



Analyzing the Role of Local Community Engagement in the Governance of Small-Scale Natural Systems (Local Governance, Sustainable Tourism, and the Regeneration of Rural Ecosystems)

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Abstract

Participation in the governance of decentralized, small-scale natural systems has been widely explored as an approach to sustainable development and environmental management, particularly in local contexts. Given the inherently local character of the Sistan region (Iran), one promising strategy to support environmental conservation and local culture—while simultaneously revitalizing and renewing villages, preventing migration and unemployment, and enhancing infrastructure, welfare, services, and healthcare—is the development of sustainable eco-villages. Although numerous scientific studies have examined the management of tourist villages and ecosystems in other countries, similar research adopting a participatory approach involving local communities remains scarce in Iran. This study aims to investigate the level of participation, attitudes, and decision-making preferences of local residents and a panel of local experts regarding the development of tourist villages in the Sistan region, with a focus on sustainability and environmental management. Accordingly, 289 surveys were conducted in 2024 among local stakeholders, indigenous residents, and non-indigenous tourists in the Sistan region. The findings indicate that villages with tourism potential and ecological compatibility are generally preferred by individuals aged between 35 and 55 years, who also tend to have higher levels of education and income. These individuals express a strong desire to be involved in decision-making and local urban governance. Self-sufficiency and economic prosperity, utilization of natural potentials, and enhancement of social sustainability—such as adopting sustainable lifestyles and experiencing authentic rural living—are identified as the most influential factors encouraging tourist participation in establishing sustainable eco-villages. Furthermore, factor analysis revealed that among the various dimensions of eco-village and environmental characteristics, the economic and natural aspects hold the greatest significance. Specifically, among the different factors examined, "self-sufficiency and economic prosperity" ranked the highest in importance.

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Introduction

Participatory governance in decentralized systems involves the active engagement of citizens and various community members in local decision-making and management processes. This governance approach is founded on the principles of decentralization, which devolve power to the local level to enable communities to make their own decisions. The goal is to enhance transparency, build trust, and increase public involvement in civic matters. For this approach to be effective, participants must have adequate information and access to opportunities for engagement. This model is used to foster sustainable development, boost public trust, and create a direct link between people and governing bodies.

The importance of this kind of participatory governance lies in its ability to establish a direct connection between citizens and local authorities, increase transparency and public trust, and support sustainable development. It allows people to play an active role in decisions that affect their urban and local lives, thereby improving public affairs. One viable activity in rural and local areas is the creation of ecotourist villages, where local residents and officials can play a significant role (Salehi & Shateri, 2024).

Recent global economic, social, technological, and environmental changes have highlighted the need to differentiate activities, services, and consumer habits. With the rise of new types of tourism, new centers of attraction, and a return to nature and natural products, this study focuses on tourist villages that are both sustainable and eco-friendly. These villages are poised to become new living spaces and tourist hubs in the future, with local participation being key. Such an approach not only improves the economic situation but also creates local areas that are compatible with nature and the environment (Sadeghi&Jadiri Abbasi, 2015).

The Sistan region of Iran, despite its natural potential, historical richness, and social capital, has faced significant economic, environmental, and social crises in recent years. This necessitates proper planning and policies that involve public participation to overcome these challenges. In this research, the eco-village model is considered as a comprehensive framework for creating tourist villages and achieving sustainable development in the region. Implementing the eco-village model requires a bottom-up process involving the participation of visitors, residents, and local institutions, which brings about sustainability in all its dimensions for the target villages.

Therefore, the main objective of this paper is to gain insights into the perspectives and participation of domestic and foreign visitors, local expert panels, village headmen (Dehyars), and academic experts on the establishment of an eco-village area in the Sistan region. Specifically, this study aims to examine the perceptions and attitudes of visitors and local residents toward creating eco-villages and to identify the important factors that influence their preference for nature and eco-friendly villages. The study also investigates the relationship between visitor demographics and their attitudes toward the local management of tourist and eco-villages. Furthermore, local community participation in tourism governance is a key focus of this study, as it helps increase public trust, improve resource management, and ensure the equitable distribution of economic benefits, all of which are fundamental pillars of sustainable development in rural areas (Silva et al., 2024).

