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Original Article

Evaluating of Factors Inhibiting the Activity of Nomadic Cooperatives in Fars Province: Solutions for Rural-Nomadic Development of the Region

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Abstract

Purpose- This study aimed to evaluate the factors inhibiting the performance of nomadic cooperatives in Fars Province, Iran, and to identify the major barriers affecting their effectiveness using a sequential exploratory mixed-methods approach.

Design/methodology/approach- The research employed a sequential exploratory mixed-methods design. In the qualitative phase, semi-structured interviews were conducted with 40 members of nomadic cooperatives selected through snowball sampling until theoretical saturation was achieved. The interview data yielded 62 initial concepts, which formed the basis for developing a researcher-made questionnaire. In the quantitative phase, data were collected from 380 cooperative members selected through simple random sampling. The questionnaire consisted of respondents' demographic characteristics and items measuring the identified barriers using a five-point Likert scale. Data were analyzed using descriptive statistics and exploratory factor analysis (EFA) in SPSS.

Findings- Exploratory factor analysis identified 11 principal factors with eigenvalues greater than one, explaining 86.19% of the total variance in barriers to the performance of nomadic cooperatives. Economic barriers accounted for the largest share of explained variance, followed by educational and knowledge, managerial, legal–political, organizational, social, cultural, skills, market and marketing, infrastructural, and ecological barriers. Key challenges included limited financial resources, inadequate access to credit, weak managerial capacity, insufficient training, administrative complexity, low member participation, poor marketing systems, inadequate infrastructure, and environmental constraints such as drought and water scarcity.

Research limitations/implications- The study focused exclusively on nomadic cooperatives in Fars Province, which may limit the generalizability of the findings. Future research is recommended to examine cooperatives in other regions using comparative and longitudinal approaches.

Originality/value- While previous studies have mainly focused on rural cooperatives, limited attention has been given to nomadic cooperatives in Iran. By integrating qualitative exploration with quantitative validation, this study provides a comprehensive framework for identifying and prioritizing the barriers affecting nomadic cooperatives. The findings offer practical insights for policymakers and cooperative managers to strengthen financial support, managerial capacity, education, infrastructure, and institutional policies, thereby enhancing the sustainability of nomadic cooperatives and contributing to rural–nomadic development.

Keywords- Inhibiting Factors, Nomadic Cooperatives, Mixed Research Methods, Fars Province.

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1. Introduction

Today, cooperatives play an important role in economic development via multiple channels, particularly, in developing countries' cases (Paudel & Acharya, 2022). A new Cooperatives Act, which is based on international cooperative principles, was lawfully signed by the SA government in August 2005. This Act foresees a major role for cooperatives in promoting social and economic development, more especially by creating employment, income, economic empowerment and eradicating poverty (Mangoejane & Christian, 2025).

Therefore, today, sociologists have turned more attention to cooperatives and partnerships as a way to help reduce poverty, increase employment, and empower poor people in developing countries (Lanzi, 2023). The World Summit on Social Development, held in 1995, and the United Nations General Assembly resolution adopted in 1996, recognized the importance of cooperatives in a people-centered approach to social development (Samian et al., 2017). Cooperatives have gained prominent attention in recent years as strategic elements to achieve social cohesion and sustainable economic development social cohesion in the context of neoliberal globalization (Bretos & Marcuello, 2017).

According to the International Cooperative Alliance,1 more than eight hundred million people in the world today are organized into cooperatives spanning a wide range of activities, including economic ones (Reyes & Harnecker, 2013).

Studies conducted on agricultural cooperatives indicate that cooperatives play an important role in important decision-making (Pakrah et al., 2020). For this reason, special emphasis has been placed on cooperatives in the development process of various countries, as well as in the Iranian Constitution and socio-economic development programs (Ansari Renani, 2016).

In recent years, the increase in economic, social, and environmental challenges in cities and the rise in living costs have increased the tendency of urban dwellers to reside and invest in rural areas (Behi et al., 2026). This trend has made it more necessary to pay attention to sustainable rural development, because the sustainability of villages requires simultaneous attention to economic, social, cultural, and environmental dimensions and strengthening the spatial organization of rural settlements (Moahammadi & Nasrollahizadeh, 2021).

Rural life depends on the economy and production, and livelihood plays a decisive role in the formation of the spatial and physical organization of rural houses. In fact, human settlements, after the transition from a nomadic lifestyle, have been formed and developed mainly on the basis of agriculture, animal husbandry, and related activities (Rezaei et al., 2025). It is also worth noting that Iran, as one of the first and most important origins of the settlement of nomadic societies, villages have always played a fundamental role in the development of human settlements (Shekari et al., 2022). The main strategies for economizing activities in nomadic societies lead to comprehensive development and the realization of a resistance economy and support for domestic production. The first step for the development of these societies is to involve nomads in economic activities. This can lead to attracting the participation of nomads in the resistance economy through the implementation of a plan for nomad organizations such as nomad cooperatives (Baseri et al., 2010).

As a type of exploitation system, nomadic cooperatives play a fundamental role in the qualitative growth of the conditions of the exploiters in economic and social fields through cooperation and cooperation, and have been directly effective in reducing poverty through the economic and social progress of the members and indirectly through economic mobility and the development of the social foundations of the communities in which they operate. According to surveys, in recent years, 225 nomadic cooperatives have been established nationwide, of which 23 are located in Fars province. This province, which houses 12.5 percent of the country's nomadic population, is considered the first nomadic province in the country (General Directorate of Nomadic Affairs of Fars, 2022). The nomads of Fars province play a key role in providing a large part of the province's protein and livestock products, and their share in this field is far greater than their population ratio. Despite the significant production of agricultural and livestock products by this productive group, disregard for their economic status has been the main factor in migration and the decline of the nomadic

population. This situation has led to widespread livelihood problems among the nomads. In such circumstances, cooperatives are considered an efficient and tested solution. These organizations can help maintain social cohesion, pool small capital, facilitate resource management, and establish effective communication with government institutions. Therefore, maximizing the potential of nomadic cooperatives as economic and social units, accurately identifying the challenges they face, and providing continuous support, guidance, and supervision to these grassroots organizations is of great importance. On the other hand, based on the basic results of the last census of nomadic tribes conducted by the Statistical Center of Iran using the registration-based method and published in 1400, the nomadic population of Fars province is 120,684 winter quarter and 118,080 summer quarter, with the share of women in this population being 56,348 (46.7 percent) and 55,356 (46.9 percent), respectively, which indicates a gender ratio of about 113 men to women in the nomadic community of Fars province (Statistical Center of Iran, 2025).

These cooperatives play an undeniable role in the economic, social and cultural structure of nomadic societies, therefore, it is essential to utilize all the existing fields and capacities of nomadic cooperatives as economic and social units, to accurately identify the issues facing them, to guide, support and monitor these popular organizations, and to evaluate and identify the drivers and inhibitors of their activities. On the other hand, due to the special characteristics of the nomadic society, including their nomadic nature and dispersion in different parts of Fars province, no research has been conducted on this society, especially in the field of nomadic cooperatives. However, the conflict between the high potential of nomadic cooperatives and their actual performance is due to the lack of accurate understanding of the inhibiting factors. Since the cultural and geographical characteristics of these communities differ from general agricultural patterns, there is an urgent need to specifically identify these barriers to the transition to sustainable development. Therefore, it is an undeniable necessity to pay attention to nomadic cooperatives and identify the inhibitors of their activities in order to achieve corrective solutions. The present study was designed to answer the fundamental question: What is the main Inhibiting to the activity of nomadic cooperatives in Fars Province? To achieve this goal, the research process includes the stage of collecting qualitative data through in-depth interviews and subsequently analyzing and categorizing the findings through exploratory analysis.

2. Research Theoretical Literature

There has been a great diversity in rural development policies over the past half century (Zasada & Piorr 2015). These policies and strategies include community development (Shaturaev 2021) intensive agricultural development (Ruiz and Dumont 2012), integrated rural development (Leakey 2017), livelihood approaches (Jagger et al. 2012), and a variety of participatory methods, such as rapid rural assessment and participatory rural assessment, sustainable development approaches, and cooperative development (Ashley & Maxwell, 2001; Ataei & Zamani-Miandashti, 2017). A cooperative is an independent association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled economic enterprise. This definition is important because cooperatives are autonomous and self-organizing (Scholz & Calzada, 2021).

In development programs related to nomads, efforts have also been made to support and increase the production sector quantitatively by using government support and the capacity of cooperative companies. Following the creation of some environmental restrictions for the rangeland-based production and livestock system, the use of government resources and nomad capital has been taken in the form of government support and the capacity of cooperative companies. The government has tried to support and organize nomads in the five-year development programs by considering the characteristics and status of nomads, while maintaining their production capabilities and providing services to nomads in order to promote public and social welfare in an appropriate manner and with the participation of nomads and without increasing government ownership. So that it can improve the main development indicators in nomads as a result (Pakrah et al., 2020).

In this regard, in 1982, the Nomadic Affairs Organization established the Union of Nomadic Cooperatives to delegate affairs to the nomads with the aim of reducing government ownership and establishing healthy commercial relations and supplying nomad products. The statutes of these cooperatives are multi-purpose in order to provide numerous social and economic services to the nomads. The tasks listed below show that cooperatives can have many fields, the most important of which are: providing livestock inputs, providing facilities, loans or credit to members, marketing nomad products, carrying out production activities such as producing concentrates and growing fodder, providing public services such as providing basic goods needed by members, implementing and developing educational and promotional programs, and carrying out related projects in the nomad community (Jafary, 2013).

Most cooperatives face several problems, including lack of financial support, poor management, and lack of competitive markets to sell their products (Mhembwe and Dube, 2017). Issues such as lack of employee discipline due to lack of an attendance management system, large number of competitors, low employee capability, decreasing number of members, high number of inactive members, lack of member loyalty, and failure to pay cooperatives on time for product sales affect cooperative performance (Harisudin et al., 2020). Various studies have been conducted to identify inhibitors of cooperative activity, which are briefly introduced below.

In a study Abdolmaleki (2015), based on factor analysis, it showed that the obstacles to the formation and development of walnut production cooperatives in Hamedan province were divided into seven groups, which, respectively, lack of cultural infrastructure, insufficient knowledge and incorrect opinions of producers and leaders, inadequate laws and vulnerability, and infrastructural obstacles had the greatest impact on the formation and development of walnut production cooperatives.

The authors such as Sebhatu et al. (2021), Maksimova et al. (2021) They have showed that the deterrent nature of agricultural credit cooperatives is determined by two groups of factors: exogenous (financial instability, lack of institutional conditions, excessive requirements from the Bank of Russia) and endogenous (confidence of agricultural producers, lack of financial and digital literacy in rural areas) In research, Hessam and Mahmodi (2024) examined the obstacles to the establishment and development of rural cooperatives in Gilan province. it shows that the five core categories of institutional-management, economic, social-cultural, awareness, and laws are the most important obstacles, respectively.

In a study, Baldacchino et al. (2018) analyzed the barriers to the development of cooperatives in Malta. The results of their study showed that lack of education and awareness are the main barriers to the development of cooperatives in this country. They suggested that for the growth and development of cooperatives, addressing the lack of education and awareness and increasing the level of cooperation between cooperatives in order to overcome the challenges.

The research of Najafi et al. (2024) showed that among the performance dimensions of rural producer cooperatives, improving the livelihood of members is the most important component and has the highest factor load. Also, among the management dimensions, leadership was recognized as the most effective factor in improving the performance and management of cooperatives. The findings of the quantitative part of Ataei & Izadi's (2015) research in Fars Province showed that eight variables: board accountability, cooperative management performance, member training, drought, social participation, awareness of cooperative principles, satisfaction with the board of directors, and social trust, are collectively able to predict 80 percent of the changes in the dependent variable. Qualitative findings also revealed that seven factors: economic, environmental, social, human capital, management, support and training were affecting factors on success of rural cooperative.

In a study by Barati et al. (2017), a combined method (ANP-SWOT) in Iran. According to results, 19 key strategic factors such as lack of management knowledge, and ability to improve value and supply chains were identified. Also, identified 11 strategic alternatives which among them Implement public policy and provide technical and financial services, Facilitate procurement of inputs and develop supply and value chains and Involve rural cooperatives, had

greater priority in Iran. According to the findings of Brandão and Breitenbach (2019), Three categories of problems were verified in the management of agricultural cooperatives: political and institutional, behavioral and technical-administrative.

In a study by Zhu et al. (2018) they examined agricultural cooperatives in Mongolia. The results of the study showed that the most important economic and financial problems faced by cooperatives include lack of liquidity of cooperatives, lack of bank facilities, and long-term.

In a study by Ton et al. (2016) organizational challenges and organizational environment were examined, and a comparative analysis of dairy cooperatives in Kenya and Morocco was conducted. The results of the study indicated that there are two major organizational challenges, namely effective quality assurance systems and attractive and affordable payment methods for members. The ways to overcome these challenges were also stated as strengthening the internal organizational structure of the cooperative sector, public support with favorable policies and regulations, and facilitating multilateral platforms.

3. Research Methodology

3.1 Geographical scope of the research

Fars Province is a vast mountainous region whose heights follow the great Zagros mountain range. The Fars Zagros Mountains complex with deep valleys and relatively green plains in the Fars part on the 27 to 30 degrees north latitude is known as the widest region of the Zagros. The height of the Fars Zagros decreases from the northeast to the southwest, which plays a significant role in the diversity of weather and the change in climatic conditions. The heights of northern Fars with an altitude of more than 3300 meters above sea level are very effective in changing the weather. This province has an area of more than 133,000 square kilometers and enjoys three types of noticeable climates: cold, warm and temperate, and dozens of unique regional features and benefits from the potential facilities of nature.

Fars nomads have a total of 3,081,631 head of light livestock and 13,012 head of heavy livestock in the province. The most important products of the nomads of Fars province include meat, dairy products, handicrafts, and medicinal plants. nomad roads are one of the most important livelihood infrastructures of the nomad community, which the nomads use to move from the summer quarter to winter quarter or vice versa. On this route, which takes about two months, the fodder on the route is used for the livestock and they are gradually transferred from the hot region to the cold region or vice versa. During this period of time, the pressure on the summer quarter and winter quarter pastures is reduced (Iranian Nomad Affairs Organization 2025). Figure 1 shows a map of Fars province.

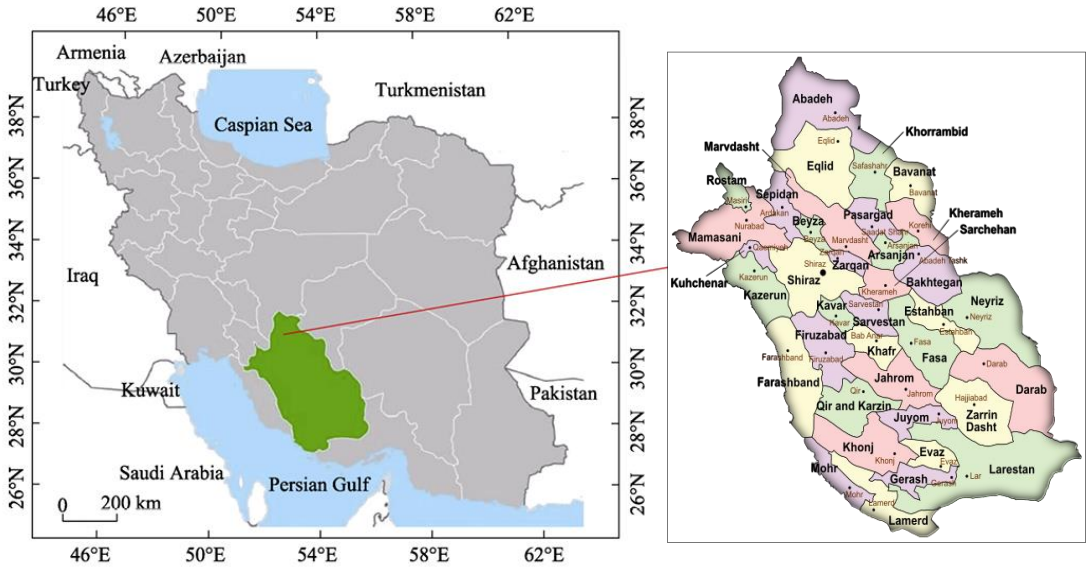


Figure1. Location of the study area (Fars Province)

3.2 The first phase of research

The present study used an integrative research approach. The main idea of the integrative method, which is also referred to as a multi-method or mixed method approach. According to Creswell and Plano-Clark (2011), a mixed methods research design includes its own philosophical assumptions and research methods. Combining qualitative and quantitative data allows us to analyze research problems in a meaningful way. Also, this method provides a deeper understanding of the details of the problem (Dawadi et al. 2023). The qualitative part of the research aimed to identify the inhibitors of the activity of nomadic cooperatives in Fars province. The statistical population related to identifying the inhibitors of the activity of nomadic cooperatives was the members of the board of directors, managing directors, inspectors of cooperative companies and key members of nomadic cooperative companies. Sampling was carried out using the snowball method and continued until theoretical saturation was reached. Accordingly, 40 board members, managing directors, inspectors of cooperative companies, and key members of the companies were selected as a sample. The data collection tool in the qualitative phase of the research was a semi-structured interview (in-depth interview) that was formed by a set of questions and topics, and the interviews were recorded. These interviews continued until the point of theoretical saturation and until the statistical samples no longer revealed new information and the topics became repetitive. The data analysis from the research was conducted using content analysis. Content analysis is also conducted in such a way that field notes and all the writings collected from the interviews are reread and the inhibitors of the activities of nomadic cooperatives are extracted in the interviews.

