

Research Paper: Analysis of Tourism Indicators in the Sustainable Rural Development of Semi-Arid Regions in Iran

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ABSTRACT

Purpose: Sustainable rural development in arid regions depends on various approaches, with tourism being one of the most important. Tourism can also have multiple effects as an economic activity that helps diversify the rural economy. This research investigates tourism development indicators and their role in the sustainable rural development of semi-arid regions in Abadeh City, Iran.

Methods: The research method is descriptive-analytical and relies on data collection through surveys. The statistical population consists of rural residents. Based on the research's limitations and the Cochran formula, the sample size was determined to be 372 individuals. Experts confirmed the validity of the questionnaire, and its reliability was verified by administering 30 questionnaires and calculating a Cronbach's alpha coefficient greater than 0.70.

Results: The results showed that the economic and environmental indicators of sustainable rural development were significantly less than 0.05. Economic indicators, with an average of 3.088, are considered average, while environmental indicators, with an average of 2.967, are evaluated as weak. Additionally, social indicators, with a significant level of 0.152 and an average of 121.3, have been rated as average. The results also indicated that the tourism indicators are substantial at a level of less than 0.05, with an average of 3.199, placing them in an average range. The best situation in tourism indicators relates to the hospitality indicator of villagers, with an average of 3.879. The impact of tourism indicators on sustainable rural development is 90%, and investment in the rural tourism sector has the most significant effect, with an explanatory value of 0.81.

Conclusion: The conclusion showed that the status of sustainable development indicators in rural areas could be improved. However, tourism as an approach in semi-arid rural areas, while not currently favorable, can positively impact their stability and development.

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1. Introduction

Villages in different countries have their own unique geographical and social systems. Consequently, their economic positions vary due to these features (Bandoi et al., 2020: 4). However, it seems that a village is defined as a place that strives to provide an independent and sustainable way of life through the proper arrangement of space and people, as well as efficient production (Bhutoria, 2020: 519). This perspective on the village highlights the concept of sustainability and sustainable development. Sustainable rural development is a complex phenomenon with multiple dimensions. In fact, with a comprehensive understanding of the various aspects of village life, preserving the future of the village is possible. Maintaining the stability of the village is the ultimate goal of sustainable rural development components. Unilateralism or neglecting any of these components will cause irreparable damage to the village's future (Khodamoradpour & Zanganeh, 2019: 186). Sustainable development is an approach that can guarantee the future while preserving existing resources and assets (Mihai & Latu, 2020: 10). Rural areas are considered the main hubs of production and employment, holding a special place in the cycle of prosperity and economic development of any country. The development of villages has long been a focus for many policymakers and is a priority in each country's macro development plans. The process of sustainable development can only be completed with attention to the qualitative role of villages. Rural development can effectively create employment, eliminate poverty, secure foreign currency income, manage population density, improve the environment, and achieve sustainable development (Fayez et al., 2022: 212). In the pursuit of sustainable rural development, a range of approaches and policies can be proposed. However, tourism has become more prominent today due to its economic effects and the limitations of natural resources. Tourism serves as a platform to reduce pressure on nature and manage it in rural areas (Rangus et al., 2017: 4).

Rural tourism is developing in many countries, with its importance increasing steadily due to economic stagnation in the villages (Mousavand et al., 2013: 81). Today, tourism serves various functions, including job creation, income generation, infrastructure strengthening, and attracting foreign currency (Rahimipour et al., 2024: 109). An important part of tourism and its effects is related to rural tourism and ecotourism. According to many experts, the prosperity of tourism can aid in the revival and

reconstruction of rural areas (Rajabnejad Sheikhan et al., 2019: 785). As Hall (2021) emphasizes, the expansion and prosperity of rural tourism contribute to increased production efficiency and higher income for villagers. Tourism development is recognized as a comprehensive economic and social approach that creates development platforms in rural areas (Woyesa & Kumar, 2021:815) and can also address and mitigate existing problems and challenges. Tourism is also recognized as an important activity for the economic diversification of rural communities, ultimately leading to sustainable rural development (Romanenko et al., 2020: 6).