A Framework for Local Community Participation in the Governance of Small-Scale Natural Systems in the Sistan Region

Community participation in the governance of decentralized, small-scale natural systems in the Sistan region, with an emphasis on sustainable rural development and ecotourism, can be outlined within the following framework:

1. Decentralized Governance and Social Participation as a Foundation for Sustainable Development

Decentralized governance, by distributing power to the local level, provides the basis for active participation of rural communities in decision-making related to natural resource management and economic development. This approach, which is rooted in local knowledge and traditional lifestyles, not



only helps preserve the environment but also ensures that development is community-driven and based on local needs and values. By empowering people in the design of strategies, this model guarantees that progress is authentic and sustainable.

2. Sustainable Rural Development: Intersecting Indigenous Knowledge and Appropriate Technology

A sustainable development model for Sistan's villages requires integrating modern science with indigenous knowledge. The participation of villagers in the use of eco-friendly technologies (such as traditional irrigation systems or local renewable energy) while leveraging their socio-economic capabilities creates a foundation for self-sufficiency and reduces reliance on external resources. This process, by strengthening a sense of ownership and responsibility, helps to reduce migration and enhance rural well-being.

3. Ecotourism (Eco-village) as a Participatory Model

The management of an eco-village in Sistan is a concrete example of decentralized governance where villagers, as key stakeholders, play a crucial role in the design and implementation of tourism projects. This model, which emphasizes the preservation of the cultural and natural fabric of villages and the creation of sustainable economic opportunities (e.g., local eco-lodges), requires comprehensive participation from villagers in intellectual, financial, and executive aspects. Studies show that tourists also cite authentic experiences and interaction with sustainable rural lifestyles as the main attraction of these areas.

4. Social Capital and Its Role in Livability

Social capital, which includes networks of trust and cooperation among villagers, is a necessary prerequisite for the success of decentralized governance. In the Sistan region, local institutions like the Red Crescent Society, by mobilizing volunteers and providing crisis management training, exemplify the strengthening of social capital. These organizations can expand their activities into the fields of environment and tourism, facilitating public participation in natural resource conservation and attracting tourists.

5. Challenges and Future Solutions

Despite existing potential, challenges such as weak infrastructure, a lack of specialized training, and the absence of transparent mechanisms for distributing tourism benefits hinder effective participation. A key solution is to create legal and financial frameworks that guarantee villagers' share of tourism revenues, while simultaneously empowering them through technical and managerial training programs. This requires collaboration among government agencies, the private sector, and non-governmental organizations. In sustainable rural development, the strategy and development model must originate from within the community, drawing inspiration from the deep-seated thoughts of the villagers. Therefore, the use of science, indigenous knowledge, and the application of appropriate technologies, along with placing people at the center and ensuring their participation in all intellectual, physical, and financial aspects, are considered crucial for sustainable development. Without these criteria, progress in rural development cannot be achieved. The management of ecotourism (eco-village) is a type of rural tourism that requires participatory governance of decentralized, small-scale natural systems in the villages of the Sistan region. This approach allows villagers to play an active role in local decision-making, thereby improving public affairs.

This theoretical framework demonstrates that the sustainable development of Sistan's villages depends on decentralized governance, active public participation in all stages of planning and implementation, and the integration of indigenous knowledge with compatible technologies. The eco-village model, as an innovative approach, not only enhances the livability of villages but also breaks the vicious cycle of migration and natural resource degradation by creating employment and preserving the environment. The success of this model is contingent on strengthening local institutions, ensuring transparency in benefit distribution, and investing in education. The following table lists the assessment criteria for local villages in Sistan, highlighting their potential for tourism and effective management.

**Table 1.** Assessment Criteria for Local Villages in Sistan

Main Criteria	Specific Indicators			
Economic	Production of traditional rural crafts, carpet weaving, agriculture, livestock farming, beekeeping, etc.	Special types of soil and wind (wind turbines)	Having tourism capabilities	Breeding of special species of plants, livestock, etc.
Environmental	Unique natural places and areas	Visual landscapes		
Socio-Cultural	Distinctive ways of life	Village management	Age and history of the village	
Physical (Structural)	Use of indigenous materials in construction	Compatibility with the climate	Village architecture	
Historical	Existence of historical buildings	Historical events that have occurred	Age and history of the village	