3.3 The second phase of research

The quantitative part of the research was conducted with the aim of prioritizing the inhibitors of the activity of nomadic cooperatives and ultimately identifying the most important inhibitory factor. In this phase of the research, the research method was applied in terms of its purpose and non-experimental in terms of the data collection method, a survey type. The statistical population related to this part was the members of nomadic cooperatives in Fars province. According to official statistics from the General Directorate of Nomadic Affairs of Fars Province (2023), Fars Province includes 23 cooperative companies, and according to the latest information received, the number of cooperative members is 38,315. The sample size of the study was estimated to be 380 members based on the Krejci and Morgan minimization table. The sample size of the research was estimated to be 380 members based on the Krejci and Morgan minimization table. After estimating the total sample size, a percentage of the sample size was allocated to them in proportion to the total number of members in each cooperative. The data collection tool in this part of the research was a structured and researcher-made questionnaire that measured the inhibitors of the activity of nomadic cooperatives. and in order to ensure the reliability of the questionnaire and the consistency within the questions, Cronbach's alpha coefficient was calculated for the preliminary study. The alpha value obtained (0.868) from each phase of the questionnaire indicates the reliability of the questionnaire and the internal consistency of the items.

In order to collect data, 380 questionnaires were distributed among members of nomadic cooperatives in Fars province. After checking the completeness of the responses, 380 questionnaires were used for the final analysis. In this phase of the research, after collecting and classifying the data using SPSSver24 software, descriptive statistics (mean, standard deviation and frequency) and inferential statistics (exploratory factor analysis) were used to analyze the data.

4. Findings

4.1 Qualitative Findings

In this phase of the research, initially, by conducting content analysis and interviews with board members, managing directors, inspectors of cooperative companies and key members in the companies and studying the collected information line by line, the factors inhibiting the activities of nomadic cooperatives were extracted. The responses of the audience to the semi-structured questions during the individual interviews, as well as other topics that were raised during their conversations, were reviewed word by word in the text and the key issues raised were extracted in separate parts. In this way, the results of the interviews with (40) board members, managing directors, inspectors of cooperative companies and key members in the companies, a total of 62 factors were identified and extracted

4.2 Quantitative Findings

Descriptive analysis of findings related to the inhibitors of the activities of nomadic cooperatives showed that the lack of attention and investment of the cooperative in economic activities and production works with a mean of 3.86 and a standard deviation of 0.34 ranked first among 62 inhibitors, and the lack of attention of the cooperative to the educational needs of its members, the lack of awareness and recognition of the members of the existing principles and laws governing the cooperative system, and the lack of awareness and recognition of the members of the existing principles and laws governing the cooperative system were ranked 2nd to 4th, respectively. Also, the item of occasional drought and its direct impact on the profit of cooperatives was ranked last with a mean of 1.92 and a standard deviation of 1.29. The complete results are presented in (Table 1).

Table 1. Description and prioritization of inhibitors to the activity of nomadic cooperatives

Factors inhibiting the activity of nomadic cooperatives	Average rank*	Standard deviation	Coefficient of variation	Priority
1. Lack of attention and investment by the cooperative in economic activities and production work	3.86	0.34	0.08	1
2. The cooperative's lack of attention to the educational needs of its members	4.75	0.43	0.09	2
3. Lack of awareness and recognition by members of the existing principles and laws governing the cooperative system.	4.17	0.41	0.09	3
4. Limited access to financial resources and lack of liquidity to carry out activities	3.10	0.30	0.09	4
5. The spirit of individualism in cooperatives (lack of members' involvement and expression of opinions in cooperative issues, resulting in blind reliance on the actions of cooperative bodies)	4.59	0.49	0.10	5
6. Failure to provide adequate cooperative services to members	3.80	0.40	0.10	6
7. Lack of diversification in the activities of nomadic cooperatives by managers	2.96	0.31	0.10	7
8. Price fluctuations in the market and instability in the price of raw materials	4.51	0.54	0.11	8
9. Lack of long-term and medium-term plans in cooperative companies	4.48	0.50	0.11	9
10. Lack of fair allocation of livestock inputs between rural and nomadic cooperatives	4.42	0.52	0.11	10
11. Lack of fair distribution of facilities among cooperatives and reduction of facilities provided by the cooperative administration to nomadic cooperatives	4.41	0.49	0.11	11
12. Lack of awareness among members of nomadic cooperatives about the rights and obligations arising from membership	4.36	0.48	0.11	12
13. Inability to attract livestock inputs due to high indebtedness of cooperatives	4.17	0.49	0.11	13
14.Failure to attract investors in capital-intensive cooperative projects	4.07	0.46	0.11	14
15. Small membership and weak financial strength of nomads to increase cooperative capital	3.79	0.42	0.11	15
16. Low level of education of cooperative members and CEOs	3.76	0.42	0.11	16
17. Weakness in training cooperative managers and employees	4.53	0.58	0.12	17
18. Inexperience of CEOs	4.41	0.56	0.12	18

Factors inhibiting the activity of nomadic cooperatives	Average rank*	Standard deviation	Coefficient of variation	Priority
19. Lack of a strong financial management system in cooperatives	4.27	0.52	0.12	19
20. Limitation of the scope of activity of cooperative companies	4.12	0.52	0.12	20
21. Failure to provide the necessary training by the General Directorate of Cooperatives and other training centers in developing the activities of nomadic cooperatives and improving economic efficiency.	4.05	0.51	0.12	21
22. Lack of conditions for efficient competitiveness among nomadic cooperatives	2.98	0.37	0.12	22
23. Failure to distribute profits and notify them to members in some cooperative companies	4.42	0.61	0.12	23
24. Lack of allocation of national and provincial funds for the development of cooperative activities	4.24	0.56	0.13	24
25. Cumbersome rules and regulations for new members to join the cooperative	4.12	0.57	0.13	25
26. Lack of organizational discipline in the cooperative	3.59	0.49	0.13	26
27. Unequal base of cooperative members	3.52	0.49	0.13	27
28. The cooperative's lack of knowledge of marketing and market management principles (identifying customers and sales policies)	3.29	0.45	0.13	28
29. Lack of access of nomadic cooperatives to the required facilities and equipment	4.20	0.61	0.14	29
30. Distribution of members covered by cooperatives in various nomadic areas	3.98	0.57	0.14	30
31. Failure to select specialized and skilled individuals in the bodies of nomadic cooperatives	3.71	0.54	0.14	31
32. Lack of close and continuous communication between members and the relevant cooperatives	3.50	0.50	0.14	32
33. The cooperative's failure to achieve pre-defined goals and plans (such as planning for the development and sustainable export of livestock products through the utilization of all capacities)	3.47	0.50	0.14	33
34. The complexity of administrative bureaucracy in carrying out cooperative-related matters	3.32	0.47	0.14	34
35. Lack of continuous monitoring of various training courses and their quantitative and qualitative evaluation by the Cooperatives Affairs Department of the General Directorate of Nomadic Affairs of Fars and the Extension Management of the Agricultural Jihad Organization	4.14	0.64	0.15	35
36. Lack of attention from cooperative administration officials to cooperative problems	4.23	0.71	0.16	36
37. Inability to repay bank facilities	3.94	0.65	0.16	37
38. Inflation in society and the company's ever-increasing current costs	3.71	0.63	0.16	38
39. Low level of education of cooperative members	3.61	0.61	0.16	39
40. Failure to fully implement the provisions of the statute by cooperative officials	3.93	0.67	0.17	40
41. Job dissatisfaction of cooperative members	3.67	0.65	0.17	41
42. Lack of a healthy economic culture in cooperatives (rents, cronyism, and bribery)	3.52	0.61	0.17	42
43. Cultural weakness of cooperative members in carrying out collaborative and collective work	3.60	0.67	0.18	43
44. Weakness of marketing services in nomadic	3.43	0.66	0.19	44

Factors inhibiting the activity of nomadic cooperatives	Average rank*	Standard deviation	Coefficient of variation	Priority
cooperatives in Fars province (good intermediaries, cold storage and warehouses, etc.)				
45. Lack of modern technology in cooperatives (such as creating electronic sales platforms and creating electronic monitoring platforms)	3.96	0.85	0.21	45
46. The presence of powerful intermediaries and brokers in the cooperative economy	4.25	1.02	0.24	46
47. Lack of strong supervision and timely control from the provincial cooperative affairs and Nomad affairs departments	3.27	0.81	0.24	47
48. Lack of serious cooperation between the government sector and the cooperative sector and officials' reliance on idealistic slogans without providing operational tools and grounds.	3.89	0.99	0.25	48
49. Lack of complete independence of nomadic cooperatives and unnecessary government interference in cooperatives	3.10	0.80	0.25	49
50. Lack of sufficient cultural development in establishing cooperative thinking among members	3.53	0.93	0.26	50
51. Lack of support for the sale of manufactured products due to distance from the sales market	3.84	1.07	0.27	51
52. Traditional thinking and management in nomadic cooperatives	3.23	0.88	0.27	52
53. High costs of hiring the human resources required by the cooperative	3.23	0.93	0.28	53
54. Weakness of cooperative CEOs in providing economic, legal and technical information to company members	3.98	1.16	0.29	54
55. Low level of livestock disease control by cooperatives	3.25	0.97	0.29	55
56. Lack of active participation of member group leaders in the cooperative's general assembly	3.331	1.01	0.30	56
57. Low skills of cooperative sellers in attracting customers and making profits	3.28	0.99	0.30	57
58. Lack of number of cooperative stores	3.45	1.16	0.33	58
59. Nomads' tendency to buy from private stores instead of cooperatives (due to the lack of price difference)	2.94	1.00	0.34	59
60. Lack of support from members for cooperative activities	2.05	1.29	0.62	60
61. Weak social interactions among cooperative members	2.08	1.38	0.66	61
62. Occasional droughts and their direct impact on cooperative profits	1.92	1.29	0.67	62

The average range is from 1 to 5 (Source: Research findings)

In order to analyze and identify the components and inhibitors of the success of nomadic cooperatives, the KMO coefficient and Bartlett test were used. Accordingly, the initial statistical calculations of the research showed that the necessary conditions for conducting factor analysis, namely the determinant of the correlation matrix being greater than zero to find out the inhomogeneity of the variables, KMO greater than 0.5 to know the adequacy of the number of samples and the significance of the Bartlett test, which indicates the existence of a correlation between the variables, exist. Based on the research findings, the KMO value is equal to 0.832 and the Bartlett statistic value is equal to 45514.049 with a significance level of 0.0001, indicating the suitability of the variables entered for the analysis (Table 2).

Table 2. Amount of statistics required for factor analysis

KMO	0.832
Bartlett's Test	45514.049
Sig	0.0001

Principal component analysis was used to analyze the factors of the questionnaire on the obstacles to the success of nomadic cooperatives. Then, the Varimax rotation method was used to analyze the possible factors that underlie the questionnaire. To determine whether the questionnaire is saturated with several significant factors, three main indicators were used, which are: 1) the eigenvalue, 2) the proportion of variance explained by each factor, and 3) the eigenvalue diagram, which is called the Scree test. Figure 2 shows the Scree test. As can be seen in this diagram, 11 factors can be observed whose eigenvalues are greater than 1. It can also be concluded that the contribution of factor one in explaining the variance of the total questions is higher than the contribution of other factors.

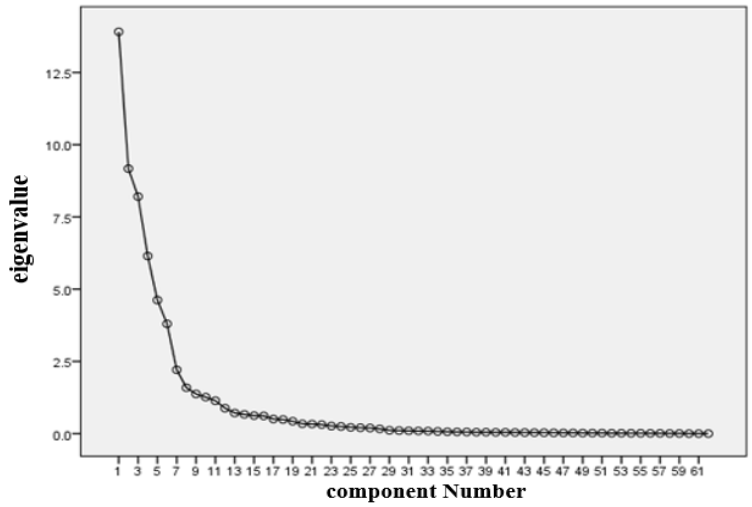


Figure 2. Scree Plot

According to the results obtained in Table 3 from the principal component analysis, initially 11 factors with eigenvalues greater than 1 were extracted, which explained 86.191 percent of the variance changes. After selecting the factors, their rotation is necessary. The purpose of rotating the factors is to achieve a simple factor structure. In factor analysis, there are multiple factor structures for a correlation matrix. The first factor is usually a general factor on which all or most of the variables have a high factor loading. The results of the principal component analysis and Varimax rotation showed that in this model, 11 factors were obtained according to the number of eigenvalues greater than 1, which in total explain 86.191 percent of the total variance of the obstacles to the success of nomadic cooperatives, and 13.809 percent of the remaining variance is related to factors that were not identified through factor analysis.

Table 3. Extracted factors along with the eigenvalue of variance after factor rotation

Factor	Eigenvalues	Percentage Variance	Cumulative variance percentage
1	12.288	19.819	19.819
2	7.880	12.710	32.528
3	7.173	11.570	44.098
4	6.853	11.054	55.152
5	3.658	5.900	61.052
6	3.371	5.473	66.489

Factor	Eigenvalues	Percentage Variance	Cumulative variance percentage
7	2.993	4.828	71.317
8	2.856	4.607	75.924
9	2.526	4.075	79.998
10	2.314	3.732	83.731
11	1.526	2.461	86.191

After examining the variables related to each factor and their factor loadings, the variables covered by the main factors were shown in the table below. In Table 4, the variables of each factor are arranged based on the factor loading.