Rural communities see the development of tourism as an opportunity to diversify and revitalize the economy of rural areas (Ivona, 2020: 5). Current trends indicate that rural tourism represents a growing market and offers a promising opportunity for growth to rural communities (De Rosa et al., 2019: 292). Additionally, it can make a valuable contribution to the sustainable development of rural areas (Lopez-sanz et al., 2021: 3). To this end, the organization of various businesses is evolving towards alternative network models that guarantee greater economic and social benefits, as well as a more proactive role in the economic system (Wijijayanti et al., 2020: 6). Considering the tourism boom on the one hand and the importance of sustainability issues in rural areas on the other, the concept of sustainable tourism was formed. Sustainable tourism has become recognized as a desirable goal in tourism development due to the addition of the concept of sustainability to tourism to reduce the negative impacts experienced during the tourism development process (An & Alarcón, 2020: 2). This type of tourism seeks to promote sustainable rural development (Martin Martin et al., 2020: 48). Therefore, the significance of tourism as a vital approach in rural areas cannot be ignored.

Sustainability issues are particularly important for some rural areas due to their unique conditions and characteristics. Villages in semi-arid regions are a clear example. Due to their geographical and climatic conditions and certain limitations, sustainability indicators are crucial for these villages (Haywood et al., 2020: 1034) and should be carefully considered. Diversification of economic activities can be considered a desirable approach in these areas, with tourism being a prime example of efforts to diversify the rural economy and ensure the sustainability of these regions (Rogerson & Rogerson, 2022: 65). Abadeh city in Iran is recognized as one of the semi-arid regions with unique development capacities and obstacles. In this context, its rural areas present a distinct situation. Due to the geographical

and climatic conditions of the region, these rural areas require specific planning and operational measures. In other words, the villages in this region need economic and social approaches that, firstly, exert minimal pressure on the environment, and secondly, yield beneficial effects in various aspects for the villages. Tourism is one of the most important approaches to rural development in semi-arid regions, and the villages of Abadeh in Iran are no exception. Various factors, such as ethnic and cultural diversity, ecotourism attractions, a culture of hospitality, handicrafts, community cooperation, and geographic and communication advantages, underscore the significance of adopting this approach. To address these factors, a platform should be established to help rural areas in semi-arid regions achieve sustainability. Due to the climatic and environmental challenges inherent in semi-arid regions, rural areas frequently face numerous obstacles, which impact their development and sustainability. Therefore, rural areas in semi-arid regions do not always have favorable conditions for sustainability. Tourism in these regions can help alleviate some of these challenges, promote diversification, and reduce environmental pressure. Given the significance of tourism today and the sustainability issues faced by villages in semi-arid regions, it is essential to understand tourism indicators and their role in sustainable development accurately. Consequently, this research aims to examine tourism development indicators and their impact on the sustainable rural development of semi-arid regions in Abadeh city.

2. Literature Review

The concept of sustainable development is an integrated one, encompassing various economic, social, and environmental aspects. In this context, rural areas are closely connected to the concept of sustainable development due to their extensive interaction with the environment. Moreover, numerous approaches can be proposed for the development of rural areas, with tourism being recognized as a particularly important approach in today's era. The relationship between tourism and sustainable development in rural areas is therefore closely intertwined (Mak et al., 2017: 4). Sustainable development aims to preserve village resources while utilizing them in line with sustainability principles. In this context, tourism has specific economic, social, and environmental effects within its framework. It offers various benefits, including job creation, income diversification, stimulation of production activities, increased participation of villagers, enhanced knowledge and awareness, education, and improved environmental health (Xu et

al., 2021: 330). However, tourism also has potential negative effects, such as intensifying land use changes, causing environmental pollution, and leading to cultural conflicts (Martinez et al., 2019: 167). The two-way effects of tourism in rural areas highlight the importance of focusing on sustainable concepts in these regions. Therefore, firstly, to ensure that villages are guided towards preserving and managing resources effectively, the concept of sustainable development should be emphasized. Secondly, to enhance tourism and its positive impact on sustainable rural development, attention must be given to sustainable policies and programs in this sector.