Many believe that local actions are the most effective means of achieving ecological communities and a sustainable society. For this reason, in recent years, a sustainable management and ecological design approach has been adopted in urban neighborhoods to shift away from modern development methods (Barton, 2000). In this context, the eco-village model is a global response to the need for local action to build a sustainable, ecological community. Etymologically, "eco-village" is made up of two words: "eco" and "village" (Oxford Dictionaries, 2020). "Eco" means "home," "habitat," or "environment," and "village" means "a group of houses and associated buildings, larger than a hamlet and smaller than a town, situated in a rural area." Therefore, the term "eco-village" literally means a "harmonious ecosystem village" or "eco-village" (Khayrkhah & Nemati Mehr, 2021, p. 80). The design process for eco-villages is participatory and interactive, balancing public opinion with expert planning. In eco-villages, community members themselves plan and make decisions collectively, defining their goals and values as a group. Eco-village planners believe that building a sustainable community is an ongoing process that requires continuous attention at all stages of development, including visioning, planning, and implementation. Today, there is no single universally accepted method for how to build eco-villages; each group follows a process tailored to its unique characteristics, local conditions, and goals. Based on a review of the literature, there are ten essential features of eco-villages and tourist villages (Bates, 2003; Jackson & Svenson, 2002):

- Eco-villages recognize the importance of community.
- Eco-villages offer on-site job opportunities to residents and tourists.
- Eco-villages are not tied to a specific ecology.
- Eco-villages use the latest technologies, such as passive solar design and homes that utilize natural insulation.
- Eco-villages require planned architecture and landscaping.
- Villages are planned in a way that eliminates the need for polluting, vehicle-based public transportation.
- Eco-villages have specific social contracts or social management plans.
- Eco-villages provide affordable housing for their residents.
- Eco-villages reflect an awareness of nature.
- Local people and the local government are essential for successful eco-villages.

Materials and Methods

This study is an applied research project that used qualitative strategies to achieve its objectives. The theoretical section involved reviewing and extracting the principles of eco-villages through a textual analysis of existing literature (a documentary method). For the field study, a simple random sample of 289 individuals was selected in 2024. Research data were collected and compiled using questionnaires and in-person interviews. The validity of the questionnaire was established through content validity based on the opinions of experts and



specialists. To determine its reliability, a pilot study was conducted on 30 questionnaires using Cronbach's Alpha in SPSS v23, which yielded a value of 0.88. This value indicates a suitable level of internal consistency and reliability for the questionnaire. The validity of the questionnaires was also considered in two ways: first, major indicators were extracted from previous theoretical studies, and second, these indicators were confirmed by a panel of 10 relevant local experts and specialists. Furthermore, to assess the normality of the studied variables, the standard error of skewness and kurtosis coefficients was used. As a general guideline, a skewness and kurtosis value between -1.5 and +1.5 indicates a higher probability of normal data distribution, while a value smaller than -2 or larger than +2 suggests a lower probability of normality. Based on the results, all studied variables were found to be normally distributed. Data analysis was performed using Exploratory Factor Analysis (EFA) and a SWOT model. The ranking of factors was conducted using the Analytic Hierarchy Process (AHP) technique.

Research Findings

Demographics and Awareness

The demographic characteristics of the participants are detailed in Table 2. The results show a balanced gender distribution, with most respondents being married, middle-aged (35-55), and holding a university degree. Their income levels generally fell between 8 and 15 million [currency unit]. The participants were from various provinces, including Sistan and Baluchestan (Sistan, Zahedan, Chabahar, Iranshahr) as well as non-native provinces like Yazd, Gorgan, Birjand, and Mashhad, who had traveled to the Sistan region. Approximately 79% of the respondents demonstrated an understanding and knowledge of eco-villages. This awareness was particularly high among middle-aged individuals with higher education and income levels, who shared the common belief that eco-villages are a viable concept.

Attitudes and Preferences

There was a notable relationship between the desire to spend holidays in eco-villages and the variables of gender and income. Female respondents showed a greater inclination to live in sustainable eco-villages than their male counterparts. When participants were asked about their prior experience, over half (71%) had never been to a sustainable eco-village, while the remaining 29% had. A strong majority (95%) expressed a willingness to see eco-villages designed in the area and to spend their holidays there.