Table 4. Variables related to each factor and factor loading obtained from the inhibitors of the activity of nomadic cooperatives

Factors	Variables	Factor Loading
(1) Economic Inhibitors	Lack of attention and investment in cooperatives for economic activities and production work	0.661
	Limited access to financial resources and lack of liquidity to carry out activities	0.863
	Failure to attract investors in capital-intensive cooperative projects	0.846
	Failure to distribute profits and notify them to members in some cooperative companies	0.625
	Inability to repay bank facilities	0.516
	Inability to attract livestock inputs due to high indebtedness of cooperatives	0.678
	Inflation in society and the company's ever-increasing current costs	0.730
	Small membership and weak financial strength of nomads to increase cooperative capital	0.626
	High costs of hiring the human resources required by the cooperative	0.619
	Nomads' tendency to buy from private stores instead of cooperatives (due to the lack of price difference)	0.527
(2) Educational and knowledge inhibitors	Lack of awareness and recognition by members of the existing principles and laws governing the cooperative system.	0.935
	Lack of awareness among members of nomadic cooperatives about the rights and obligations arising from membership	0.847
	Low level of education of cooperative members	0.890
	Weakness in training cooperative managers and employees	0.900
	Low level of education of cooperative members and CEOs	0.920
	The cooperative's lack of attention to the educational needs of its members	0.947
	Failure to provide the necessary training by the General Directorate of Cooperatives and other training centers in developing the activities of nomadic cooperatives and improving economic efficiency	0.859
	Weakness of cooperative CEOs in providing economic, legal and technical information to company members	0.961
(3) Management Inhibitors	Inexperience of CEOs	0.810
	Lack of a strong financial management system in cooperatives	0.792
	Traditional thinking and management in nomadic cooperatives	0.832
	Lack of conditions for efficient competitiveness among nomadic cooperatives	0.847
	Limitation of the scope of activity of cooperative companies	0.854
	Lack of continuous monitoring of various training courses and their quantitative and qualitative evaluation by the Cooperatives Affairs Department of the General Directorate of Nomadic Affairs of Fars and the Extension Management of the Agricultural Jihad Organization	0.870
	Failure to provide adequate cooperative services to members	0.878

Factors	Variables	Factor Loading
	Lack of attention from cooperative administration officials to cooperative problems	0.808
	Lack of strong supervision and timely control from the provincial cooperative affairs and Nomad affairs departments	0.798
	Lack of diversification in the activities of nomadic cooperatives by managers	0.884
	Low level of livestock disease control by cooperatives	0.912
(4) Legal and political Inhibitors	Lack of fair distribution of facilities among cooperatives and reduction of facilities provided by the cooperative administration to nomadic cooperatives	0.866
	Lack of fair allocation of livestock inputs between rural and nomadic cooperatives	0.565
	Cumbersome rules and regulations for new members to join the cooperative	0.685
	The complexity of administrative bureaucracy in carrying out cooperative-related matters	0.627
	Lack of allocation of national and provincial funds for the development of cooperative activities	0.827
	Lack of serious cooperation between the government sector and the cooperative sector and officials' reliance on idealistic slogans without providing operational tools and grounds.	0.792
	The presence of powerful intermediaries and brokers in the cooperative economy	0.663
	Lack of complete independence of nomadic cooperatives and unnecessary government interference in cooperatives	0.619
(5) Organizational Inhibitors	Lack of organizational discipline in the cooperative	0.797
	Failure to fully implement the provisions of the statute by cooperative officials	0.606
	Failure to fully implement the provisions of the statute by cooperative officials	0.896
	Lack of long-term and medium-term plans in cooperative companies	0.904
(6) Social Inhibitors	Weak social interactions among cooperative members	0.621
	Job dissatisfaction of cooperative members	0.652
	Lack of close and continuous communication between members and the relevant cooperatives	0.853
	Unequal base of cooperative members	0.876
	Lack of support from members for cooperative activities	0.873
(7) Cultural Inhibitors	Lack of sufficient cultural development in establishing cooperative thinking among members	0.572
	Lack of a healthy economic culture in cooperatives (rents, cronyism, and bribery)	0.589
	Lack of active participation of member group leaders in the cooperative's general assembly	0.586
	Cultural weakness of cooperative members in carrying out collaborative and collective work	0.774
	The spirit of individualism in cooperatives (lack of members' involvement and expression of opinions in cooperative issues, resulting in blind reliance on the actions of cooperative bodies)	0.831
(8) Skill Inhibitors	Failure to select specialized and skilled individuals in the bodies of nomadic cooperatives	0.807
	Low skills of cooperative sellers in attracting customers and making profits	0.603
(9)	Price fluctuations in the market and instability in the price of raw	0.825

Factors	Variables	Factor Loading
Market and marketing inhibitors	materials	
	The cooperative's lack of knowledge of marketing and market management principles (identifying customers and sales policies)	0.698
	Weakness of marketing services in nomadic cooperatives in Fars province (good intermediaries, cold storage and warehouses, etc.)	0.600
(10) Infrastructure Inhibitors	Lack of modern technology in cooperatives (such as creating electronic sales platforms and creating electronic monitoring platforms)	0.764
	Lack of number of cooperative stores	0.540
	Lack of access of nomadic cooperatives to the required facilities and equipment	0.792
(11) Ecological inhibitors	Distribution of members covered by cooperatives in various nomadic areas	0.828
	Occasional droughts and their direct impact on cooperative profits	0.822
	Lack of support for the sale of manufactured products due to distance from the sales market	0.751

5. Discussion and Conclusions

Cooperatives, especially nomadic cooperatives, play a vital role in the sustainable development of communities and help empower individuals by relying on the principles of self-help and cooperation. Due to the specific challenges faced by nomadic communities, these cooperatives can reduce economic risk, facilitate access to markets, and provide essential services and training. However, several barriers affect their success. Identifying these barriers is essential for designing effective interventions and optimal allocation of resources, and can contribute to the sustainability of cooperatives. In the present study, which was conducted with the aim of identifying the inhibitors of the activity of nomadic cooperatives, in order to systematically compare the findings of the present study with the results of previous studies, a summary of this comparison is presented in Table 5. Then, each of the identified factors is discussed and interpreted in detail.

Table 5. Comparison of the findings of the present study with previous studies

Findings of the present study	Previous research	Comparison result
Economic Inhibitors	Zhu et al. (2018), Sebhatu et al. (2021), Maksimova et al. (2021)	Both studies have identified economic problems, lack of capital, and lack of financial stability as the most important obstacles to the success of cooperatives.
Educational and knowledge inhibitors	Abdolmaleki (2015), Baldacchino et al. (2018)	The importance of training, knowledge promotion, and empowerment of members and managers has been confirmed in both studies.
Management Inhibitors	Zhu et al. (2018), Najafi et al. (2024)	This finding aligns with previous studies indicating that management weaknesses, such as lack of experience and managerial inefficiency, are key limiting factors for the performance of cooperatives.
Legal and political Inhibitors	Sebhatu et al. (2021), Maksimova et al. (2021), Brandão and Breitenbach (2019)	This finding aligns with previous studies, indicating that regulatory complexity, the multiplicity of policymaking institutions, and weak legal protections are significant barriers to the development of cooperatives.
Organizational Inhibitors	Hessam and Mahmodi (2024), Ton et al. (2016)	This finding aligns with previous studies, indicating that structural weaknesses and organizational performance issues have a negative impact on the success of cooperatives
Social Inhibitors	Hessam and Mahmodi (2024), Brandão and Breitenbach (2019)	his finding aligns with previous studies, indicating that social factors and declining member participation are key barriers to cooperative activities.
Cultural Inhibitors	Hessam and Mahmodi (2024)	This finding aligns with previous studies, indicating that a weak culture of participation and cooperation reduces the efficiency of cooperatives.

Skill Inhibitors	Baldacchino et al. (2018)	This finding aligns with previous studies, indicating that a lack of specialized and professional skills is a barrier to the success of cooperatives.
Market and marketing inhibitors	Mhembwe and Dube (2017), Harisudin et al(2020)	This finding aligns with previous studies, indicating that weak marketing and limited market access are major challenges for cooperatives.
Infrastructure Inhibitors	Abdolmaleki (2015)	This finding aligns with previous studies, indicating that a lack of infrastructure and equipment limits the performance of cooperatives.
Ecological inhibitors	Ataei and Izadi's (2015)	This finding aligns with previous studies, indicating that environmental and climatic conditions are significant barriers to the activities of nomadic cooperatives.

The first factor was named the economic inhibitory factor, according to the components in which it was placed, and it is able to explain 19.819 percent of the variance. In interpreting this research finding, it can be stated that capital is a very important factor that strengthens the foundations and sustainability of cooperative companies. Among the economic inhibitors, the most important pest that threatens the life of cooperatives is the lack of credit and financial capital of cooperatives and the failure to apply appropriate methods to solve this problem. In the absence of sufficient capital, the cooperative is practically unable to apply modern production methods. The government needs to take various measures, including direct participation, regulating the prices of domestic products, supporting exports, and supporting activists and investors in this sector, to address the economic problems of cooperatives. It is important to note that government support for nomadic cooperatives must be provided within a specific time frame and scope.

The second factor was called the educational and knowledge inhibitory factor, which explains 12.710 percent of the variance .It goes without saying that education is considered as a major infrastructure in the cooperative system. Education plays an undeniable role in the development and training of thoughts, the results of which will be evident in the long term. But the point is that in educating members of nomadic cooperatives, issues such as productivity and exploitation of opportunities, legal education, and training related to creative thinking, management, and leadership should be seriously considered.

The third factor is Management Inhibitors, which explain 11.570 percent of the variance. The lack of managerial experience of the CEO and their low executive power have caused the management department to lack the necessary efficiency. This situation could be the result of the CEO not taking the necessary training courses to manage a complex institution such as a cooperative. The results and effects of these management problems extend to all areas of cooperative activity. In particular, the lack of empowerment and training of board members has caused these individuals to lack sufficient awareness of their duties and responsibilities and to perform poorly during planning and decision-making. On the other hand, the lack of practical planning skills and the lack of specialized and up-to-date knowledge in the management of cooperatives, such as ignorance of the capacity of laws and regulations supporting cooperatives, lack of creativity, and lack of use of technology, have caused the lack of a programmatic approach in the prevailing management, the absence of long-term policies and plans for the management of cooperatives, and the cooperative is managed on a daily basis. In such a situation, the capacity and potential of the cooperative is not recognized and the maximum capacity of the cooperative will not be utilized. In addition, the lack of a strong performance evaluation system to control the performance of the cooperative management and its compliance with laws and regulations causes the spread of factionalism in the management of the cooperative and unhealthy practices prevail in it. The inability of managers leads to the incorrect implementation of plans and the use of inappropriate executive mechanisms, and the implementation of measures will be based on imprecise management and will be accompanied by trial and error. Due to the lack of a precise monitoring and evaluation system, sometimes the cooperative's manager or board of directors clash with experts and inspectors.

The fourth factor was named Legal and political Inhibitors, which explains 11.054 percent of the

variance. Like many sectors, the cooperative sector also suffers from multiple and parallel institutions in policymaking in this sector. The Ministry of Security, the Ministry of Cooperatives, Labor and Social Welfare, the Cooperative Chamber, the Ministry of Agriculture, the Rural Cooperative Organization of Iran, various cooperative supervision and coordination unions, and the Urban and Rural Consumer Cooperative Organization are some of the policy-making organizations in the cooperative sector, which in some cases have conflict or disagreement between their policies. One of the fundamental and important problems that the Iranian economy has been acutely involved with in recent years has been the broker-oriented and intermediary-oriented economy. In an economy based on brokerage and speculation, the productive sector suffers the most, and the economic mechanism is driven towards price bubbles and severe fluctuations. One of the main obstacles to the successful implementation of policies in various sectors, especially the cooperative sector, is excessive legal or administrative formalities, in other words, the process of issuing licenses, activities, attracting investment is long, and many of the phases and processes of issuing licenses are unnecessary, which is why it is essential for the responsible agencies to pay attention to this issue.

The fifth factor was named organizational inhibitors, which explains 5.900 percent of the variance. The sixth factor was called social inhibitors, which explained 5.473 percent of the variance. Hessam and Mahmodi (2024), Brandão and Breitenbach (2019) also reached a similar conclusion in their research and introduced social inhibitors as an effective factor in the failure of cooperatives.

The seventh factor was named cultural inhibitors, which explains 4.828 percent of the variance, One of the concerns of nomadic cooperatives is the indifference of members to the fate of the cooperative, or in other words, the cultural weakness of cooperative members in carrying out cooperative and collective work, which will gradually lead to the decline and bankruptcy of these economic enterprises. The participation of members in decision-making in cooperative affairs brings many benefits, but since most members have become members of cooperatives to use cooperative facilities and meet professional needs, they do not have much desire to participate in its affairs. On the other hand, most members do not consider the cooperative company their own and consider it a government institution that is responsible for meeting their needs. Therefore, they do not have effective participation in cooperative decision-making and programs. Cooperatives need the participation and consensus of all members to grow and develop, and therefore, cooperative members should be considered as like-minded individuals and not just as profit-seeking individuals. Therefore, if members continue to turn away from continuing participation and cooperation, the main burden falls on the shoulders of the CEO, accountant, and warehousemen. In these circumstances, cooperative members do not consider the company their home and in many cases, instead of helping to build the future of the cooperative company, they destroy it. With the decline in social capital and individualism, the spirit of people's participation in cooperative activities has decreased. Whenever individualism increases in a society along with distrust, the spirit of collective work and cooperative activity in that society also weakens.

The eighth factor was called skill inhibitors, which includes the lack of selection of specialized and skilled individuals in the pillars of nomadic cooperatives and the low skill of cooperative sellers in attracting customers and making profits, which explains 4.607 percent of the variance.

The ninth factor was named market and marketing inhibitors, which explained 4.075 percent of the variance. All these studies have shown that cooperatives are unsuccessful in finding out about suitable markets and identifying customers. The existence of a suitable market for products is effective in improving the income level of members. Today, there are few nomadic cooperative companies in Fars province that have paid attention to online network marketing by relying on cultivating the creative power of members or their managers, or even provided the grounds for it. Wherever the distance between the consumer and the producer decreases, the share of nomads in income increases and they move towards greater justice. Marketing of nomad products is one of the development requirements in these societies and should be seriously considered.

The tenth factor was named infrastructure inhibitors, which explains 3.732 percent of the

variance. The use of new technologies enables companies and related individuals to, while trying to acquire and become familiar with the policies and programs developed at the macro and upstream levels, also employ new knowledge and advanced technological methods, and by improving the level of general knowledge and social awareness, bring more inclusive groups and groups of society into the field of struggle to achieve the expected results of the programs.

The eleventh factor was named ecological inhibitors and explained 2.461 percent of the variance. Since the activity of most cooperatives has been in the field of production and employment in the production and agricultural sectors, the recent water shortage crisis and droughts have made them extremely vulnerable and have prevented the realization of many of the upstream programs. Therefore, based on the research findings, the following suggestions are made:

- Given that economic barriers were identified as the first and most important obstacle for nomadic cooperatives in Fars Province, it is suggested that the General Directorate of Nomadic Affairs, the General Directorate of Cooperatives, and the operating banks support the activities of nomadic cooperatives by providing low-interest facilities, providing working capital, and fairly distributing livestock inputs.
- In order to reduce educational barriers, it is suggested that the General Directorate of Nomadic Affairs and the Agricultural Jihad Organization continuously hold need-based training courses in the field of cooperative management, marketing, and cooperative laws and regulations.
- Also, to reduce cultural barriers, it is suggested that the boards of directors of cooperatives provide the basis for strengthening trust, cooperation, and a cooperative culture by holding regular meetings, providing transparent reports, and increasing member participation in decision-making.

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The authors equally contributed to the preparation of this article.

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Original Article

ارزیابی عوامل بازدارنده فعالیت شرکت‌های تعاونی عشایری در استان فارس: شناسایی راهکارهای توسعه روستایی- عشایری منطقه

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چکیده

مبسوط

۱. مقدمه

تعاونی‌ها به‌عنوان یکی از مهم‌ترین نهادهای اقتصادی و اجتماعی، نقش مؤثری در توسعه پایدار، ارتقای رفاه اجتماعی، کاهش فقر و افزایش مشارکت مردمی ایفا می‌کنند. در این میان، شرکت‌های تعاونی عشایری به دلیل ارتباط مستقیم با معیشت خانوارهای عشایری، از جایگاه ویژه‌ای در توسعه اقتصادی و اجتماعی مناطق عشایری برخوردارند. این تعاونی‌ها با تأمین نهاده‌های تولید، ارائه خدمات پشتیبانی، بازاریابی محصولات و ایجاد بستر مشارکت جمعی می‌توانند نقش مهمی در بهبود وضعیت اقتصادی و توانمندسازی جوامع عشایری ایفا کنند. با وجود این، بسیاری از تعاونی‌های عشایری در دستیابی به اهداف خود با چالش‌ها و موانع متعددی مواجه هستند که موجب کاهش کارایی، بهره‌وری و اثربخشی آن‌ها شده است. ازاین‌رو، شناسایی و تحلیل عوامل بازدارنده فعالیت این تعاونی‌ها می‌تواند زمینه مناسبی برای تدوین سیاست‌ها و برنامه‌های حمایتی فراهم سازد. پژوهش حاضر با هدف ارزیابی عوامل بازدارنده فعالیت شرکت‌های تعاونی عشایری در استان فارس انجام شد.

۲. مبانی نظری تحقیق

موفقیت تعاونی‌ها به مجموعه‌ای از عوامل اقتصادی، مدیریتی، اجتماعی، فرهنگی، آموزشی و نهادی وابسته است. بر اساس نظریه‌های توسعه مشارکتی، تعاونی‌ها زمانی می‌توانند به اهداف خود دست یابند که اعضا از مشارکت فعال، اعتماد متقابل و احساس تعلق سازمانی برخوردار باشند. همچنین نظریه سرمایه اجتماعی تأکید می‌کند که اعتماد، همکاری و مشارکت اعضا از مهم‌ترین عوامل موفقیت سازمان‌های تعاونی محسوب می‌شوند. در مقابل، ضعف سرمایه اجتماعی، کاهش اعتماد و گسترش فردگرایی می‌تواند اثربخشی فعالیت‌های تعاونی را کاهش دهد.

