	2.11	1.95
	Compatibility of green space use with other land uses in the village	3.13	37.158	0.000	2.25	2.02

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Table 7. Relationship between Green Space Variables of Villages Surrounding the City of Rasht and Sustainability Dimensions

Independent Variable	Sustainability Indicators	Correlation Coefficient	Significance Level
Urban Green Space of Rasht	Economic	0.118	0.065
	Social	0.101	0.069
	Physical	0.123	0.054
	Environmental	0.115	0.067

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According to Table 7, there is no significant and positive relationship between the green space variable of villages surrounding the city of Rasht and the dimensions of sustainability (economic sustainability with a coefficient of 0.118, social sustainability with a coefficient of 0.101, physical sustainability with a coefficient of 0.123, and environmental sustainability with a coefficient of 0.115), as the significance level is greater than 0.05.

5. Discussion

Rural green spaces, are essential for sustainable development, significantly impacting environmental preservation, quality of life, and economic development growth. properly designed and well-maintained green spaces not only enhance environmental balance but also contribute to social well-being and economic stability in rural communities. Consequently, integrating green space development and conservation into rural planning policies should be prioritized to ensure the long-term prosperity and sustainability of these regions.

The villages surrounding the city of Rasht, despite having significant environmental potential, suffer from insufficient per capita green space. These villages face challenges due to factors such as population growth driven by an influx of urban residents for villa construction, leading to a mismatch between the number of green spaces and their per capita availability. Therefore, this research aims to examine the indicators of sustainable development in the green spaces of the villages surrounding the city of Rasht.

In this study, to examine the relationship between green space in the villages surrounding the city of Rasht and sustainable development approaches, independent t-tests and Pearson correlation tests were utilized. First, using the t-test, the sustainability indices (economic, social, physical, and environmental) in green spaces were examined within the two components of sustainable green space design and location. According to the results, the mean of all indices under consideration was below the average value of (3). Therefore, the manifestation of sustainability indices (economic, social, physical, and environmental) in the green spaces of the villages surrounding Rasht is at an undesirable level in both components.

After evaluating the manifestation of green space in the surrounding villages of Rasht with sustainability indices, the Pearson correlation test was used to examine the relationship between them. According to the results, there is no significant or positive correlation between the green space variable in the villages surrounding Rasht and the dimensions (economic sustainability with a coefficient of 0.118, social sustainability with 0.101, physical sustainability with 0.123, and environmental sustainability with 0.115) at a significance level greater than 0.05.

Finally, it can be stated that today, in the studied villages, some individuals, due to unsustainable and unprincipled exploitation of environmental resources, have exacerbated the environmental degradation of rural areas, and the rural Islamic councils have not taken effective action. Gardens and farms have been destroyed, and the desire for urbanization has significantly reduced the rural population. The observable result of the reduction in rural green spaces is the accelerated process of turning villages into cities, and the Islamic councils can take effective steps toward the sustainability of these areas by enacting efficient laws and expanding rural green spaces.

The findings of this research are consistent with earlier studies, including Javani and Anabestani (2016), Anabestani & Javanshiri (2014), Hosseinabadi & Khanmohammadian (2018), and Zhang and Qian (2024), reinforcing the need for strategic interventions to ensure the sustainable development of green spaces in rural regions.

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Conflict of Interest

The authors declared no conflicts of interest.

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