Table 2. Demographic Characteristics of the Study Sample

Variable	Category	Count	Percentage
Gender	Male	152	52.50
	Female	137	47.50
Marital Status	Married	160	55.30
	Single	129	44.70
Education	High School Diploma and Below	99	34.30
	University Degree	190	65.70
Age	17-34	111	38.30
	35-55	139	48.10
	60 and Above	39	13.60
Average Income	Below 8 million	150	51.90
	8-15 million	109	37.10
	Above 15 million	30	11

Respondents were asked to state their opinions and level of participation on various issues concerning local ecosystem management and eco-villages. In Table 3, the results of the analysis of variance (ANOVA), including mean values, standard deviations, and F-test statistics, are presented. Based on the reported F-value for the first statement, it can be concluded that there is no significant difference in opinions and levels of participation among individuals from different cities. The findings suggest that "ecovillages will become future public spaces, new lifestyles, and centers for sustainable leisure in areas related to environmental sustainability," where people can actively engage through empowerment, decision-making, and local



management. Regarding the second statement—that ecovillages are effective and feasible solutions for overcoming social, ecological, and emotional distress—no significant differences were found among respondents from various cities. In other words, all participants in the study agreed that ecovillages demonstrate an environmentally friendly way of life suited for the modern era, and that everyone should have a role in the decision-making and management processes of these sustainable, ecosystem-compatible communities. For the third statement, respondents expressed the highest overall mean score, indicating that "management and participation in establishing ecologically compatible villages will have negligible negative impacts on the environment." Given that the ANOVA result was not statistically significant ($F = 1.6$), this perception was consistent across respondents from different provinces, showing no notable regional variation.

Participants were also asked: "Are you willing to spend more money on the sustainable development and environmental management of local ecovillages compared to other places?" The findings for this statement were statistically significant at the 95% confidence level, indicating differences in responses. Post-hoc multiple comparison tests were conducted to identify any significantly different provincial groups. The results revealed that respondents native to the province showed a significantly higher willingness to pay compared to non-native respondents (e.g., from Yazd, Gorgan, etc.), who generally have greater access to recreational, ecotourism, and tourism facilities. Additionally, the idea of "paying more" was particularly supported by married tourists, individuals with higher income levels, and those aged over 55. Finally, regarding the statement that "ecovillages have more positive impacts on the local economy compared to other areas," no significant differences were found among respondents from different provinces. This indicates a general consensus that ecovillages can positively influence rural economies.

Table 3. Comparison of Mean Values of Tourist Opinions on Nature-Compatible Eco-Villages

Statement/Idea	Region/Province	Mean	St.D.	F-Value	Significance
Eco-villages will be future living spaces and leisure centers.	Sistan and Baluchestan (Native)	3.85	0.843	0.45	0.55
	Other provinces (Non-native)	3.81	0.865		
Eco-villages represent an effective way to overcome social, environmental, and emotional depressions and show us a new eco-friendly way of life.	Sistan and Baluchestan	3.8	0.765	1.3	0.11
	Other provinces	2.85	0.643		
Eco-villages will have minimal adverse environmental impacts compared to other areas.	Sistan and Baluchestan	3.9	0.745	1.6	0.31
	Other provinces	3.5	0.793		
Would you be willing to pay more for a holiday in an eco-village than for a mass-tourism package holiday?	Sistan and Baluchestan	3.55	0.724	5.6	0.002
	Other provinces	2.55	0.793		
Eco-villages will have a positive impact on the local economy compared to other areas.	Sistan and Baluchestan	3.76	0.724	6.7	0.001
	Other provinces	3.45	1.03		

As shown in Table 4, respondents were asked to indicate their priority preferences for ecovillage attractions and activities. The results revealed that the most preferred attractions were "locally adapted sustainable farming activities" (35.5%), followed by "local food and beverage outlets" (22.6%) and "local food and handicraft markets" (19.6%). Other notable preferences included "bicycle and walking trails" (7.5%), "recreational workshops" (6.8%), and "natural sports fields" (5.5%). In contrast, the least preferred options were "exhibition centers" (0.7%), "community libraries" (1.5%), and "sports centers and halls" (1.3%), indicating significantly lower priority among respondents. These findings highlight a strong preference for agricultural, culinary, and nature-based local experiences, while more formal or institutional facilities received considerably less interest.