In recent decades, tourism has become one of the main economic driving forces in sensitive regions, particularly in rural areas. However, there has been limited research on the sustainability of development resulting from tourism activities in these areas, and the existing studies have produced conflicting results. Villanueva-Álvarez et al. (2017) pointed out that tourism has significant effects on improving environmental awareness among residents and leads to the creation of people-oriented institutions in rural areas. Petrović et al. (2017) concluded that tourism contributes to sustainable rural development by reducing poverty, improving facilities, enhancing social capital and quality of life, diversifying activities, and promoting environmental protection through increased resident awareness and higher incomes. The research results of Ibănescu et al. (2018) showed that tourism has a positive and significant effect on rural areas, most notably in terms of economic growth, demographic stabilization, and the improvement of residents' well-being. Jacobs et al. (2020) pointed out that tourism is a viable approach to the development of rural areas because it leverages significant ecotourism and cultural attractions to draw tourists. These attractions, in turn, depend on the region's climate and environment. Liu et al. (2023) demonstrated that tourism has diverse effects on rural communities and resource conservation, all of which contribute to the sustainability of rural areas. The most important effects include comprehensive support, villager participation, investment, cultural and educational improvements, and economic benefits.

Najmi & Vali Shariat Panahi (2010) pointed out that rural tourism revives the local and traditional culture of villages, encourages collective activities among villagers, increases their income, and reduces migration and evacuation of villages. Ghanbari et al. (2013) concluded that the positive effects of tourism in rural development include strengthening infrastructure, increasing employment and income, preserving cultural and historical

monuments, renewing interest in local culture, improving quality of life, diversifying activities, and promoting local goods. However, tourism also has negative effects, such as an increase in the cost of living for residents, higher land values, and increased costs of services. [Golmohammadi \(2014\)](#) highlighted the growing influence of tourism on the rural economy. This economic, social, and cultural activity plays a valuable role in the economic growth of villages by creating employment, diversifying household economies, encouraging social participation, and utilizing local perspectives and resources as a complement to agricultural activities. [Mirlofti et al. \(2020\)](#) emphasize that one of the most important tourism potentials of arid regions lies in their socio-cultural attractions, which have received less attention. [Shahbazi & Mousavi \(2023\)](#) showed that tourism has positively impacted the local economy, creating employment, increasing income, promoting familiarity with culture and customs, and enhancing environmental protection across economic, social, cultural, and environmental fields. [Saljooghi et al. \(2023\)](#) concluded that, in the tourism pathology of desert areas, the development of tourism faces various challenges, including a lack of access to water resources.

Tourism and sustainable development are two interrelated concepts that have been discussed in various research studies. However, the present research focuses on sustainable rural development through the lens of tourism, examining its role in rural development. Additionally, this study emphasizes the villages of semi-arid regions, considering their unique characteristics, capacities, and development obstacles. Therefore, this research differs from previous studies in terms of content, location, and methodology.

3. Methodology

The descriptive-analytical research method is considered applied research in terms of its purpose. Data was collected through a survey using a questionnaire. Experts assessed the questionnaire's validity, and its reliability was tested by administering the questionnaire outside the statistical sample. Specifically, for reliability, 30 individuals were randomly surveyed outside the statistical sample, and the data calculation was confirmed with a Cronbach's alpha coefficient greater than 0.70. The statistical population of the research consists of the residents of the villages in Abadeh city. The number of inhabited villages in the city exceeds 22, and for this study, 13 villages with more than 30 households each were selected. The total population of the region is 11,451 people across 3,426 households. Using Cochran's

formula, the sample size was calculated to be 372 individuals. The number of samples required to complete the questionnaire in each village was determined based on the population of women in that village. The respondents were randomly selected residents of these villages. SPSS and AMOS software were used for data analysis.