از سوی دیگر، نبود مدیران توانمند و ضعف مهارت‌های مدیریتی می‌تواند موجب کاهش بهره‌وری و ناکارآمدی تعاونی‌ها شود. همچنین رویکردهای توسعه اقتصادی، دسترسی به منابع مالی و سرمایه را یکی از مهم‌ترین الزامات پایداری فعالیت‌های تعاونی می‌دانند. کمبود سرمایه، محدودیت اعتبارات و مشکلات تأمین مالی از جمله عواملی هستند که می‌توانند مانع رشد و توسعه تعاونی‌ها شوند. بنابراین، بررسی جامع عوامل بازدارنده فعالیت تعاونی‌های عشایری مستلزم توجه هم‌زمان به ابعاد مختلف اقتصادی، اجتماعی، مدیریتی و محیطی است.

۳. روش تحقیق

این پژوهش با استفاده از رویکرد آمیخته و راهبرد اکتشافی متوالی انجام شد. در مرحله نخست، به‌منظور شناسایی عوامل بازدارنده فعالیت شرکت‌های تعاونی عشایری، از روش کیفی و مصاحبه‌های نیمه‌ساختاریافته استفاده شد. مشارکت‌کنندگان پژوهش شامل ۴۰ نفر از اعضای شرکت‌های تعاونی عشایری استان فارس بودند که به روش نمونه‌گیری گلوله‌برفی انتخاب شدند. مصاحبه‌ها تا دستیابی به اشباع نظری ادامه یافت. داده‌های حاصل از مصاحبه‌ها پس از کدگذاری و تحلیل، به استخراج مفاهیم و مؤلفه‌های اصلی منجر شد. در مرحله دوم، بر اساس نتایج بخش کیفی، پرسشنامه‌ای محقق‌ساخته طراحی گردید. این پرسشنامه شامل مشخصات فردی پاسخگویان و گویه‌های مربوط به عوامل بازدارنده فعالیت تعاونی‌های عشایری بود که بر اساس طیف پنج‌درجه‌ای لیکرت تنظیم شد. جامعه آماری بخش کمّی را اعضای شرکت‌های تعاونی عشایری

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استان فارس تشکیل دادند که از میان آنان ۳۸۰ نفر به روش نمونه‌گیری تصادفی ساده انتخاب شدند. داده‌های جمع‌آوری‌شده با استفاده از نرم‌افزار SPSS و از طریق آمار توصیفی و تحلیل عاملی اکتشافی مورد تجزیه و تحلیل قرار گرفت.

۴. یافته‌های تحقیق

در بخش کیفی پژوهش، ۶۲ مفهوم اولیه از مصاحبه‌ها استخراج شد. سپس در مرحله کمّی، تحلیل عاملی اکتشافی برای دسته‌بندی و شناسایی ابعاد اصلی عوامل بازدارنده به کار گرفته شد. نتایج نشان داد که ۱۱ عامل اصلی دارای مقدار ویژه بیشتر از یک شناسایی شدند که در مجموع ۸۶/۱۹۱ درصد از واریانس کل عوامل بازدارنده فعالیت شرکت‌های تعاونی عشایری را تبیین کردند. این عوامل شامل بازدارنده‌های اقتصادی، آموزشی و دانشی، مدیریتی، قانونی ـ سیاسی، سازمانی، اجتماعی، فرهنگی، مهارتی، بازار و بازاریابی، زیرساختی و اکولوژیکی بودند. عامل اقتصادی با تبیین۱۹/۸۱۹درصد از واریانس، مهم‌ترین عامل بازدارنده شناخته شد. کمبود سرمایه و نقدینگی، محدودیت دسترسی به تسهیلات مالی و نبود سرمایه‌گذاری کافی از مهم‌ترین مؤلفه‌های این عامل بودند. پس از آن، بازدارنده‌های آموزشی و دانشی و بازدارنده‌های مدیریتی قرار گرفتند که نشان‌دهنده اهمیت آموزش، دانش تخصصی و مدیریت کارآمد در موفقیت تعاونی‌ها است. همچنین عوامل قانونی ـ سیاسی، از جمله تعدد نهادهای تصمیم‌گیر و پیچیدگی فرایندهای اداری، از دیگر موانع مهم فعالیت تعاونی‌ها محسوب شدند. در کنار این موارد، ضعف مشارکت اجتماعی اعضا، کاهش روحیه همکاری، کم‌رنگ بودن فرهنگ تعاون، کمبود مهارت‌های تخصصی، ضعف بازاریابی محصولات، محدودیت زیرساخت‌های فنی و ارتباطی و در نهایت خشکسالی و کم‌آبی به‌عنوان مهم‌ترین چالش‌های اکولوژیکی شناسایی شدند.

۵. بحث و نتیجه‌گیری

نتایج پژوهش نشان داد که فعالیت شرکت‌های تعاونی عشایری در استان فارس تحت تأثیر مجموعه‌ای از عوامل چندبعدی قرار دارد که به‌صورت هم‌زمان بر عملکرد و موفقیت آن‌ها اثر می‌گذارند. اهمیت بالای عامل اقتصادی بیانگر آن است که پایداری مالی و دسترسی به منابع اعتباری، پیش‌شرط اساسی تداوم فعالیت تعاونی‌ها محسوب می‌شود. همچنین جایگاه عوامل آموزشی، دانشی و مدیریتی نشان می‌دهد که توسعه سرمایه انسانی و ارتقای توان مدیریتی از الزامات اساسی موفقیت تعاونی‌های عشایری است. از سوی دیگر، وجود موانع قانونی، اجتماعی و فرهنگی نشان می‌دهد که مشکلات تعاونی‌ها تنها به مسائل اقتصادی محدود نمی‌شود و برای افزایش کارآمدی آن‌ها باید به اصلاح ساختارهای نهادی، تقویت فرهنگ مشارکت و افزایش اعتماد اعضا نیز توجه شود. علاوه بر این، ضعف بازاریابی، کمبود زیرساخت‌ها و چالش‌های محیطی از جمله خشکسالی، ضرورت اتخاذ سیاست‌های جامع و هماهنگ برای حمایت از تعاونی‌های عشایری را آشکار می‌سازد. بر این اساس، پیشنهاد می‌شود سیاست‌گذاران و دستگاه‌های اجرایی با توسعه حمایت‌های مالی هدفمند، تسهیل دسترسی تعاونی‌ها به اعتبارات، برگزاری دوره‌های آموزشی مستمر، توانمندسازی مدیران، تقویت فرهنگ تعاون، توسعه زیرساخت‌های مورد نیاز و حمایت از برنامه‌های سازگار با شرایط اقلیمی، زمینه ارتقای عملکرد و پایداری شرکت‌های تعاونی عشایری را فراهم آورند. نتایج این پژوهش می‌تواند مبنای مناسبی برای برنامه‌ریزی و سیاست‌گذاری در جهت توسعه پایدار تعاونی‌های عشایری و بهبود شرایط اقتصادی و اجتماعی جوامع عشایری باشد.

کلیدواژه‌ها: عوامل بازدارنده، شرکت‌های تعاونی عشایری، روش تحقیق آمیخته، استان فارس.

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Original Article

Foresight of Community-Based Regeneration in Historic Urban Fabrics with Rural Origins: A Case Study of Sofla Neighborhood, Isfahan, Iran

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Abstract

Purpose- In recent years, community-based regeneration has gained attention because of its emphasis on participation and local governance. However, uncertainty about future development paths makes planning interventions more complex. Therefore, this study explores the future of community-based urban regeneration in the historic Sofla neighborhood of Isfahan by identifying key driving forces and possible scenarios.

Design/methodology/approach- This research is applied in purpose and follows a descriptive–analytical design using a mixed approach. First, key variables affecting community-based urban regeneration were extracted through literature review and document analysis. Next, a cross-impact matrix questionnaire was completed by 15 experts in urban planning and regeneration selected through purposive sampling. Relationships among variables were analyzed using structural analysis to determine influence and dependence levels. Finally, key drivers were used in scenario analysis to identify consistent future scenarios.

Findings- The analysis revealed that "Integrated Urban Management" acts as the primary key driver, while four leverage variables—"Formalization of Local Development Office," "Preparation and Implementation of Regeneration Program," "Stakeholder Identification and Local Needs Assessment," and "Formation of Community-Based Organizations"—function as critical dual-aspect variables with the highest capacity to transform the system. Subsequently, the dual-aspect variables were entered into scenario planning analysis, yielding two consistent scenarios. The results indicate that a desirable future for regeneration relies on strengthening institutional structures, enhancing real participation, and fostering synergy between urban management and the local community.

Research limitations/implications- The primary limitations of this study include the scarcity of specialized experts in this specific field, the lack of local community-based knowledge, and the ongoing dominance of a purely physical perspective in urban planning. To counter these challenges, future strategies must prioritize raising awareness and educating local communities about participatory approaches. Furthermore, shifting the planning paradigm from a traditional physical focus toward an integrated social and institutional framework is essential for meaningful urban regeneration.

Originality/Value- This study provides significant value by integrating structural cross-impact matrices with scenario analysis specifically within the historic context of Isfahan's Sofla neighborhood. Its originality lies in shifting the regeneration paradigm from standard physical interventions toward a dynamic, future-oriented model of participatory governance. Ultimately, it offers urban planners actionable empirical tools to navigate uncertainties and support informed decision-making in historic preservation.

Keywords- Foresight, Community-Based Regeneration, Historic Fabrics, Rural Origins, Isfahan.

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1.Introduction

It has in the past been seen not only as a place where people live but also as a setting in which a collective identity, social interactions, and the historical memory of communities are developed. Yet, in recent decades rapid economic, social, and spatial changes have modified the structure of many cities and have led to the development of spatial and social inequalities. The growth of the urban population, the fact that economic activities are concentrated in cities, and unbalanced spatial development have resulted in the creation and expansion of areas which suffer from a great many physical, social, and economic problems. Such areas, which are known in the literature on urban planning as *inefficient or dysfunctional urban fabrics*, often have to deal with problems including urban poverty, insufficient services and infrastructure, weak social capital, and a declining quality of the living environment (Cherunya et al., 2020; Ghaedi et al., 2025).

On a global scale, the fact that urbanization is increasing has led to a large number of people in urban areas. It is expected that by the middle of the twenty-first century about 70% of the world's population will be living in urban areas, most of the growth in this regard taking place in developing countries (Parikh et al., 2020; Wainaina et al., 2022).

In Iran many cities have also come up against the problems of decline and inefficiency in their urban neighbourhoods as a result of rapid urbanisation and the political and economic changes that have taken place over the past few decades. In this situation, the settlements and the rural-historical areas which had before developed through endogenous social mechanisms, local ways of making a living and collective knowledge have been hit more severely than other regions. Because of the uneven development processes and the horizontal spread of the metropolitan areas, a large number of these indigenous and rural settlements have suddenly been incorporated into the administrative and spatial framework of the cities, giving rise to *rurban ecosystems* or peri-urban areas (Ganjeali & Ghalandarian, 2024; Saghaei, 2020).

The shift speedily from traditional and rural local communities to peripheral and peri-urban areas has caused disruptions to the genuine economic and social functions, led to a deterioration in environmental quality, resulted in weaker neighborhood ties, and brought about the erosion of local identity (Hosseini et al., 2023; Momeni & Kozegarkaleji, 2025).

Experience shows that urban interventions in these areas have generally not led to sustainable improvements in neighborhood conditions when they are mainly based on physical measures and physical renovation. This is due to the fact that such approaches have not given sufficient attention to the social, cultural, and institutional aspects of urban development, and the part played by local communities in decision-making and the implementation of projects has stayed limited (Amanzadegan et al., 2021; Akbari et al., 2023).

Because of these limitations, urban regeneration has come about as a thorough method of urban planning aimed at tackling the physical, social, economic, and environmental aspects of urban development at the same time by means of an integrated approach (Arthurson, 2003). In this framework, emphasis has been placed on the role of local communities and on the active involvement of citizens in the planning and implementation processes, so that community-based urban regeneration has been identified as one of the most important strategies for achieving sustainable regeneration (Shakour & Shojaeifard, 2021).

This method focuses on local capabilities, traditional knowledge, and social interactions and sees the residents of the neighbourhood as the main actors in the process of urban change. It aims at achieving sustainable urban development by enhancing social capital and encouraging citizen participation (Mangunsong et al., 2023; Ziaei, 2015; Smith, 2011).

In Iran too, policymakers and urban managers have in recent years tried to set up kinds of offices such as neighbourhood development offices in order to enable local communities to take part in the process of regeneration. The purpose of setting up these offices is to promote communication between residents, local organisations and urban management, and they are important for building trust, for helping to develop local institutions and for keeping an eye on the neighbourhood development programmes (Masoudi, 2022).

Yet, practical experience in carrying out these policies shows that problems like poor institutional

coordination, legal limitations, social difficulties, and the lack of effective indigenous models still prevent the full achievement of the aims of community-based regeneration in a great many urban neighborhoods (Najdaghi & Nejad Ebrahimi, 2019). Conversely, the complexity of the relationships between urban actors and the conflicts of interest existing among various institutions show that urban regeneration is not simply a technical or physical process; instead, it serves as a setting for social interactions, power negotiations, and communicative exchanges among different urban groups. This issue may be examined using perspectives such as Habermas's theory of communicative action (Habermas, 1984).

The metropolitan areas expand in a number of ways, one of these being the incorporation of outlying settlements. In accordance with the policies concerning spatial development, the Isfahan metropolis added the city of Khorasgan to its administrative and physical structure in 2013 as District 15. Yet an examination of the area's morphology and genealogy shows that Khorasgan has always been of a rural origin and evolved as a result of the linking together of eight historical rural centres—Abr, Buzan, Sofla, Olya, Kongaz, Pazveh, Khayadan and Ardaji—around lines of communication and agricultural land. Of these, the Sofla district is regarded as the earliest original nucleus in the development of the area.

Therefore, today this area is not merely an urban fabric, but rather a historical-urban fabric with an authentic rural origin and genesis. Despite its integration into the administrative organization of the metropolis, it continues to retain the physical layers, place-based neighborhood structure, and deeply rooted collective memory associated with its settlement and rural history. From a theoretical perspective, the rapid integration of such fabrics into the centralized urban management system has intensified the rupture of endogenous social mechanisms. One-sided and physical-oriented urban intervention approaches have largely lacked the capacity to understand the indigenous capabilities and complexities of the rural. Under these circumstances, urban regeneration can only be structurally sustainable if it goes beyond simplistic viewpoints and sets in motion the conditions needed for the reproduction of social capital and for the active involvement of the local community. The Sofla neighbourhood in Isfahan, as a clear example of historical urban areas that originated in a rural setting, is now experiencing a wide range of physical, social and managerial problems. In view of this, the current study, using a futures-oriented method, aims to identify the main driving forces, examine the patterns of influence and dependence between the various factors, and produce plausible scenarios so as to provide a knowledge-driven and forward-looking basis for effective policymaking and planning regarding the regeneration of historical areas with rural origins. Historical fabrics with rural origins.

In this regard, the present article seeks to answer the following main research questions:

1. What is the present situation of the factors and forces that are affecting the future of community-based regeneration in the rural-historical area of the Sofla neighbourhood?
2. What plausible scenarios and possibilities can be imagined for the community-led regeneration of the Sofla neighbourhood?

2. Theoretical Literature Review

In recent years, community-based urban regeneration within historical areas has developed into an interdisciplinary method at the point where cultural heritage conservation, participatory governance, neighbourhood-based development, and urban foresight meet. As shown in the current body of literature, the success of this approach does not consist simply in carrying out physical interventions, but rather in redefining the relationship between local communities, historical heritage, and the structures responsible for urban decision-making. In this context, foresight, as a strategic tool, allows for a synergy between long-term urban visions and community-driven actions at the neighbourhood level. The existing theoretical literature stresses that cultural heritage in historical areas should be seen as a dynamic and value-creating resource in the urban ecosystem, not just as a set of static objects. It has been shown that heritage-based methods can act as promoters of sustainable regeneration by generating new economic, social and cultural values (Aldossary et al., 2025; Pulles et al., 2023). According to this view, conserving historical value in the process of urban regeneration is effective to the extent that it results in the recognition of local identity and the revival of social capital (Ricci et al., 2024).

It has likewise been stressed that historical continuity, spatial distinctiveness, and the quality

of the shared public spaces all play a crucial role in enhancing the feeling of belonging and social resilience (Tilaki & Farhad, 2025). Among the methods which can guarantee the functional dynamism of historical areas are those involving a multidimensional assessment of culture-based projects and the combination of economic interests with heritage conservation (Della Spina, 2024; Burnham, 2022). Yet certain studies cautions that if the logic of tourism or real-estate investment takes over, the historical character of areas tends to suffer from excessive commercialisation and a decline in social authenticity (Lak et al., 2020; Lei & Zhou, 2022). A key theoretical basis of community-based regeneration is the shift from demolition-focused and top-down approaches to network governance and co-production. Experience with regeneration in East Asia shows that collaborative workshops, the involvement of local facilitators, and flexible participation procedures have been effective in enabling communities and increasing the vitality of neighbourhoods (Yang et al., 2022; Baek & Kwon, 2020).