**Table 4.** Decision-making priorities for ecovillage attractions/activities and improvement of local village public affairs

Activity / Attraction	Number of Respondents	Percentage
Locally adapted sustainable farming activities	289	35.50
Local food and beverage outlets	289	22.60
Local food and handicraft markets	289	19.60
Bicycle and walking trails	289	7.50
Recreational workshops	289	6.80
Natural sports fields	289	5.50
Exhibition centers	289	0.70
Community libraries	289	1.50
Sports centers and halls	289	1.30

Participation in the Decision-Making and Management of Ecovillages: An Effective Approach Toward Sustainable Rural Development

Following an assessment of the perspectives of expert panels and tourists from the Sistan region, it became evident that ecovillages in this area possess both the demand and potential necessary for establishing sustainable, ecosystem-compatible communities. Given the recent prolonged droughts and environmental challenges in the region, participatory decision-making and active community involvement in developing ecovillages can unlock significant economic, environmental, and social opportunities. Table 5 outlines the key design dimensions and principles of ecovillages as perceived by domain experts.

Table 5. Dimensions and Design Principles of Ecovillages from the Perspective of Local Experts and Specialist Panel

Dimension	Indicator	Statement / Principle
Economic	- Emphasis on local economy - Strengthening the role of tourism - Enhancing residents' affordability - Securing funding for the local community	Localization and self-reliance, economic sustainability, housing diversity and affordability, establishment and encouragement of local production enterprises, generation of livelihoods compatible with local conditions, saving and investing in local community funds, keeping money circulating within the ecovillage (local currency or barter systems), and economic localization.
Environmental	- Energy efficiency and use of clean energy sources - Environmentally harmonious construction - Local and organic food production - Improvement of infrastructure - Conservation and restoration of natural potentials	Use of renewable energy sources and waste recycling; responsible and non-harmful use of natural resources; protection of organic agricultural resources; development of public transportation; energy and water conservation; wastewater treatment and reuse; use of local building materials; local and organic food production; green construction and retrofitting; consumption of local and organic food; application of appropriate technologies for water and energy; integrated, systems-based ecological design; use of clean energy; biodiversity conservation; promotion of ecological business principles; product lifecycle assessment; and preservation of soil, water, and climate.
Social	- Strengthening social cohesion and interactions - Promoting healthy and hygienic lifestyles - Meeting local residents' needs - Enhancing safety and security - Encouraging social participation and fostering a sense of belonging	Fostering personal relationships and communication among community members; involving residents in social decision-making; cultivating a vibrant local life; promoting healthy lifestyles; creating a supportive local community; reducing dependency on government aid; community-led development and planning; resident interaction and cooperation; establishing a comprehensive local healthcare system; encouraging diverse groups to migrate to the community; promoting creativity and art; individual empowerment and leadership; conflict resolution and communication; building inclusive communities and embracing diversity; knowing and connecting with others; sharing public resources and mutual aid; emphasis on preventive and primary healthcare; ensuring food access for all; and providing lifelong learning and education opportunities to strengthen solidarity.

Given the variety of statements, exploratory factor analysis (EFA) was employed to categorize the research criteria into meaningful underlying factors. Exploratory factor analysis is widely used in new or emerging research areas where no pre-established theoretical framework exists. In this study, since there was no prior basis for grouping the criteria into specific factors or categories, EFA was deemed an appropriate method to



uncover the latent structure among the variables. In this process, all variables were entered into the analysis to determine how they load onto potential factors. In other words, EFA helps reduce the number of variables by identifying patterns of correlation and grouping them into a smaller number of interpretable factors. However, the validity and reliability of EFA depend on two essential prerequisites: adequate sample size and sufficient correlations among variables. To ensure these conditions are met, two preliminary tests are commonly used: the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The KMO value obtained in this study was 0.85, which indicates that the data are highly suitable for factor analysis. According to Kaiser's criteria, KMO values above 0.8 are considered "meritorious," suggesting that the correlations between variables are strong enough to proceed with EFA. Additionally, Bartlett's Test of Sphericity yielded a chi-square value of 3288, which was statistically significant (p -value ≈ 0.000 , well below the significance level of $\alpha = 0.05$). This result rejects the null hypothesis that the correlation matrix is an identity matrix (i.e., variables are uncorrelated), confirming that there are significant intercorrelations among the variables—further justifying the use of factor analysis.