4. Findings

Abadeh city, with an area of 6,800 square kilometers, is located in the north of Fars province, with Abadeh as its center. This city is bordered by Abarkuh in Yazd province to the east, Khorrambid to the south, Eqlid and Semirrom to the west, and Isfahan province to the north. Its average annual rainfall is about 120 mm, and its total annual precipitation is about 200 mm, classifying it as one of the semi-arid regions of Iran. The distance between the center of Abadeh city and Shiraz is 275 kilometers, and it is located 200 kilometers south of the center of Isfahan province. Its location near the national road from the south to the center of Iran has created a unique situation for Abadeh. According to the 2016 census, the population of this city was 203,725 (Statistical Centre of Iran, 2016). This region has diverse capacities for agriculture, tourism, and communication, some of which are present in its rural areas and require further investigation and research. According to 2016 statistics, there are more than 22 inhabited villages in the region. However, many villages have been deserted due to climatic conditions and various crises, including environmental and water tensions as well as economic issues. [Figure 1](#) shows the location of the studied villages in Abadeh city, Iran.

Characteristics of the statistical sample

Examining the characteristics of the statistical sample reveals that, in terms of gender, 65.6% of the sample is male, while 34.4% is female. Regarding age, the largest segment is the 41-50-year-old group, comprising 96 individuals, or 25.8% of the sample, whereas the smallest segments are the 51-60-year-old group and the 61 years and older group, each with 59 individuals, or 15.9%. Additionally, 24.5% of the sample falls within the 26-30 years age range, and 18% are between 31 and 40 years old. In terms of education, the largest proportion holds a high school diploma (51.9%), followed by those with a bachelor's degree (25.3%). The junior high school group has the smallest representation, with 0.5%, while 15.3% have elementary education. Furthermore, 4.3% of the sample has a master's degree or higher.

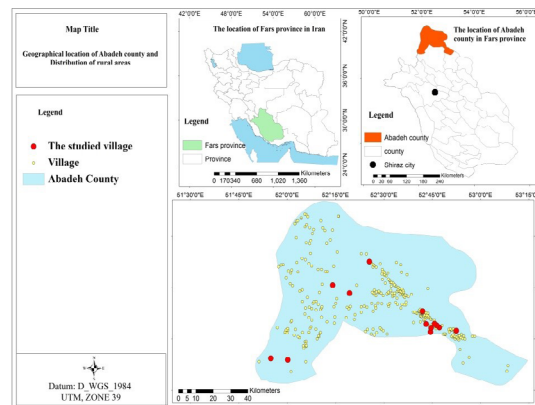


Figure 1. Location of Abadeh City in Iran and distribution of rural areas



Assessing the status of sustainable rural development indicators in semi-arid regions of Iran

Examining the results of the binomial test in the context of the economic indicators of sustainable rural development in the semi-arid regions of Iran shows that all indicators were significant at a level of less than 0.05. Analysis of the direction of significance, using the average parameter, reveals that the income indicator (with an average of 3.382), the level of employment (with an average of 3.102), and the area under cultivation (with an average of 3.022) are evaluated as average. In contrast, the indicators of livelihood diversity (with an average of 2.992) and amount of productivity and production (with an average of 2.944) are assessed as poor. The observed ratio for group one (less than 3) is higher than that for group two (more than 3) for these two variables. This article also confirms the poor condition of the indicators of livelihood diversity and the amount of productivity and production.

Additionally, in the context of the social indicators of sustainable rural development, the results show that all indicators were significant at a level of less than 0.05. Analysis of the direction of significance reveals that access to health services (with an average of 3.148), access to educational services (with an average of 3.084), cooperation and participation status (with an average of 3.328), and housing situation (with an average of 3.331) are evaluated as average. In contrast, the migration status indicator is assessed as poor, with an average of 2.618. The observed ratio for group one (less than 3) is higher than that for group two (more than 3) for this variable. This article also confirms the unfavorable situation of the migration indicator.

Examining the results of the binomial test in the context of environmental indicators also indicates the sig-

nificance of all indicators at a level of less than 0.05. Analysis of the direction of relevance, using the average parameter, shows that the indicator of respect for the environment (with an average of 3.328), access to water resources (quantity and quality) (with an average of 3.462), and the indicator of protection of natural resources (forests and others) (with an average of 3.226) are evaluated as average. However, the erosion indicator (with an average of 2.828) and change of land use (with an average of 1.995) indicate a poor situation (Table 1).