Models like the ‘urban regeneration engine’ show that the combination of governmental and social forces through a dual mechanism can act as an engine for transforming historical neighbourhoods (Shen et al., 2021; Momeni et al., 2026). Moreover, co-creation methods and public sociology introduce formal planning tools into the area of democratic dialogue and thus offer a foundation for redefining the role of citizens in the planning process (Polci & Pierantoni, 2024). In this framework, the main factors which drive community-based regeneration can be seen as part of an interconnected network involving local community participation and empowerment, trust and social capital, a sense of identity and attachment to the area within its historical context, the institutional structure and coordination between different agencies, the autonomy and capabilities of the local development offices, and the connection between environmental sustainability and quality of life. These factors influence the route to successful regeneration not on their own, but as a result of interacting with each other (Momeni et al., 2025). On the other hand, research into 'authoritarian participation' shows that formal and controlled participation can result in the reproduction of inequality and in the displacement of the population (Meskell, 2018). Studies carried out in the Mediterranean area have likewise shown that it is essential to have genuine and inclusive participation if successful regeneration is to take place in historic districts (Li et al., 2020).

The combination of foresight with urban regeneration has created a new theoretical perspective in which planning at the neighbourhood level is linked to long-term thinking and the use of scenario-based methods. In this approach, strategic foresight—by making use of an analysis of macro trends and the social, technological, economic, environmental, political and values as well as legal (STEEPVL) framework.[1]—allows the detection of driving forces and the formulation of intelligent visions for urban development (Szpilko, 2020). A study that employed a political, economic, social, technological, environmental and legal (PESTEL) analysis[2] together with causal layered analysis (CLA)[3] shows that the integration of futures research methods can help in developing alternative scenarios for urban development over the long term and in deriving policy options suitable to each scenario (Alegado, 2025).

Similarly, a systematic review of participatory foresight has identified three main models: expert-driven scenarios, the quadruple-helix model (government–industry–academia–civil society), and public foresight (Neuhoff et al., 2023).

The fact that urban foresight methods show social preferences concerning possible futures to be diverse and differing among social groups indicates that it is necessary to consider a variety of perspectives when preparing regeneration scenarios (Sharifi et al., 2024). Even though the literature reviewed has individually dealt with the various dimensions of heritage value, participatory governance, and foresight, the overall synthesis of that literature shows a basic conceptual and operational gap caused by the failure to take into account the original centres of indigenous settlements and their essential differences from other types of urban area. Most of the existing studies have looked at 'community-based regeneration' and 'foresight' either in the context of ordinary urban areas or by using general physical methods, while failing to carry out an analytical and scenario-based examination of the process in 'historical areas with a genuine rural origin'. These areas, having been incorporated administratively

into metropolitan regions, have suffered from structural instability and therefore need the role of neighbourhood development offices to be redefined if their social capital and local collective memory are to be restored.

In fact, the main feature and contribution of the present study is that, instead of taking a purely physical and episodic approach, it focuses mainly on the historical core of the building fabric, on the reproduction of endogenous social capital and its rural ecosystem, and looks at the ways in which the challenges in these areas are met by means of a new type of urban structure known as "neighbourhood development offices". The research background shows that earlier studies had mostly assessed the performance of these offices in terms of the urban fabric alone, without taking into account their historical and rural origins. By contrast, this article, through incorporating the concept of the "authentic local community" and "community-based institutional mechanisms", provides a knowledge base for achieving place-based and sustainable governance. On this basis, since the theoretical foundations have been developed, any community-based urban regeneration in historical areas must take into account the physical, social, cultural, and institutional aspects and include the active participation of the local community in the decision-making processes. The foresight approach enables a better understanding of the possible routes of transformation and helps to avoid fragmented interventions by linking the analysis of driving forces with the development of alternative scenarios. That is why the present study, using structural scenario planning, aims to identify the factors that will influence things and to draw up plausible scenarios for the future of community-based urban regeneration in the Sofla neighbourhood of Isfahan.

3. Research Methodology

This study was carried out with the objective of carrying out foresight concerning community-based urban regeneration in historical areas by identifying and analysing the main factors that affect the performance of the neighbourhood development offices, which act as facilitating institutions, in the Sofla neighbourhood of Isfahan.

As regards its aim, the study belongs to the field of applied research; in terms of its character it is a descriptive-analytical one and made use of a mixed-methods approach that combined both qualitative and quantitative methods.

In the first stage, which was the qualitative one, the various factors influencing the performance of the neighbourhood development offices were identified and organised by means of written sources, by reviewing the relevant documents and regulations relating to the performance of these offices, and by carrying out a content analysis of the offices' terms of reference. The result of this stage was the establishment of six key dimensions—namely managerial, legal–regulatory, economic, planning, empowerment, and environmental understanding—together with the respective components of each dimension, these forming the basis on which the data collection instrument was designed.

The cross-impact matrix is not a reflective psychometric scale, and so in order to examine the reliability of the data in the cross-impact matrix used in this study, two complementary approaches were applied: one based on 'the percentage of agreement among the experts across all the dimensions and components' and the other involving 'a sensitivity analysis and a structural stability analysis of the matrix using MICMAC software'. The degree of agreement among the experts across all the dimensions was greater than the standard threshold of 70%, the average percentage of agreement being 82.1%. Moreover, in the second approach, a sensitivity analysis and a structural stability test of the matrix were carried out using the MICMAC software to evaluate the robustness of the model. When the rotation of the relationships was examined over cycles 2 to 4, it was found that 94.7% of the key variables had attained stability and settled into a stable position after two cycles of computation, thus confirming the structural stability of the matrix and the validity of the analyses. Finally, in order to assess validity, face validity was used; this involved the questionnaire being reviewed and approved after consultation with a group of faculty members and experts in the areas of urban planning and urban regeneration.

Table 1- Dimensions and Components for Performance Evaluation by Experts

Dimension	Component	Description of Component
Managerial	Integrated urban management	Coordination and synergy among various governmental and public organizations and institutions active within the area.
	Human resource management	Recruitment, retention, and empowerment of specialized and committed personnel in the local development office and related institutions.
	Formal recognition of the local development office	Formal recognition, possession of legal authority, and a clearly defined organizational position for the local development office.
Legal and regulatory	Ownership	Transparency, organization, and resolution of conflicts in property and land ownership documents within the historical fabric.
	Law enforcement	Enforcement guarantees, effective oversight, and the absence of conflicts among laws and regulations concerning conservation, renovation, and improvement.
	Incentive and facilitative regulations	The existence of incentive laws and regulations for attracting private and public participation.
Economic	Financial resources	Diversity, sustainability, and adequacy of financial resources allocated through government budgets, public–private partnerships, and other sources.
	Credit facilities and low-interest loans	Easy access for residents and small-scale developers to appropriate credit resources for the renovation and revitalization of properties.
	Local economy and entrepreneurship	Empowerment, strengthening, and creation of sustainable employment opportunities compatible with the historical and cultural identity of the neighborhood.
Planning	Plan preparation	A participatory and scientific process for developing operational plans that takes into account all physical, social, and economic dimensions.
	Plan approval	The speed, transparency, and efficiency of the final approval process for plans by competent legal authorities.
	Plan implementation	Operationalization, continuous monitoring, and periodic evaluation of approved plans in practice.
Empowerment	Training and capacity building	Organizing training courses to enhance residents' and stakeholders' knowledge, skills, and attitudes toward regeneration.
	Formation of community-based institutions	Establishing or strengthening community groups, councils, or cooperatives as mechanisms for community participation and oversight.
	Access to information	Transparency and equitable distribution of information related to projects, regulations, and decisions among all stakeholders.
Environmental understanding	Baseline studies and data recording	Conducting comprehensive field studies and systematically documenting the physical, social, and historical characteristics of the fabric.
	Stakeholder identification and needs assessment	Accurate identification of all stakeholder groups (residents, property owners, business owners, etc.) and prioritization of their needs and demands.
	Continuous monitoring of changes	Regular monitoring and evaluation of the social, physical, and economic impacts of implemented projects and spontaneous transformations within the fabric.

3.1. Geographical Scope of the Study

The study area of this research is the Sofla neighborhood in District 15 of Isfahan, which was previously part of the city of Khorasgan. This neighborhood is regarded as one of the oldest settlement and habitation nuclei in Khorasgan and, owing to its historical background, identity-related components, and traditional spatial organization, has played a prominent role in shaping the urban identity of this area. The neighborhood is located in the southern part of Khorasgan and is bounded by Jey, Shariati, Abazar, and Fajr axes. The extent of its inefficient urban fabric is estimated at approximately 18.9 hectares. The Sofla

neighborhood, owing to the presence of a number of valuable historical elements and buildings, including the Imamzadeh Abol-Abbas (AS) and the historic Khan Mansion, is considered one of the important centers of the area's cultural and historical identity. Historical evidence and documentation also indicate that the initial nucleus of the city of Khorasgan originated in this area, after which the physical expansion of the city extended to other parts. However, following the incorporation of Khorasgan into the metropolis of Isfahan in 2013 and subsequent transformations resulting from spatial and physical development, a significant portion of the historical fabrics in this area became subject to structural changes. The outcome of these transformations, together with the unbalanced patterns of urban development in recent years, has led to weakened spatial and social cohesion and intensified deterioration in parts of the neighborhood. Under such circumstances, the Sofla neighborhood, as one of the areas prioritized for intervention within urban renovation and improvement programs, has attracted the attention of Isfahan's urban management. In addition, the presence of more than **140 hectares of inefficient urban fabric in District 15** indicates the depth and extent of development-related problems and challenges in this part of the city. Among these areas, the Sofla neighborhood, due to its concentration of historical elements, relatively high population density, and its position within the historical memory and identity of the area, represents a prominent case for examining community-based urban regeneration processes in historical fabrics.

Accordingly, by focusing on this neighborhood, the present study seeks to identify and analyze the drivers influencing the future of neighborhood regeneration in historical fabrics, thereby providing a basis for formulating effective policy strategies grounded in local community participation (Momeni, 2020).

3.2. Research Method

In the analytical stage, structural analysis was employed to investigate the reciprocal relationships among the components and determine the influential factors. In this regard, 15 academic and executive experts active in the fields of urban planning and urban regeneration were selected through purposive sampling. The criteria for selecting these individuals included relevant educational qualifications, professional experience in urban regeneration, and familiarity with the mechanisms and performance of neighborhood development offices.

To address the contradiction between the community-based approach and technocratic decision-making, four trusted and prominent community members and activists of the Sofla neighborhood, from different age groups, who had maintained active and continuous participation—from the initial establishment of the neighborhood development office through major regeneration decision-making processes—were included in the expert panel as representatives of the social body, representing residents, property owners, and local business owners. The experts completed a cross-impact matrix, assessing the degree of influence and dependence of the research variables. The resulting data were analyzed using MICMAC software. The results of this process enabled the identification, classification, and prioritization of variables according to their level of influence and degree of dependence, ultimately leading to the extraction of the key drivers affecting community-based urban regeneration in historical fabrics. The extracted dimensions and components were organized into a coherent conceptual framework and considered as components of a dynamic and interdependent system. Accordingly, the final table of dimensions and components was regarded as the initial conceptual model of the community-based urban regeneration system, whose internal structure and pattern of interaction among its variables were examined through structural analysis. Subsequently, following the identification of the key drivers, a prospective scenario-writing approach, using Scenario Wizard software, was employed to develop alternative futures for community-based urban regeneration in the Sofla neighborhood of Isfahan. At this stage, based on the principal drivers and strategic uncertainties, a set of consistent and plausible scenarios was developed to depict and analyze a range of potential transformation pathways for this historical neighborhood. Ultimately, the results of the analyses provided a basis for presenting strategic recommendations aimed at strengthening the effectiveness of neighborhood development offices and improving the quality of the community-based urban regeneration process in historical fabrics.

It should be noted that in the qualitative phase of the research, components related to the performance of neighborhood development offices were extracted and classified based on library resources, upstream policy documents, and an examination of the terms of reference of neighborhood development offices. These components constituted the foundation for developing the conceptual framework of the research.

4. Research Findings

To investigate the reciprocal interactions among the variables, the cross-impact matrix was completed with the participation of experts and subsequently processed using MICMAC software. The output of this stage was presented in the form of an influence–dependence table, indicating the degree of influence (influence power) and dependence (degree of susceptibility to influence) of each variable within the overall system structure.

This table constitutes the core of the structural analysis of the research, as it enables the identification and differentiation of variables with driving and strategic roles, dependent variables, and elements occupying regulatory or intermediary positions. Such an analysis goes beyond a purely descriptive assessment by providing an understanding of the internal logic governing the community-based urban regeneration system. It also serves as an analytical basis for prioritizing policies and directing future interventions in the historical fabric under study.

Table 2- Influence and Dependence of the Dimensions and Components of the Study

No.	Variable	Total Number of Rows (Influence)	Total Number of Columns (Dependence)
1	Integrated Urban Management	38	24
2	Human Resource Management	22	26
3	Formal Recognition of the Local Development Office	37	28
4	Ownership	18	27
5	Law Enforcement	28	27
6	Incentive and Facilitative Regulations	26	18
7	Financial Resources	28	28
8	Credit Facilities and Low-Interest Loans	18	21
9	Local Economy and Entrepreneurship	25	29
10	Plan Preparation	36	33
11	Plan Approval	25	31
12	Plan Implementation	29	39
13	Training and Capacity Building	22	27
14	Formation of Community-Based Institutions	29	31
15	Access to Information	29	26
16	Baseline Studies and Data Recording	23	22
17	Stakeholder Identification and Needs Assessment	32	28
18	Continuous Monitoring of Changes	22	22
Totals		487	487

When the results given in the influence–dependence table of the variables, as derived from the output of the structural analysis software, are examined, it is found that the community-based urban regeneration system in the Sofla neighbourhood adheres to a rather clear institutional and planning-focused approach. In other words, the future structure of this system is mainly dependent on the quality of local governance and on its planning processes. It shows that certain variables act as structural drivers, while others mainly serve as dependent variables, as revealed by an analysis of the influence weights (the row totals) and the dependence weights (the column totals).

Of the variables identified, "integrated urban management", which has the greatest level of influence (38), along with "formal recognition of

the local development office" (37) and "plan preparation" (36), are some of the most important factors affecting the future of regeneration. This shows that even though community-based regeneration is based on public participation and agency, its sustainability and long-term viability rely on institutional cohesion, the consolidation of the legal status of the development office, and an improvement in the quality of urban planning. To put it simply, regeneration in the Sofla neighbourhood will be able to move forward only when the foundations of local governance and its institutional structure are properly strengthened.

On the other hand, a variable like "plan implementation", which has the highest degree of dependence (39), shows that the implementation stage is more influenced by the quality of the planning, institutional coordination, financial support, and legal support than it is itself a decisive factor. This result is in agreement with the field findings and with the views of residents, who had pointed out weaknesses in the implementation phase. It is therefore necessary that the implementation of plans rely on a stable and adequate decision-making and local management structure.

Other variables include 'the formation of community-based institutions', 'stakeholder identification and needs assessment', and 'the local economy and entrepreneurship', which hold an intermediate and dual position. This implies that they are capable of affecting other factors while at the same time being greatly affected by them. The fact that the social and economic aspects of regeneration can act as drivers of neighborhood development only occurs when the institutional and managerial foundations have reached the required level of effectiveness.

At a lower level of influence the variables such as “credit facilities and low-interest loans”, “baseline studies and data recording”, and “continuous monitoring of changes” show fairly balanced amounts of influence and dependence. They mainly act as supporting elements of the system and their performance is dependent on the activation of the more general managerial and planning variables.

The analysis shows that the main factors responsible for regeneration in the Sofla neighbourhood are mainly institutional, managerial and related to planning, while the implementation, economic and social aspects are more frequently treated as dependent variables. It follows that if a desirable future for the regeneration of this historical neighbourhood is to be achieved, it is necessary to strengthen local governance, give formal status to the development institutions and improve the quality of urban planning since these are essential prerequisites for activating the other aspects of regeneration.

To interpret the dynamics governing the community-based urban regeneration system in the Sofla neighborhood, the direct influence–dependence map shown in Figure 1 was developed. By positioning the variables according to their degree of influence (vertical axis) and degree of dependence (horizontal axis), this map enables the identification of the functional role and position of each variable within four distinct analytical areas and serves as a key tool for explaining the future-oriented structure of the system.

In the first area (upper-left), variables are positioned that have high influence and low dependence and are therefore recognized as fundamental and structure-forming drivers. The findings indicate that components such as “integrated urban management,” “formalization of the legal position of the neighborhood development office,” and, to some extent, the “plan preparation process” are concentrated in this area. The positioning of these variables within the driver area indicates that future regeneration developments in the Sofla neighborhood depend more than any other factor on strengthening institutional, managerial, and planning foundations, while other components of the system respond to changes in these structural layers.