Table 6. KMO Measure and Bartlett's Test of Sphericity

Test	Value
Bartlett's Test of Sphericity	0.85
	$\chi^2 = 3288.93$
	df = 91
	p-value < 0.001

Following the assessment of sampling adequacy using Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure, the analysis proceeded to examine and interpret the number of eigenvalues (also known as latent roots) to determine the underlying factor structure. As shown in Table 7, the third column presents the eigenvalues derived from the correlation matrix. The eigenvalue represents the amount of total variance explained by each individual factor. In factor analysis, the total variance across all variables is equal to 100% (or numerically, equal to the number of variables when standardized). The higher the eigenvalue of a factor, the more variance it accounts for in the dataset. As indicated in Table 7, the first factor has an eigenvalue of 6.79, meaning it explains a substantial portion of the overall variance. The subsequent eigenvalues for other factors are also listed in the same column, showing a decreasing trend. The third column also shows the percentage of variance explained by each factor, calculated by dividing the eigenvalue of that factor by the total number of variables (or total variance) and multiplying by 100. This provides a clear indication of each factor's relative contribution to the overall data structure. According to the widely used Kaiser's criterion, only factors with eigenvalues greater than 1 are considered meaningful and retained for interpretation. In this analysis, three factors met this criterion (eigenvalues > 1). Together, these three components account for 68.67% of the total variance. This percentage is considered acceptable in social science and exploratory research contexts, as it indicates that the three extracted factors effectively capture a significant portion of the underlying patterns in the data. Generally, the closer this cumulative percentage is to 100%, the more comprehensively the factors represent the original variables. While 68.67% does not explain all variance, it reflects a solid and interpretable factor solution, especially given the complexity of human behavior and perception variables involved.

Table 7. Summary Statistics of the Three Extracted Factors

Row	Factor	Eigenvalue	Percentage of Variance	Cumulative Variance (%)	Eigenvalue After Rotation	Variance Percentage After Rotation
1	First	6.79	48.52	48.52	4.41	31.55
2	Second	1.71	12.25	60.78	4.03	28.80
3	Third	1.1	7.89	68.67	1.16	8.32

In Table 8, principal component analysis was conducted using Varimax rotation, resulting in the decomposition of components into orthogonal (uncorrelated) factors. Following rotation, the factor loadings for each variable



across the three retained factors were obtained, allowing for a clearer interpretation of the underlying structure. Based on the magnitude of the factor loadings—i.e., the correlation between each indicator and its underlying factor—appropriate labels or thematic titles were assigned to each factor. The higher the absolute value of the factor loading, the greater the contribution of that factor to explaining the variance of the corresponding variable.

Table 8. Varimax Rotation Method and Rotated Component Matrix (Pattern of Factor Loadings)

Factor	Factor Label	Indicator	Factor Loading
1	Self-Reliance and Local Economic Development	Emphasis on local economy	0.85
		Securing funding for the local community	0.84
		Strengthening the role of tourism	0.81
		Enhancing residents' affordability	0.8
2	Sustainable Development and Environmental Management (Utilization of Natural Potentials)	Energy efficiency and use of clean energy sources	0.81
		Local and organic food production	0.79
		Environmentally harmonious construction	0.89
		Conservation and restoration of natural potentials	0.76
		Improvement of infrastructure	0.78
3	Promotion of Social Sustainability	Strengthening social cohesion and interactions	0.75
		Promoting healthy and hygienic lifestyles	0.74
		Meeting local residents' needs	0.74
		Enhancing safety and security	0.72
		Encouraging social participation and fostering a sense of belonging	0.7

Based on the SWOT matrix, it can be said: The Sistan region has notable strengths—such as its strategic border location, rich cultural heritage, historical sites, and natural attractions—that provide a solid foundation for ecovillage and sustainable tourism development. However, these advantages are counterbalanced by significant weaknesses, including environmental degradation, water scarcity, poor infrastructure, and limited investment returns. The region holds promising opportunities in job creation, local industry revival, and cross-border trade, especially through the activation of the free trade zone. Yet, these are threatened by environmental damage, land speculation, cultural conflicts, and seasonal limitations. Therefore, leveraging strengths to seize opportunities, while addressing weaknesses and mitigating threats, is essential for sustainable rural development in Sistan.