An assessment of the significance of the sustainable rural development status in the semi-arid regions of Iran

Examining the test results in the context of sustainable rural development dimensions shows that the economic and environmental dimensions were significant at a level of less than 0.05. Analysis of the direction of significance, using the average parameter, indicates that the financial dimension is evaluated as average with an average score of 3.088. For the environmental dimension, the significance level of the test is 0.000, which is less than 0.05, and the average score of 2.967 suggests that this aspect of sustainable rural development is weak to somewhat average. In the social dimension, the significance level of 0.152, which is greater than 0.05, indicates that this aspect has not been significant. The average score of 3.121 suggests an average status for this aspect of sustainable development. The closeness of the observation ratios in the two groups of tests confirms these findings.

Examining the test results at the level of sustainable rural development (sum of dimensions) indicates significance at a level of less than 0.05, specifically 0.013. The average score of 3.072 confirms that the villages have been evaluated as having average sustainability in terms of the dimensions (Table 2).

Table 1. An assessment of the significance of the status of sustainable rural development indicators in semi-arid regions of Iran

-	Indicator	Observed ratio for group one (less than 3)	Observed ratio for group two (less than 3)	Test case ratio	p-value	Average
Economic indicators	Income	0.58	0.42	0.50	0.002	3.382
	Level of employment	0.78	0.22	0.50	0.000	3.102
	Area under cultivation	0.78	0.22	0.50	0.000	3.022
	Livelihood diversity	0.80	0.20	0.50	0.000	2.992
	Amount of productivity and production	0.87	0.13	0.50	0.000	2.944
Social indicators	Access to health services	0.74	0.26	0.50	0.000	3.148
	Access to educational services	0.76	0.24	0.50	0.000	3.083
	Migration status	0.99	0.01	0.50	0.000	2.618
	Cooperation and participation status	0.61	0.39	0.50	0.000	3.328
	Housing situation	0.62	0.38	0.50	0.000	3.331
Environmental indicators	Soil erosion	0.95	0.05	0.50	0.000	2.828
	Change of land use	0.98	0.02	0.50	0.000	1.995
	Respect for the environment	0.60	0.40	0.50	0.000	3.328
	Access to water resources (quantity and quality)	0.50	0.50	0.50	1.000	3.462
	Protection of natural resources (forests and others)	0.71	0.29	0.50	0.000	3.226



Table 2. An assessment of the significance of sustainable rural development status in the semi-arid regions of Iran

Sustainable rural development dimensions	Observed ratio for group one (less than 3)	Observed ratio for group two (less than 3)	Test case ratio	p-value	Average
Economic dimension of sustainable rural development	0.65	0.35	0.50	0.000	3.088
The social dimension of sustainable rural development	0.46	0.54	0.50	0.152	3.121
The environmental dimension of sustainable rural development	0.70	0.30	0.50	0.000	2.967
Total dimensions (sustainable rural development)	0.43	0.57	0.50	0.013	3.072



Comparing the results of different dimensions of sustainable rural development based on Figure 2 shows that the social dimension has had a better situation in the villages than other dimensions. The economic dimension is in second place, followed by the environmental dimension. The stretching of the graph below indicates that possible plans and strategies should be based on the integration of economic and social indicators of sustainable development. This approach will provide both the background and platform for rural development and improve the environmental dimensions.

Assessing the status of rural tourism indicators in semi-arid regions

Examining the results of the binomial test on the status of rural tourism indicators in the semi-arid regions of Iran reveals that all indicators of rural tourism, except for the development of technology (e.g., the Internet), were significant at a level of less than 0.05. Analysis of the direction of significance, using the average parameter, indicates that the most favorable conditions among tourism indicators are related to the following four factors: hospitality of villagers (3.879), cost of staying and visiting in the village (3.847), easy access to tourist attractions in the town (3.847), and village security (3.831). Among the most important indicators with weaker performance are investment in the rural tourism sector, availability of tourist accommodations, advertising for

rural tourism, government support for rural tourism, and rural tourism marketing.