The second area (upper-right) comprises variables that simultaneously have high influence and high dependence and therefore possess a sensitive, unstable, and strategic nature. Variables such as “plan implementation,” “formation of community-based institutions,” “development of the local economy and entrepreneurship,” and “stakeholder identification and needs assessment” are located within this area. The position of these variables indicates that any targeted intervention in, or disruption to, these factors can produce multilayered consequences throughout the regeneration system and direct its future toward either sustainability or inefficiency.

The third area (lower-right) contains variables with

limited influence and high dependence, indicating their strong dependence on other components of the system. The presence of "plan implementation," with the highest level of dependence, in this area, together with some operational and economic indicators, demonstrates that the implementation process in the Sofla neighborhood functions less as an independent driver and more as a direct outcome of the quality of governance, institutional cohesion, and planning effectiveness. Accordingly, strengths or weaknesses in plan implementation can be regarded as reflections of the performance of higher-level managerial and institutional structures.

Finally, the fourth area (lower-left) consists of variables with relatively low levels of both influence and dependence, whose role is primarily supportive and complementary. Components such as "baseline studies and data recording" and "continuous monitoring of changes" are located in this area. Although these factors do not independently possess sufficient capacity to direct structural transformations, once the key drivers are activated, they can contribute to improved efficiency, institutional learning, and the sustainability of the regeneration process.

Overall, the analysis of the influence–dependence map indicates that the structure of community-based urban regeneration in the Sofla neighborhood has an institutional–planning-oriented nature, and the future success of this process is directly dependent on strengthening integrated urban management and consolidating the legal and institutional position of neighborhood development offices. The positioning of social and economic variables in intermediate areas also indicates that these factors function as intermediary links, and the practical realization of regeneration objectives will depend on activating structural drivers at higher levels of decision-making and local governance.

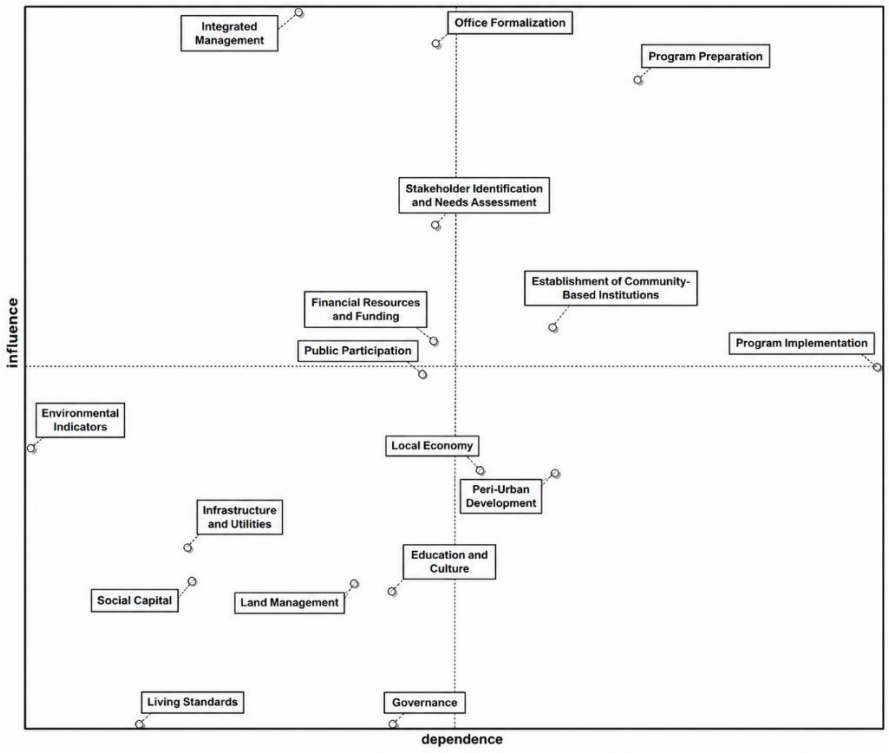


Figure 1. Output Map of the Dimensions and Components of the Study

Building on the results obtained from the influence–dependence map, the scenario-writing stage can be initiated. The distribution of the key variables in the output map indicates that a number of drivers are located in the upper-right quadrant, characterized by simultaneously high influence and high dependence. This condition indicates that the community-based urban regeneration system in the Sofla neighborhood possesses a degree of dynamic uncertainty and structural sensitivity, a characteristic

that constitutes one of the principal prerequisites for entering the scenario-writing process. Accordingly, the presence of unstable and interactive drivers in this quadrant demonstrates that different and distinguishable futures for the regeneration of the Sofla neighborhood can be envisioned and that the system under study has moved beyond a static or entirely linear state. Therefore, in the next stage of the research, with the aim of explaining potential future pathways and analyzing the consequences of each pathway, the selected drivers are entered as inputs into Scenario Wizard software so that alternative scenarios for community-based urban regeneration in this historical fabric can be developed and evaluated.

In this study, the selection of drivers for entry into the scenario-writing stage was conducted purposefully and based on the results of the structural analysis. To this end, all variables influencing community-based urban regeneration within the study area were initially identified, and their degrees of influence and dependence were calculated using cross-impact analysis. The results of this analysis showed that only five drivers were located in the quadrant characterized simultaneously by high influence and high dependence, namely, the upper-right quadrant of the influence–dependence map. The focus on these drivers was based on the fact that variables located in this quadrant play the greatest role in shaping the future of the system while simultaneously being the most strongly affected by changes in other variables. In other words, these drivers not only determine the future pathways of urban regeneration but also encompass the greatest degree of uncertainty and sensitivity to environmental changes. Therefore, they are considered the most appropriate variables for entering the scenario-writing stage, because scenarios are fundamentally shaped around key uncertainties and strategic drivers.

In contrast, variables located in the other areas of the influence–dependence map perform different functions. Variables with high influence and low dependence primarily represent relatively stable contextual conditions, whose changes over the time horizon under consideration are limited. Variables with low influence and high dependence are mainly consequences of interactions among the principal drivers and, by themselves, lack the capacity to shape alternative futures. Variables characterized by both low influence and low dependence also possess relatively lower strategic importance. Accordingly, introducing these variables into the scenario-writing stage would not only fail to enhance the analytical richness of the scenarios but could also increase unnecessary complexity and reduce the clarity of the results.

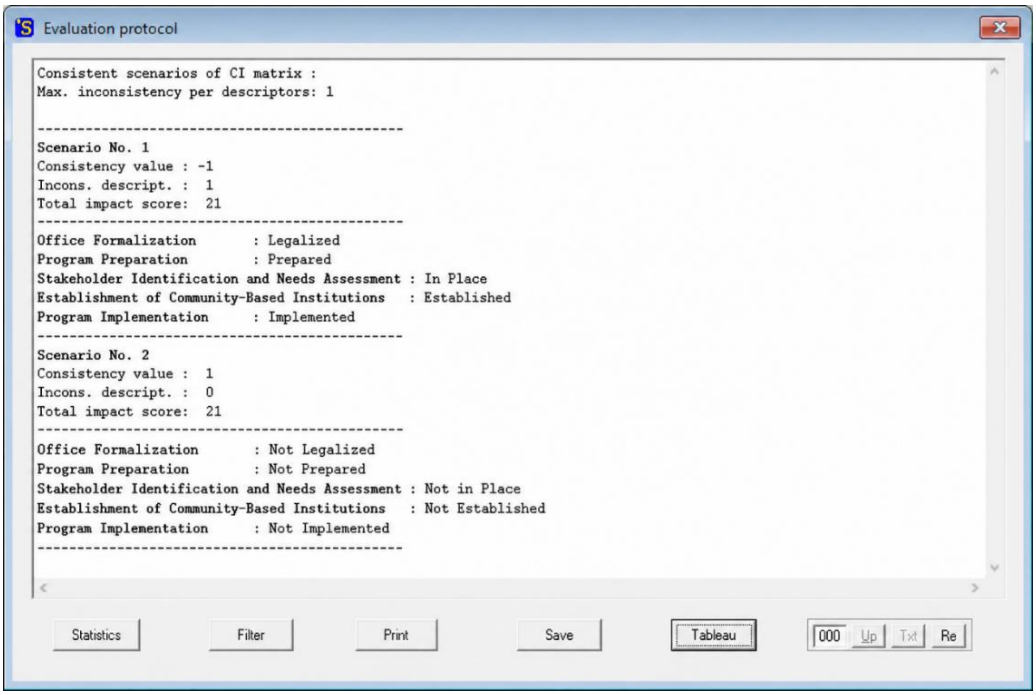


Figure 2. Scenario Development Output

In the scenario development stage, in order to identify plausible futures based on the interaction of key drivers, a Cross-Impact Balance (CIB) analysis was conducted using the Scenario Wizard software. In this method, different combinations of driver states are evaluated in terms of their internal consistency, and only those combinations that demonstrate sufficient logical coherence are accepted as valid scenarios. Accordingly, to prevent the analysis from being confined to a single deterministic pathway while maintaining analytical consistency among the variables, the consistency threshold was set at 0.85.

The selection of this value indicates that the extracted scenarios exhibit a high degree of coordination among the drivers, while simultaneously allowing for the emergence of more than one plausible future. If the consistency threshold had been set at the maximum value of 1, only one perfectly consistent combination would have been identified as a scenario, thereby restricting the futures analysis to a single deterministic pathway. In contrast, setting the threshold at 0.85 enabled the identification of several relatively consistent pathways that nevertheless maintained an acceptable level of logical coherence.

The results of this stage indicated that, at this level of consistency, two consistent scenarios for the future of community-based regeneration in the study area could be extracted. These two scenarios represent two distinct yet structurally feasible patterns of interaction among managerial, planning, environmental-awareness, and social-empowerment drivers. They can therefore serve as a basis for analyzing plausible futures and formulating appropriate strategies within the urban regeneration process.

5. Discussion and Conclusion

Assessing the sustainability and regeneration of historic-rural fabrics within metropolitan areas requires a profound understanding of the structure of inter-variable relationships within the ecosystem of these neighborhoods. As one of the valuable historic-rural cores of Isfahan, Sofla Neighborhood in Khorasgan has faced a conflict between centralized management and its indigenous socio-social structure following its incorporation into the metropolitan area. Achieving sustainable regeneration in this area requires the identification of institutional, physical, and social drivers and a precise distinction of their roles in shaping the neighborhood's future. The structural analysis conducted in this study, with the aim of elucidating these relationships, classified 18 main variables into three conceptual categories based on the standard concepts of structural foresight:

Primary Key Driver (System Input)- The variable "Integrated Urban Management," characterized by the highest level of direct and indirect influence and very low dependence, is positioned in the input zone of the system. This variable functions as the primary structural driver and determines the overall direction of the regeneration system in Sofla Neighborhood.

Dual and Critical Variables (Core Basis of Scenario Development)- Five variables, namely "Formalization of the Local Development Office," "Preparation of the Regeneration Plan," "Stakeholder Identification and Local Needs Assessment," "Establishment of Community-Based Institutions," and "Implementation of the Regeneration Plan," are positioned in the northeastern zone. These variables simultaneously possess high levels of influence and dependence and therefore function as key leverage points and regulatory mechanisms within the system. Due to their leverage characteristics and high transformative sensitivity, these five variables were selected as input variables for developing future scenarios and were entered into the Scenario Wizard software.

Dependent and Output Variables- Economic variables, such as credit facilities, loans, and financial resources, as well as service and basic infrastructure variables, are positioned in the lower regions of the diagram, indicating their dependent and consequential nature within the regeneration process of Sofla Neighborhood. The positioning of "Formalization of the Local Development Office" at the top of the dual and leverage variables indicates that the future of regeneration in the historic-rural fabric of Sofla Neighborhood—the initial and community-oriented core of Khorasgan—is influenced above all by institutional dynamics. Following the incorporation of the neighborhood into the Isfahan metropolitan area, its indigenous ecosystem underwent a rapid transition into a peri-urban area. The primary reason for the central role of the "Formalization of the Local Development Office" is that these fabrics experience a structural disconnect between

centralized metropolitan management and traditional social structures. If granted legal and administrative formalization, the Local Development Office can function as an "institutional translator," transforming top-down decisions into locally oriented practices that are acceptable to and supported by the local community.

Another important finding is the relatively low importance of economic and financial variables compared with institutional variables in initially directing the system. In historic-rural fabrics surrounding metropolitan areas, the allocation of development funds or financial facilities cannot, by itself, serve as a driver of sustainable regeneration. In the absence of a legitimate institutional structure, the injection of financial capital often leads to land speculation, gentrification, increased living costs, and, ultimately, the displacement of original residents. Therefore, economic variables are essentially subordinate and outcome-oriented, and their success is conditional upon the establishment of an institutional management framework as a prerequisite.

On the other hand, the findings demonstrate that "social participation" cannot guide the system without the support of formal institutions. In the regeneration literature, a clear distinction should be made between "genuine participation (empowerment)" and "nominal participation (ceremonial participation)." Nominal participation is reduced to one-way information dissemination or the symbolic presence of residents in meetings; genuine participation, however, emerges when local structures possess decision-making and bargaining power.

In Sofla Neighborhood, without the formalization of the Local Development Office and the establishment of community-based institutions, traditional social capital, such as trust and neighborhood relations, remains fragmented and ultimately results in nominal participation. Therefore, formalizing local institutions is a necessary condition for transforming community capacities into genuine participation.

Comparison of these findings with domestic and international models reveals important contextual differences. Compared with the Northeast Asian model of urban-rural fabric regeneration, where strong and centralized state management constitutes the primary driver, the dynamics of the system in Sofla Neighborhood require a balance between urban management and traditional social capital. In the historic fabrics of Southern Europe, regeneration is based on commercialization, specialized tourism, and local financial markets, whereas in Sofla Neighborhood, the rural-urban identity and locally embedded institutions take precedence over purely commercial dimensions. In most historic fabrics of the country's metropolitan areas, regeneration programs have also failed due to the dominance of a physical and top-down approach. The findings of this study demonstrate the necessity of a paradigm shift from "physicalism" to "participatory institutionalism" in fabrics with rural origins.

This analytical model can be generalized to other historic-rural and peri-urban fabrics in Iran that have experienced incorporation into metropolitan areas, such as the peripheral fabrics of Shiraz, Tabriz, and Karaj. The common and challenging issue across all these areas is the conflict between centralized metropolitan management and the indigenous socio-ecological structure of local neighborhoods.

In the next step, the five dual and critical variables—formalization of the Local Development Office, plan preparation, stakeholder identification, institutional formation, and plan implementation—were introduced into the Scenario Wizard software as key variables for scenario development. Through the analysis of the consistency matrix, two main scenarios were extracted:

Scenario 1 (Empowered and Institution-Oriented Future)- The Local Development Office is granted legal formalization, integrated urban management is achieved, and regeneration proceeds through participatory decision-making and the preservation of historic assets, such as Imamzadeh Abol-Abbas and Khan Mansion.

Scenario 2 (Constrained and Dependent Future)- The lack of formalization of local institutions leads to the fragmented implementation of localized physical interventions, the weakening of social capital, and the gradual deterioration of the neighborhood's indigenous identity.

Based on the results of the structural analysis and the extracted scenarios, the following recommendations are proposed to achieve the desirable future of urban regeneration in historic fabrics:

1. Institutionalizing the Formal Structure of Local Development Offices: Establishing a stable administrative and legal framework for Local Development Offices as an intermediary between the metropolitan management of Isfahan and the original residents of Sofla Neighborhood. These offices should recognize the capacities of local governance and traditional social structures, and ensuring their continued presence would be essential to realizing the desirable scenario.

2. Integrating Planning Across Institutional Levels and the Local Community: Developing regeneration plans through genuine collaboration among urban institutions—including the municipality, cultural heritage authorities, and the neighborhood council—and community-based institutions, with an emphasis on the active preservation of historic areas, valuable buildings such as Khan Mansion and Imamzadeh Abol-Abbas, and the remaining physical and livelihood layers originating from the neighborhood's rural background.

3. Strengthening Social Capacities and Training for Local Participation: Empowering local groups, indigenous residents, cultural associations, and neighborhood youth by redefining traditional social capital and transforming it into participatory awareness. Enhancing mechanisms for dialogue and collective decision-making can ensure the continued presence of original residents within the fabric and prevent the loss of local identity resulting from accelerated peri-urbanization processes.

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Authors' contributions

The authors equally contributed to the preparation of this article.