Table 9. SWOT Analysis

Strengths	Weaknesses	Opportunities	Threats
Strategic location on the Afghanistan border, enabling cross-border trade and international tourism.	Poor soil quality, limiting agricultural productivity and sustainability.	Potential for job creation through the establishment of ecovillages.	Air pollution caused by increased transportation and vehicle traffic.
Use of local, indigenous building materials that are climate-adaptive, cost-effective, and environmentally friendly.	Frequent dust storms and the notorious "120-day winds," affecting health, visibility, and quality of life.	Opportunity to host local festivals, craft fairs, and cultural exhibitions in the Sistan region.	Destruction of agricultural and orchard lands due to land-use changes.
Presence of historical and archaeological sites (e.g., Shahr-e Sukhteh, Deh-e Now, Gholaman), offering strong potential for cultural and heritage tourism.	Lack of inflow from the Helmand River, leading to water scarcity and ecological imbalance.	Potential to strengthen and develop cultural and sports infrastructure.	Risk of ethnic and regional social tensions arising from interactions between tourists and local communities.



Strengths	Weaknesses	Opportunities	Threats
Religious pilgrimage sites that attract visitors and support spiritual tourism.	Drying up of the internationally recognized Hamoun Wetland, resulting in biodiversity loss and environmental degradation.	Potential to attract civil development funding and infrastructure investments.	Negative impacts on the traditional fabric and character of rural communities.
Mount Khajeh as a natural landmark, ideal for mountaineering, hiking, and adventure tourism.	Low return on investment, discouraging long-term capital inflow.	Potential to revive local industries, especially rubber, pipe manufacturing, and agro-processing.	Risk of rising land prices due to increased demand and speculation.
Rich mineral reserves, particularly copper mines at Jajarm, offering industrial and economic development potential.	Cultural differences and potential conflicts between tourists and indigenous communities.	Leveraging the border location to expand foreign services and goods.	Environmental degradation due to unregulated development and resource exploitation.
Presence of the country's first deep exploratory wells in the Sistan region, indicating geological and research significance.	Lack of adequate welfare facilities, services, and essential infrastructure.	Improved market access for rural products and crafts, enhancing employment opportunities.	
	Shortage of long-term accommodation options for tourists and workers.	Growing interest from mountaineers and outdoor athletes in Mount Khajeh.	
	Inadequate transportation networks and connectivity.	Faster activation of the Sistan Free Trade Zone.	
	Lack of skilled management and marketing expertise in tourism within the region.		
	Traditional agriculture and animal husbandry practices with limited modernization.		
	Seasonal limitations in tourism due to dust storms, wind, and lack of river inflow.		

Discussion and Conclusion

Decision-making in rural tourism management and the enhancement of local ecosystems can significantly contribute to the social, economic, and environmental development of rural communities, while aligning with sustainable environmental policies. The villages of the Sistan region, with their rich cultural and historical heritage—including archaeological sites such as Shahr-e Sukhteh, Deh-e Now, and the Jajarm copper mines—possess substantial potential for developing into sustainable tourism and ecovillage destinations. To fulfill this potential, ecovillages have emerged as alternative settlements and sustainable lifestyles that can strengthen the environmental, economic, social, and cultural conditions of the region. However, the key question remains: *How can local governance and the active participation of villagers, local councils, and indigenous people be effectively integrated into the decision-making and management processes of ecovillage development?* The findings of this study provide the following insights:

First, tourists perceive ecovillages as "centers for organic farming" and "hubs of sustainable living." Therefore, ecovillages should not be designed merely as tourist attractions or temporary retreats. Instead, they must be planned as permanent, livable communities where local residents and stakeholders reside year-round. This permanent habitation is essential to distinguish the ecovillage model from conventional rural tourism and to ensure authenticity, continuity, and community ownership.

By embedding local people at the core of planning and management, ecovillages can avoid becoming commodified or externally driven projects. Rather, they can evolve into models of self-reliance, ecological resilience, and cultural preservation, where sustainability is not just a theme for visitors, but a lived reality for residents.