Additionally, the analysis of the test results at the level of the total indicators shows that the significance value is 0.000; thus, the total indicators of rural tourism are considered significant. The average score of 3.199 indicates

that the indicators of rural tourism in the semi-arid regions of Iran, including Abadeh city, are assessed as average. Most of the weaknesses in the field of rural tourism are related to infrastructural indicators and facilities. In other words, these infrastructural indicators need to be upgraded and developed (Table 3).

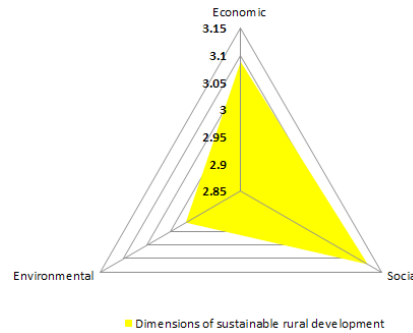


Figure 2. The status of dimensions of sustainable rural development with a tourism approach in semi-arid regions of Iran



Table 3. An assessment of the significance of rural tourism status in the semi-arid regions of Iran

Rural tourism indicators	Observed ratio for group one (less than 3)	Observed ratio for group two (less than 3)	Test case ratio	p-value	Average
Investment in the rural tourism sector	1	0	0.50	0.000	2.075
Cost of staying and visiting the village	0.19	0.91	0.50	0.000	3.847
Income and job creation for the village	0.76	0.24	0.50	0.000	3.099
Village's handicrafts and local crafts	0.92	0.08	0.50	0.000	2.884
Availability of tourist accommodations	0.96	0.04	0.50	0.000	2.513
The existence of hospitality-welfare services	0.83	0.17	0.50	0.000	3.046
Hospitality of villagers	0.26	0.74	0.50	0.000	3.879
Access and transportation to the village	0.40	0.60	0.50	0.000	3.793
Easy access to tourist attractions in the village	0.19	0.81	0.50	0.000	3.847
Biodiversity of the village (natural landscapes, plant and animal diversity, etc.)	0.58	0.42	0.50	0.000	3.430
Environmental health of the village	0.24	0.76	0.50	0.000	3.766
Collection and disposal of surface water in the village	0.65	0.35	0.50	0.000	3.336
The sanitary disposal of waste in the village	0.60	0.40	0.50	0.000	3.401
Access to healthcare services	0.60	0.40	0.50	0.000	3.368
Belief in environmental protection	0.62	0.38	0.50	0.000	3.374
Advertising for rural tourism	1	0	0.50	0.000	2.441
Except for the development of technology (e.g., the Internet)	0.52	0.48	0.50	0.378	3.301
village security	0.20	0.80	0.50	0.000	3.831
Advertising for rural tourism	0.99	0.01	0.50	0.000	2.581
Government support for rural tourism	1	0	0.50	0.000	1.793
The presence of a significant resident population in the village	0.40	0.60	0.50	0.000	3.589
Total significance (rural tourism)	0.27	0.73	0.50	0.000	3.199



Assessing and predicting the impact of tourism indicators on sustainable rural development in semi-arid areas through structural equation modeling

To present an experimental model and predict the effects of tourism indicators on sustainable rural development in semi-arid regions of Iran, the confirmatory factor analysis (CFA) model of tourism indicators was first constructed using AMOS software. Subsequently, each of the indicators was validated in the following models. The results of the factor loading analysis for tourism indicators show that the factor loadings exceed 0.3, indicating the appropriateness of the indicators in the model (Figure 3).

After fitting all the research variables in the AMOS Graphics environment, a model illustrating the effect of tourism indicators on sustainable rural development in semi-arid regions of Iran was generated (Figure 4). Examining the factor loadings related to the indicators of the model reveals that they are all above 0.3, indicating that the indicators included in the model are acceptable. Additionally, the evaluation of the final model's fit regarding the impact of tourism indicators on sustainable rural development in semi-arid regions of Iran, as shown in Table 4, demonstrates that the model possesses the necessary validity and accuracy and effectively explains the effects. Notable indicators in this context include a Comparative Fit Index (CFI) of 0.954, a Root Mean Square Error of Approximation (RMSEA) of 0.065, and

a Hoelter's critical N of 234, all of which are consistent with recommended and standard values. The model explains 90% of the variance in tourism indicators related to sustainable rural development, with all indicators aligning with suggested and standard values (Figure 4).