Conflict of interest

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Original Article

آینده‌نگاری بازآفرینی اجتماع‌محور در بافت‌های تاریخی شهری با خاستگاه روستایی: مطالعه موردی محله سفلی اصفهان

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چکیده

مبسوط

۱. مقدمه

گسترش کالانشهرها و ادغام تدریجی سکونتگاه‌های پیرامونی با ساختار فضایی و مدیریتی شهرهای بزرگ، زمینه‌ساز تغییرات گسترده در سازمان فضایی، اجتماعی و نهادی این سکونتگاه‌ها شده است. محله سفلی خوراسگان در اصفهان نمونه‌ای از بافت‌های تاریخی با خاستگاه روستایی است که در اثر توسعه کالبدی و اداری شهر اصفهان، از ساختار مستقل روستایی فاصله گرفته و با چالش‌هایی همچون فرسودگی کالبدی، تضعیف هویت و سرمایه اجتماعی، گسست میان مدیریت شهری و جامعه محلی و احتمال تشدید فرایندهای اعیانسازی مواجه شده است. تجربه‌های متعارف بازآفرینی که عمدتاً بر مداخلات کالبدی، سرمایه‌گذاری مالی و اقدامات پروژه‌محور تأکید دارند، در چنین بافت‌هایی قادر به پاسخ‌گویی کامل به پیچیدگی‌های اجتماعی، تاریخی و نهادی نیستند. ازاین‌رو، گذار از رویکرد کالبدگرا و تمرکزگرا به سوی بازآفرینی اجتماع‌محور، حکمرانی محلی و ظرفیت‌سازی نهادی ضرورت می‌یابد. از سوی دیگر، ماهیت پیچیده و متغیر آینده این بافت‌ها، استفاده از رویکردهای آینده‌نگر و سناریومحور را ضروری می‌سازد. پژوهش حاضر با تمرکز بر محله سفلی اصفهان، درصدد شناسایی پیشران‌های کلیدی و روابط متقابل میان عوامل مؤثر بر بازآفرینی اجتماع‌محور و ترسیم سناریوهای محتمل آینده است تا چارچوبی برای بازآفرینی بوم‌محور و پایدار این نوع بافت‌ها ارائه دهد.

۲. مبانی نظری تحقیق

مبانی نظری پژوهش بر پیوند سه رویکرد اصلی حکمرانی محلی، نهادگرایی جدید و آینده‌نگاری استوار است. در رویکردهای جدید بازآفرینی، پایداری فرایند بازآفرینی صرفاً به بهبود کالبدی و تأمین منابع مالی وابسته نیست، بلکه تحت تأثیر کیفیت ساختارهای نهادی، میزان مشارکت جامعه محلی، ظرفیت سازمانی و نحوه تعامل میان بازیگران قرار دارد. در این چارچوب، الحاق سکونتگاه‌های تاریخی با خاستگاه روستایی به ساختار کالانشهری، نیازمند بازتعریف روابط میان مدیریت شهری و جامعه بومی است. نهادگرایی جدید بر نقش قواعد رسمی و غیررسمی، ساختارهای حقوقی و سازمان‌های محلی در شکل‌دهی به رفتار بازیگران و نتایج بازآفرینی تأکید دارد. همچنین، رویکرد آینده‌نگاری با شناسایی پیشران‌های کلیدی، بررسی روابط متقابل متغیرها و تدوین سناریوهای مختلف، امکان مواجهه فعال با عدم‌قطعیت‌های آینده را فراهم می‌کند. در این میان، دفاتر توسعه محله می‌توانند به‌عنوان واسط نهادی میان مدیریت شهری و جامعه محلی، نقش مهمی در احیای سرمایه اجتماعی، تقویت مشارکت و هدایت فرایند بازآفرینی ایفا کنند.

۳. روش تحقیق

پژوهش حاضر از نظر هدف، کاربردی–توسعه‌ای و از نظر ماهیت، مبتنی بر رویکرد کیفی–کمی و آینده‌نگاری ساختاری است. در مرحله نخست، با استفاده از مطالعات نظری و بررسی ادبیات موضوع، مجموعه‌ای از متغیرهای مؤثر بر بازآفرینی اجتماع‌محور شناسایی و در نهایت ۱۸ متغیر اصلی برای تحلیل ساختاری انتخاب شد. داده‌های موردنیاز از طریق ارزیابی خبرگان و تکمیل ماتریس اثرات متقابل گردآوری شد. سپس با استفاده از نرم‌افزار MICMAC و بر اساس الگوی گودت، میزان اثرگذاری و اثرپذیری متغیرها تحلیل و جایگاه ساختاری آن‌ها تعیین شد. در مرحله دوم، متغیرهای دووجهی و دارای ماهیت اهرمی و تحول‌آفرین به‌عنوان متغیرهای کلیدی وارد نرم‌افزار Scenario Wizard شدند. در این مرحله، ماتریس سازگاری میان حالت‌های مختلف متغیرها تحلیل و سناریوهای محتمل و سازگار آینده برای بازآفرینی محله استخراج شد. این ترکیب روش‌شناختی امکان گذار از شناسایی عوامل مؤثر به تحلیل روابط متقابل و سپس تدوین آینده‌های بدیل را فراهم کرده است.

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۴. یافته‌های تحقیق

یافته‌های تحلیل ساختاری نشان داد که ۱۸ متغیر مورد بررسی از نظر اثرگذاری و اثرپذیری در سه سطح اصلی قابل تفکیک‌اند. در میان متغیرهای شناسایی‌شده، مدیریت یکپارچه شهری دارای بیشترین میزان اثرگذاری و اثرپذیری پایین بوده و به‌عنوان پیشران کلیدی اولیه سیستم شناخته شد. این یافته بیانگر اهمیت بنیادین هماهنگی مدیریتی و یکپارچگی تصمیم‌گیری در موفقیت بازآفرینی بافت‌های تاریخی با خاستگاه روستایی است. همچنین پنج متغیر رسمیت دفتر توسعه، تهیه برنامه، شناسایی ذی‌نفعان، تشکیل نهادها و اجرای برنامه در ناحیه دووجهی قرار گرفتند. این متغیرها به دلیل برخورداری از اثرگذاری و اثرپذیری هم‌زمان، ماهیتی اهرمی و تحول‌آفرین داشته و به‌عنوان ورودی اصلی تحلیل سناریو انتخاب شدند. در مقابل، متغیرهای اقتصادی و شاخص‌های خدماتی–پایه در ناحیه خروجی قرار گرفتند که نشان‌دهنده وابستگی آن‌ها به متغیرهای نهادی و مدیریتی است. تحلیل سناریویی در نهایت به شناسایی دو سناریوی اصلی شامل «آینده توانمند و نهادمحور» و «آینده محدود و وابسته» منجر شد.

۵. بحث و نتیجه‌گیری

نتایج پژوهش نشان می‌دهد که پایداری بازآفرینی در بافت‌های تاریخی با خاستگاه روستایی، بیش از آنکه به مداخلات کالبدی یا تزریق اعتبارات مالی وابسته باشد، به ساماندهی نهادی، یکپارچگی مدیریت و ظرفیت‌سازی اجتماعی وابسته است. جایگاه مدیریت یکپارچه شهری به‌عنوان پیشران اصلی سیستم نشان می‌دهد که نبود هماهنگی میان نهادهای مسئول می‌تواند اثربخشی اقدامات بازآفرینی را کاهش دهد. همچنین، دفتر توسعه محلی در صورت برخورداری از رسمیت حقوقی و نهادی، می‌تواند نقش «مترجم نهادی» را در برقراری ارتباط میان مدیریت شهری و جامعه بومی ایفا کند و زمینه تبدیل سرمایه اجتماعی موجود به مشارکت واقعی و مؤثر را فراهم آورد. یافته‌ها همچنین نشان می‌دهد که سرمایه‌گذاری مالی بدون ایجاد ساختارهای نهادی مشروع و مشارکتی می‌تواند به تشدید فرایند اعیانسازی و تضعیف حضور ساکنان بومی منجر شود. بر این اساس، تحقق سناریوی «آینده توانمند و نهادمحور» مستلزم حرکت از رویکرد مداخله‌ای و کالبدگرا به سوی نهادگرایی مشارکتی و بازآفرینی بوم‌محور است. مهم‌ترین راهکارهای پیشنهادی عبارت‌اند از: اعطای رسمیت حقوقی به دفاتر توسعه محلی، یکپارچه‌سازی برنامه‌های حفاظت از هویت تاریخی و روستایی، تقویت تشکل‌های اجتماع‌محور، شناسایی و مشارکت فعال ذی‌نفعان و پیوند دادن برنامه‌ریزی با سازوکارهای اجرایی. در مجموع، نتایج بیانگر آن است که بازآفرینی پایدار این بافت‌ها زمانی امکان‌پذیر خواهد بود که ابعاد کالبدی، اجتماعی، فرهنگی و نهادی به‌صورت یکپارچه مورد توجه قرار گیرد و جامعه محلی از جایگاه مخاطب برنامه‌ها به جایگاه کنشگر اصلی فرایند تصمیم‌گیری ارتقا یابد.

کلیدواژه‌ها: آینده‌نگاری، بازآفرینی اجتماع‌محور، بافت‌های تاریخی، خاستگاه روستایی، اصفهان

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Original Article

Exploring the Link Between Place Attachment and the Proliferation of Second Homes in Rural Tourism Destinations: Evidence from Mazandaran, Iran

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Abstract

Purpose- This study examines the relationship between place attachment and the proliferation of second homes in rural tourism destinations, focusing on Mazandaran Province, Iran. It specifically investigates the effects of place dependence, place identity, social bonding, and nature bonding on place attachment and the effect of place attachment on second-home tourism.

Design/Methodology/Approach- The study uses a quantitative, descriptive-analytical approach. Data were collected from second-home owners in Mazandaran Province. 404 completed questionnaires were obtained through snowball sampling. Data were analyzed with Smart PLS 4.

Findings: The results show that place identity, social bonding, and nature bonding have significant positive effects on place attachment, while place dependence has no significant effect. Nature bonding is the strongest predictor of place attachment. Place attachment also has a strong positive effect on second-home tourism. Overall, emotional, social, and nature-based connections are more influential than purely functional relationships.

Research Limitations/Implications- The main limitations are the lack of a complete sampling frame for second-home owners and the study's focus on one province. Future research should compare different rural and coastal destinations and examine factors such as the duration and frequency of second-home use, environmental changes, and relationships with host communities.

Practical Implications- Destination managers should emphasize Mazandaran's natural and cultural assets, protect natural landscapes, strengthen interaction between second-home owners and local communities, and develop marketing strategies based on emotional and experiential values rather than focusing only on functional amenities.

Originality/Value- The study's originality lies in examining the functional, symbolic, social, and nature-based dimensions of place attachment simultaneously and linking them to second-home tourism in a rural Iranian context. The finding that nature bonding is the strongest predictor, while place dependence is not significant, provides a distinctive contribution to understanding second-home demand.

Keywords- Place attachment, Second-home tourism, Rural tourism, Mazandaran.

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1.Introduction

The main motivation for tourists to travel is to escape from daily life and relax (Wang et al, 2025). As urbanization accelerates, the fast-paced lifestyle of contemporary society significantly affects individuals' physical and mental well-being. Mental fatigue, caused by the stresses and strains of everyday life, is a common complaint in today's society. As urban residents strive to meet the demands of city life, their physical, psychological, and social resources are at risk of becoming overstretched (Luo & Jiang, 2022). According to Attention Restoration Theory (Kaplan, 1995), restorative natural environments can help alleviate stress and lead to improvements in emotions and attention (Wang et al, 2025).

Rural tourism is one of the most popular types of tourism (Nasiri Hendehkhaleh et al, 2022), and it pays attention to creating new opportunities in service performance through shaping spaces, reconstruction reconfiguration and processes (Nasiri Hendehkhaleh et al, 2022). Among the patterns of tourism in rural areas is the tourism of second homes. second home development in rural areas, especially in villages with the potentials such as pristine nature and proper pathways and facilities, has resulted in economic, environmental and social-cultural consequences (Firoznia et al, 2020). Since 1945, tourism of second homes has gained a lot of acceptance, the reasons for which have been low income, having free time, improving transportation facilities, the desire to use non-urban healthy recreation, and the desire to invest personal savings.

Place attachment is an affective bond that people establish with specific places where they prefer to remain and where they feel comfortable and secure. From a phenomenological perspective, place attachment develops through perceptions of everyday symbols, activities, experiences, and meanings and can deepen over time (Falahat, 2006; Mahmoodi et al., 2018). Place identity refers to the symbolic and emotional meanings through which individuals incorporate a place into their sense of self, whereas place dependence concerns the functional capacity of a setting to support desired activities (Proshansky et al., 1983; Raymond et al., 2010). These dimensions should therefore not be treated as interchangeable: identity captures symbolic meaning, dependence captures functional utility, and social and nature bonding capture important relational dimensions of the place. A central theoretical debate concerns whether attachment is driven primarily by social relationships and community ties or by physical and environmental qualities. Earlier work emphasized social environments (Hidalgo & Hernández, 2001; Kasarda & Janowitz, 1974; Lewicka, 2011), while more recent studies indicate that physical environments can also be highly influential and, in some contexts, may be more important than social environments (Li et al., 2019; Zhu et al., 2012). This debate is particularly relevant to second-home tourism because owners simultaneously seek social familiarity, symbolic belonging, and contact with distinctive natural environments, while their functional need for a particular location may be less central than it is for permanent residents.

The novelty and originality of this study lie in integrating four complementary dimensions of place attachment -place dependence, place identity, social bonding, and nature bonding- within a single empirical model of second-home tourism in a rural destination. While previous studies have examined individual dimensions of place attachment or have focused on residents and conventional tourists, limited attention has been given to how these dimensions jointly shape place attachment among second-home owners. By examining their relative effects and testing the subsequent relationship between place attachment and second-home tourism in Mazandaran, the study provides context-specific evidence on whether symbolic, social, natural, or functional relationships with place are most salient in explaining second-home demand. The study therefore contributes to the literature by connecting the multidimensional theory of place attachment with the specific phenomenon of second-home tourism and by highlighting the potentially greater role of affective and experiential relationships with

nature than purely functional place dependence.

The present study addresses this debate by bringing together four complementary dimensions of place attachment—place dependence, place identity, social bonding, and nature bonding—and examining their relative contributions among second-home owners. The selection of these variables follows the person–process–place framework of Scannell and Gifford (2010): place identity reflects the person-related symbolic dimension, social bonding captures the relational and social process through which attachment is formed, and nature bonding represents the physical/environmental dimension of place. Place dependence is included as the functional dimension of the place. This integrated model makes it possible to distinguish between attachment based on what a place means, the relationships it enables, the natural qualities it provides, and the functions it performs. The study is especially relevant to Mazandaran because the province combines strong natural attractions with rural cultural and social environments that have encouraged second-home development. The analysis therefore tests not only whether the four dimensions matter, but also whether the relative pattern of their effects can reveal what kind of place attributes are most salient to second-home owners.

2. Research Theoretical Literature

2.1. Rural Tourism

Rural tourism generally refers to tourism activities in rural areas (Dai, 2023). Rural tourism, as one of the methods used to promote economic development and attract tourists to rural areas, can be considered as an opportunity for economic development and employment in rural areas (UNWTO, 2022). In the 1970s, the depression and decline of rural economic and social structures in developed countries made rural tourism a key tool for the revival of rural areas and achieved remarkable progress to this end (Su, 2011; Su et al, 2019; Moradbakhsh, Hashemi and Pourahmad, 2026). Starting in developed countries, rural tourism is now emerging in both developed and developing countries (Su et al, 2019). Some of the advantages of rural tourism include experiencing life in a natural environment, getting acquainted with local culture and traditions, experiencing local cuisine, and also having the opportunity to buy local arts and crafts (UNWTO, 2022).

2.2. Second home tourism

Despite the fact that second homes are booming worldwide (Nouza et al., 2015; Roca, 2013), particularly in North America and Western Europe (Strapp, 1988), and Nordic countries (Nouza et al., 2015), there is a shortage of academic research on the topic (Hoogendoorn and Visser, 2015; Visser, 2008; Seraphin and Dosquet, 2020).

Rural tourism and its follower second home tourism is the result of extensive economic, social and cultural changes in the society after World War II. In our country, especially in the mountainous areas adjacent to big cities, as well as on the shores of the Caspian Sea, second homes have been expanding for the purpose of spending leisure time (Anabestani et al., 2017). Despite the recent history of the formation of second homes in rural areas, the tourism of second homes has recently experienced a revival, which can be explained by considering the new patterns of economic production and consumption (Williams & Hall, 2000). This trend is also a reaction against the rural crisis caused by the expanding agricultural restructuring (Müller, 2002). In some countries, owning second homes is considered an inevitable part of new life, and for this reason, more villages are domestic tourism destinations (Aleskogius, 1993). The development of second home tourism as a type of tourism in rural areas has affected various dimensions of development; This effect is both positive and negative (Aligholizadeh Firouzjaei et al., 2010; Salehi Naasab, 2005). As a form of tourism, second homes are associated with terms such as routine and novelty; inversion; back-to-nature; identity; surety, continuity; work; elitism; aspiration; and time and distance (Jaakson, 1986); vacation home; holiday home and leisure home (Roca, 2013). Similar to other forms of tourism, second home tourism

contributes to capital inflows; employment creation; income generation for small businesses such as grocery shops; restaurants; services and leisure companies; and construction companies (Hoogendoorn & Visser, 2015; Larsson & Müller, 2017; Visser, 2008), partly because second home owners tend to have more disposable income than local inhabitants (Larsson & Müller, 2017; Seraphin & Dosquet, 2020).