This study underscores that successful ecovillage development in Sistan requires a participatory, community-led approach—one that empowers locals as decision-makers, not just beneficiaries. When rural communities are actively involved in shaping their future, ecovillages can become powerful tools for rural revitalization, environmental restoration, and socio-cultural empowerment, paving the way for a truly sustainable and inclusive model of rural development. Second, the findings indicate that the concept of ecovillages as new sustainable living spaces and centers for eco-tourism is particularly supported by individuals aged 35–55 years who have higher education levels and higher household incomes. This demographic appears to be both more willing and financially able to pay premium rates for sustainable rural development initiatives compared to other groups. If ecovillages are to be introduced as a novel development model in the Sistan region, this group—alongside local authorities—should be considered a primary target audience. Providing them with comprehensive information, accessible participation opportunities, and transparent decision-making channels can enhance public trust, strengthen community engagement, and foster direct collaboration between citizens and governmental institutions.

Moreover, this study reveals that women demonstrate a greater inclination than men toward participation in decision-making and express stronger support for the management and establishment of ecovillages. This finding is consistent with previous research by Haqizadeh et al. (2018), which also reported higher environmental awareness and community engagement among women in rural development contexts. Another key finding is that local residents and people from neighboring cities are willing to play an active role in decisions affecting their local lives and express a readiness to invest financially in improving public services and communal infrastructure. Notably, the idea of "paying more" for sustainable development is especially supported by married, middle-aged (35–55), high-income tourists, suggesting a viable economic base for funding ecovillage initiatives through voluntary contributions or premium eco-tourism packages. Furthermore, the results of the exploratory factor analysis (EFA) identified three key dimensions that define the ecovillage model in this region:

- Self-Reliance and Local Economic Revitalization
- Sustainable Development and Environmental Management (including utilization of natural potentials)
- Promotion of Social Sustainability

Among these, the economic and environmental sustainability dimensions emerged as the most influential, reflecting the urgent need for livelihood creation and ecological restoration in the drought-affected Sistan region. This prioritization aligns with the findings of Yavarian (2022), who emphasized the centrality of environmental and economic resilience in sustainable rural planning in arid zones. This study presents the development of rural tourism villages and ecovillages as a strategic response to the need for local action in building ecologically sustainable communities and promoting decentralized governance in small-scale natural systems within the Sistan region of Iran. The emergence of ecovillages is framed as a grassroots movement responding to the decline of rural communities, offering a model for sustainable rural development and environmental stewardship. An ecovillage is a small-scale, closely-knit community where residents live in strong social cohesion and maintain a harmonious relationship with the natural environment. This finding resonates with the work of Silva et al. (2024), who describe ecovillages as intentional communities that integrate ecological, social, and cultural sustainability through participatory design and local autonomy. The primary goal of establishing ecovillages is to advance sustainable human settlements and achieve environmental, economic, social, and cultural sustainability. As such, the ecovillage model offers a viable and contextually appropriate framework for empowering local communities in Sistan to respond effectively to existing rural challenges—including water scarcity, unemployment, environmental degradation, and outmigration.

By embedding local participation, economic self-reliance, environmental responsibility, and inclusive governance, ecovillages can serve not only as models of sustainability, but also as catalysts for rural regeneration—transforming vulnerable communities into resilient, empowered, and ecologically conscious societies. In conclusion, decision-making regarding the integration of ecovillage principles and ecotourism



offers a promising approach to sustainable development and environmental management, particularly in local and rural contexts such as the Sistan region. This integrated model not only supports ecological conservation but also fosters economic revitalization, social cohesion, and community empowerment. However, successful implementation requires careful planning, adequate investment, and strong collaboration between local authorities and communities. Establishing effective decentralized governance systems at small ecological scales depends on shared responsibility, transparency, and active citizen participation. Without such cooperation, even well-designed initiatives may fail to achieve long-term sustainability. Moreover, future efforts should focus on:

- Attracting domestic and foreign investment to support sustainable infrastructure and eco-friendly enterprises;
- Promoting practical, high-impact environmental projects with quick returns to build public trust and momentum;
- Incorporating ecovillage development plans into national and regional strategies, with active endorsement and execution by local councils (Shorayari) and regional policymakers.

By recognizing ecovillages not merely as isolated pilot projects but as scalable national models, decision-makers can drive systemic change in rural development. With committed leadership, community involvement, and strategic investment, the ecovillage-ecotourism framework can become a cornerstone of resilient, sustainable, and inclusive rural transformation in Iran and similar arid, marginalized regions worldwide.

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