After evaluating the overall model fit for the impact of tourism indicators on sustainable rural development in semi-arid regions of Iran, the effect of the independent variables on the dependent variable was subsequently examined. As shown in Table 5, the role of tourism indicators in sustainable rural development among the respondents is significant at the 99% confidence level. The critical ratio, being greater than 2.58 (a threshold indicating significance), further supports the considerable effect of the independent variable (tourism indicators) on the dependent variable (sustainable rural development in semi-arid regions). Examining the role of 21 tourism indicators in sustainable rural development reveals that the total effect value is 0.90, indicating that these indicators explain approximately 90% of the variance and demonstrate a significant positive impact on rural and sustainable development. According to the results of this model, the most influential tourism indicator in sustainable rural development for semi-arid regions is related to investment in the rural tourism sector, with an explanatory value of 0.81. advertising for rural tourism and income and job creation in villages both have an explanatory power of 0.78 in the context of sustainable rural development. The table below presents these results.

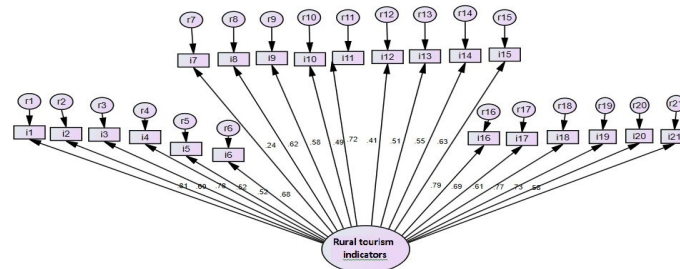


Figure 3. Factor loading related to observed variables and rural tourism indicators, as analyzed through structural equation modeling

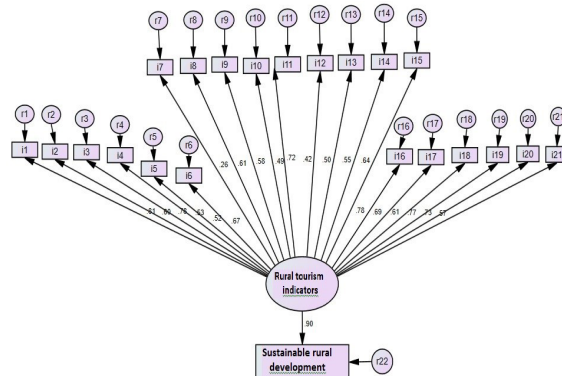


Figure 4. The final structural equation model of the impact of tourism indicators on sustainable rural development in semi-arid regions of Iran through structural equation modeling



Table 4. Evaluation indicators for the overall model of the impact of tourism indicators on sustainable rural development in semi-arid regions of Iran, as assessed through structural equation modeling

Indicator	Suggested values	Research final model
CMIN	-	9.654
DF	-	6.009
CMIN/DF	<5	1.606
CFI	>0.9	0.954
RMSEA	<0.08	0.065
HOELTER	>75	234
RMR	0	0.028
GFI	>.09	0.951
NFI	>0.9	0.942
PRATIO	0-1	0.317



Table 5. The coefficients of the regression model, analyzing the effect of tourism indicators on the sustainable rural development of semi-arid regions in Iran through structural equation modeling

Independent variable	Dependent variable	Critical ratio	Total effect	Significance level
Investment in the rural tourism sector	Sustainable development of rural areas in semi-arid regions	6.432	0.81	0.000
Cost of staying and visiting the village		4.123	0.69	0.000
Income and job creation for the village		5.432	0.78	0.000
Village's handicrafts and local crafts		4.490	0.53	0.000
Availability of tourist accommodations		5.109	0.52	0.000
The existence of hospitality-welfare services		329/6	0.67	0.000
Hospitality of villagers		5.345	0.26	0.007
Access and transportation to the village		5.198	0.61	0.004
Easy access to tourist attractions in the village		5.409	0.58	0.003
Biodiversity of the village (natural landscapes, plant and animal diversity, etc.)		6.132	0.49	0.000
Environmental health of the village		7.490	0.72	0.000
Collection and disposal of surface water in the village		5.320	0.42	0.006
The sanitary disposal of waste in the village		5.607	0.50	0.004
Access to healthcare services		5.780	0.55	0.005
Belief in environmental protection		6.587	0.64	0.000
Advertising for rural tourism		7.009	0.78	0.000
Except for the development of technology (e.g., the Internet)		6.122	0.69	0.000
village security		7.004	0.61	0.000
Advertising for rural tourism		7.008	0.77	0.000
Government support for rural tourism		6.109	0.73	0.000
The presence of a significant resident population in the village		5.567	0.57	0.000



5. Discussion

In recent decades, tourism has been regarded as a means of economic development for sensitive regions, particularly in rural areas. If rural tourism is well-managed, it can significantly contribute to the development of rural communities; otherwise, it may lead to negative outcomes. Therefore, current efforts in supporting rural tourism focus on improving accommodation quality and leveraging information and communication technology to advance the recovery, protection, management, and promotion of the substantial natural and cultural heritage in problem areas. This strategy aims to address various rural challenges, including poverty, migration, income improvement, job diversification, environmental pressure reduction, quality of life enhancement, technological advancement, population stability, public services, and socio-economic stability. Tourism, when planned and implemented within a systematic framework, can yield significant benefits and positive effects. A key aspect of rural tourism is leveraging this potential to enhance village sustainability. This research aims to investigate the state of sustainable rural development from a tourism perspective and analyze its effects, focusing on the semi-arid regions of Abadeh city.

Comparing the results of sustainable rural development indicators reveals that the social dimension has fared better in the villages compared to the other dimensions. The economic dimension follows in second place, with the environmental dimension ranking third. Therefore, plans and strategies should focus on integrating economic and social indicators of sustainable development, as this will provide the necessary foundation for rural development and enhance environmental conditions. Overall, the state of sustainable rural development in the study area is inadequate and requires improvement.

The results indicate that rural tourism indicators in the semi-arid regions of Iran, including Abadeh city, were assessed as average. The primary weaknesses in rural tourism are related to infrastructural indicators and facilities. Overall, the situation of rural tourism in these regions requires significant improvement and development. Measures such as attracting investment in the tourism sector, reducing accommodation costs, increasing income and job creation, supporting handicrafts, developing tourist accommodations, and enhancing hospitality and welfare services can substantially improve rural tourism conditions and contribute to sustainable economic and social development.

In general, the tourism approach can be effective for sustainable rural development. This conclusion is based on the results of structural equation modeling. The most effective indicators of tourism for sustainable rural development in semi-arid regions include investment in the tourism sector, tourism advertising, and income and job creation for residents. The results of the research are supported by the studies of Petrović et al. (2018), Ibănescu et al. (2018), Liu et al. (2023), Najmi & Vali Shariat Panahi (2010), Ghanbari et al. (2013), and Shahbazi & Mousavi (2023). These studies also reference the effects of the tourism approach and its role in sustainable rural development. Therefore, rural tourism, as a development approach, can have various economic, social, and environmental effects within the framework of sustainable development. Tourism represents an integrated and systematic approach involving various elements and indicators. Focusing on a single dimension of these indicators (such as economic) can impact other development sectors (social and environmental). Consequently, the integrated nature of the tourism approach to rural development can be effectively utilized to promote the sustainable development of semi-arid rural areas. In general, semi-arid rural regions of Iran can address some of their existing challenges through tourism planning, thereby providing a foundation for enhanced livability and improved development indicators. Another important point in this context is the need for a systematic and integrated perspective in rural management with a tourism approach, ensuring the involvement of all local stakeholders, including the government and the private sector. Therefore, the following recommendations are made:

Implement rural development policies and plans with a focus on tourism in the region.

Develop tourism-oriented projects in rural areas by utilizing existing tourism capacities, such as hospitality, biodiversity, and tourist attractions.

Strengthen facilities and infrastructure to support both tourism and rural development.

Prioritize advertising as a central strategy to highlight the potential of the target community.

Encourage private sector investment to enhance tourism facilities.

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Conflict of Interest

The authors declared no conflicts of interest.

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