2.3. Place attachment

The interaction between man and place is examined in three cognitive, behavioral and emotional dimensions. The cognitive aspects of interaction are led to spatial perception, during which people recognize environmental elements and use them to navigate their way. Behavioral aspects of interaction refer to the activities and functional relationship between people and the environment. Affective engagement with a place refers to satisfaction and attachment to a place (Altman and Lowe, 1992). This connection can be so strong that it creates a link between the person and the components. In this regard, people's experiences are the main means of their perception.
Place attachment as one of the levels of the sense of place, since the early 1980s and following the concept of place in the 1960s, was raised as one of the important concepts in the field of environmental psychology (Pourjafar et al, 2014). The sense of place in people can motivate them to take care of their living environment and to return or become close to meaningful places (Mahmoodi et al, 2018). Shumaker and Taylor (1983) defined place attachment as a positive emotional bond or connection between people and their residential environment (Shumaker and Taylor, 1983). In a seminal study, Relph, (1976) claimed that place attachment develops as a result of the activities and behaviors of people in a particular environment, and with other people in that environment. Also, Tuan (1977) defined place attachment as the connections people make with their environment. Guthey, Whiteman, and Elmes (2014) defined place attachment in terms of the attachments people make to place as a result of their daily activities, their imaginations, their real live experiences and by what they read about a place. Regardless of the lack of a universal definition for place attachment, most researchers agree that place attachment if required if the place is to be successful (Shabak et al, 2015).

2.4. Place identity

Researchers interested in the biophysical dimension of place have placed considerable emphasis on a two-dimensional model of place attachment comprising of place identity and place dependence (Williams et al., 1992). Place identity refers to those dimensions of self, such as the mixture of feelings about specific physical settings and symbolic connections to place (Proshansky et al.,1983; Raymond et al, 2010). Place identity is the self-awareness of one's membership to a place related community, involving the emotional and evaluative significance of this membership (Belanche et al, 2021).

2.5. Place dependence

Place dependence refers to the functional or goal-directed connections to a setting; for example, it reflects the degree to which the physical setting provides conditions to support an intended use (Schreyer et al., 1981, Raymond et al, 2010). In fact, place dependence refers to a strong relationship between a person and a specific place, in which the quality of that place and the quality of alternative places are comparable to that place. The physical and functional quality of the place has a significant effect on the degree of dependence and belonging to the place as a bed for social activities and interactions (Ujang, 2012).

2.6. Social bonding

Most studies have focused on the social aspect of place attachment (Casakin et al., 2021, Lewicka, 2011, Scannell & Gifford, 2010, Sun et al., 2020, Verbrugge and van den Born, 2018). Social bonding includes people's desire to be members of a group, such as friends and family (Kasarda & Janowitz, 1974, Mesch and Manor, 1998), as well as emotional connections based on history, interests, and common concerns (Raymond et al., 2010). In general, groups, families and members of society and similar cultures are common in place attachment. Place attachment is related to those activities that people do in their cultural conditions (Hashemnezhad et al, 2013).

2.7. Nature bonding

Nature is related to many aspects affecting place attachment and place identity, such as climate, recreation, landscape, familiarity (lack of change) and possibilities to engage in urban or rural lifestyles (Husband, 2005). Intimate contact with the natural world, contributes to form meaningful bonds and positive values toward the natural environment (Hinds and Sparks, 2008; Ramezanzadeh Lasboyee and Samian, 2025; Torabi et al, 2025). rural lifestyles offer unique opportunities to develop meaningful place identities more focused on recreation (e.g. outdoor activities), privacy (e.g. opportunities for isolation), and self-determination (e.g. higher control of a given place) than urban ones (Husband, 2005; Belanche et al, 2021).

2.8. Theoretical rationale and hypotheses

The four predictors are theoretically distinct but complementary. Place identity reflects the symbolic incorporation of a place into the self and is expected to strengthen attachment when individuals perceive the destination as part of who they are (Proshansky et al., 1983; Belanche et al., 2021). Place dependence, in contrast, is primarily functional: it reflects the extent to which a setting provides opportunities that are difficult to obtain elsewhere (Schreyer et al., 1981; Raymond et al., 2010). Social bonding represents attachment generated through family, friendship, community, shared history, and common interests (Kasarda & Janowitz, 1974; Mesch & Manor, 1998), while nature bonding represents an affective relationship with landscape and the natural environment (Hinds & Sparks, 2008).

The expected influence of nature bonding deserves particular attention. Attention Restoration Theory proposes that contact with restorative natural environments can reduce mental fatigue and support psychological restoration (Kaplan, 1995). In rural destinations, landscapes, forests, coastlines, climate, and opportunities for outdoor recreation may therefore create affective value that extends beyond functional utility. This logic is consistent with evidence that affective connection with nature contributes to meaningful environmental relationships (Hinds & Sparks, 2008). In Mazandaran, the combination of the Caspian coastline, forests, wetlands, waterfalls, and mountain landscapes may make nature a particularly salient source of place meaning. Accordingly, the study does not assume that nature bonding must always be the strongest determinant; rather, it tests whether its effect is comparatively strong in this specific rural second-home context.

The social-versus-physical debate also leads to a theoretically informative test of place dependence. If second-home owners primarily value a destination for the functions it performs—recreation, accessibility, privacy, or other practical uses—place dependence should contribute to attachment. However, second homes are often used intermittently and are associated with leisure, lifestyle, identity, and emotional meanings (Jaakson, 1986; Roca, 2013). Functional dependence may therefore be weaker than identity, social, and nature-based bonds in this context. The non-significance of place dependence, if observed, would not mean that physical characteristics are irrelevant; rather, it would indicate that the functional dimension of the physical setting is less important than the symbolic and affective meanings attached to that setting. This distinction provides a more precise way of interpreting the social-versus-physical debate.

Based on this theoretical rationale, the study proposes the following hypotheses:

H1: Place dependence has a positive and significant effect on place attachment.

H2: Place identity has a positive and significant effect on place attachment.

H3: Social bonding has a positive and significant effect on place attachment.

H4: Nature bonding has a positive and significant effect on place attachment.

H5: Place attachment has a positive and significant effect on second-home tourism.

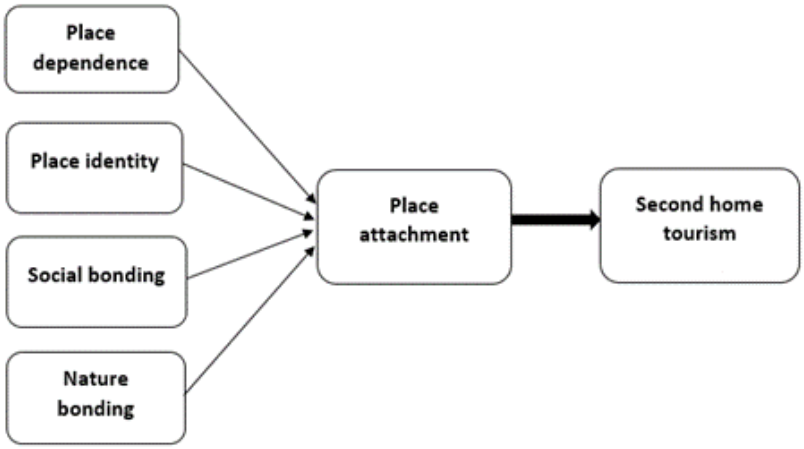


Figure 1. Conceptual model and hypothesized relationships

3. Research Methodology

This research is quantitative in nature and descriptive-analytical in terms of data analysis. Data were collected using library, documentary, field, and survey methods. The target population consisted of owners of second homes in Mazandaran Province. Because an official and complete sampling frame for all second-home owners was not available to the researchers, the population was treated as large/unknown for the purpose of initial sample-size estimation. this should be understood as a practical approximation rather than a literal claim that the population is infinite. In the sample size estimation method, since the statistical population is unlimited, the sample size was determined according to the Cochran's formula for an unlimited population:

$$n=\frac{Z^2 pq}{d^2}$$

with

Z = 1.96 (representing a 95% confidence interval), p = q = 0.5, and d as the allowable margin of error (0.05). The formula yielded a required sample of 384. However, to ensure higher reliability, 404 questionnaires were collected for the final analysis.

Sampling procedure- A snowball sampling technique was employed in this study. Respondents were recruited from across Mazandaran Province, ensuring that the sample was not confined to a specific geographic location.

Questionnaire design and measurement- The questionnaire measured place dependence, place identity, social bonding, nature bonding, place attachment, and second-home tourism. The precise number of items used for each construct is detailed in Appendix A, located at the end of this article. All items were measured using a five-point Likert scale.

Data analysis- The measurement and structural models were evaluated using partial least squares structural equation modeling (PLS-SEM). PLS-SEM was selected because the study is primarily predictive and examines a model with multiple latent constructs and a relatively complex set of relationships. Data analysis was conducted using SmartPLS software, version 4.

For the measurement model, factor loadings, Cronbach's alpha, Rho_A, composite reliability, and average variance extracted (AVE) were assessed. Convergent validity was considered satisfactory when AVE exceeded 0.50. For the structural model, bootstrapped t-statistics and p-values were used to evaluate the significance of the hypothesized paths; a two-tailed t-value above 1.96 and $p < 0.05$ were treated as evidence of statistical significance.

3.1 Geographical Scope of the Research

Mazandaran is located on the southern coast of the Caspian Sea, Iran. It is bordered clockwise by Golestan, Semnan and Tehran provinces. This province also borders Qazvin and Gilan to the west. According to the latest country divisions,

Mazandaran has 22 counties, 57 cities, 57 districts, 132 villages and 3645 villages. Mazandaran province has an area of 24091.3 square kilometers and occupies about 1.46% of the country's area. This province consists of plain and mountainous parts. Mazandaran province has many tourism potentials such as Mazandaran Sea, 12 forest parks, 9 national parks and wildlife areas, 12 important waterfalls, 10 lakes and hundreds of rivers, 4 wetlands, mineral waters and more than 170 historical and national monuments, which make this province It has become one of the most important tourist spots in Iran (FathTabar Firouzjah, 2011). Mazandaran province has many summer resorts such as Javaherdeh, Lavij, Lahijan, Kajur, Do Dange, Hazar Jarib and famous hot mineral waters such as Lavij, Larijan, Ramsar, Flaban and beautiful wetlands such as Miankale lagoon and peninsula. These attractions have increased the desire of people to have a second home in this province (Ourmozdi, 2007).

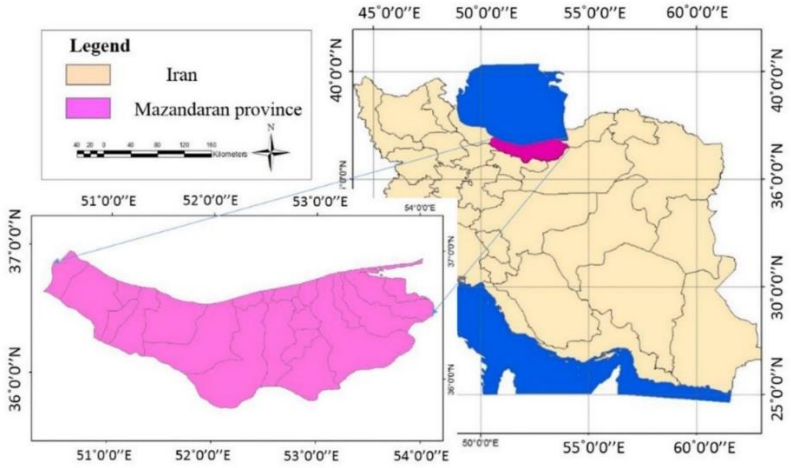


Figure 2. Geographical location of the studied area

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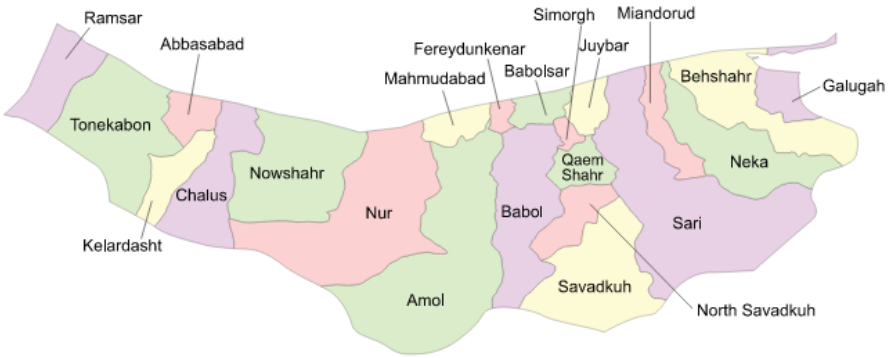


Figure 3. Map of Mazandaran province by city

Table 1. Variables related to research

Variable type	Name	objects	Source
Independent variable	Place dependence	place dependence refers to a strong relationship between a person and a specific place, in which the quality of that place and the quality of alternative places are comparable to that place.	Ujang, 2012
Independent variable	Place identity	Place identity is the self-awareness of one's membership to a place related community,	Belanche et al, 2021

Variable type	Name	objects	Source
		involving the emotional and evaluative significance of this membership.	
Independent variable	Social bonding	Social bonding includes people's desire to be members of a group, such as friends and family, as well as emotional connections based on history, interests, and common concerns.	Kasarda and Janowitz, 1974, Mesch and Manor, 1998
Independent variable	Nature bonding	Nature is related to many aspects affecting place attachment and place identity, such as climate, recreation, landscape, familiarity (lack of change) and possibilities to engage in urban or rural lifestyles.	Husband, 2005
Mediator	Place attachment	Place attachment can be defined as a positive emotional bond or connection between individuals and their residential environment.	Shumaker & Taylor, 1983
Dependent variable	Second home tourism	Rural tourism and its follower second home tourism is the result of extensive economic, social and cultural changes in the society after World War II. In our country, especially in the mountainous areas adjacent to big cities, as well as on the shores of the Caspian Sea, second homes have been expanding for the purpose of spending leisure time.	Anabestani et al,2017

4. Research Findings

4.1. Descriptive Indicators of the Study

The descriptive findings indicate that 48.3% of the respondents were male and 51.7% were female. In terms of age, 44.8% were 20–35 years old, 30.4% were 36–50 years old, and 24.8% were above 50. Regarding education, respondents with a bachelor's degree represented the largest group (49.0%), whereas respondents with guidance-school education represented the smallest group (1.2%).

Table 2. Descriptive Characteristics (Gender, Age and Education) of the Respondents

Variables		Frequency	Percentages
Gender	Male	195	48.3
	Female	209	51.7
	Total	404	100.0
Age	20-35	181	44.8
	36-50	123	30.4
	Above 50	100	24.8
	Total	404	100.0
Education	Guidance school	5	1.2
	diploma	101	25.0
	Bachelor	198	49.0
	Master	87	21.5
	P.H.D and above	13	3.2
	Total	404	100.0

According to Table 3, 32.9% of respondents were private-sector employees, 4.7% were public-sector employees, 38.4% were self-employed, 11.6% were retired, 10.4% were housewives, and 2.0% were unemployed.

Table 2. Job Status of Respondents

Variables		Frequency	Percentages
Job Status	Private sector employees	133	32.9
	Public sector employees	19	4.7
	self-employed	155	38.4
	retired	47	11.6
	housewives	42	10.4
	unemployed	8	2.0
	Total	404	100.0

As shown in Table 4, most respondents (60.4%) reported a monthly family income of more than 25 million tomans.

Table 4. The Monthly Income of the Respondents

Variables		Frequency	Percentages
The amount of family income	Less than 5 million tomans	1	2
	5 to 10 million tomans	6	1.5
	10 to 15 million tomans	18	4.5
	15 to 20 million tomans	62	15.3
	20 to 25 million tomans	73	18.1
	More than 25 million tomans	244	60.4
	Total	404	100.0

4.2. Inferential Findings

Examination of Factor Loadings of the Observed Variables- The factor loading of each observed item on its corresponding latent construct was examined. Following the study's screening criterion of 0.40, all retained items had factor loadings above 0.40, indicating an acceptable relationship between the observed indicators and their respective constructs.

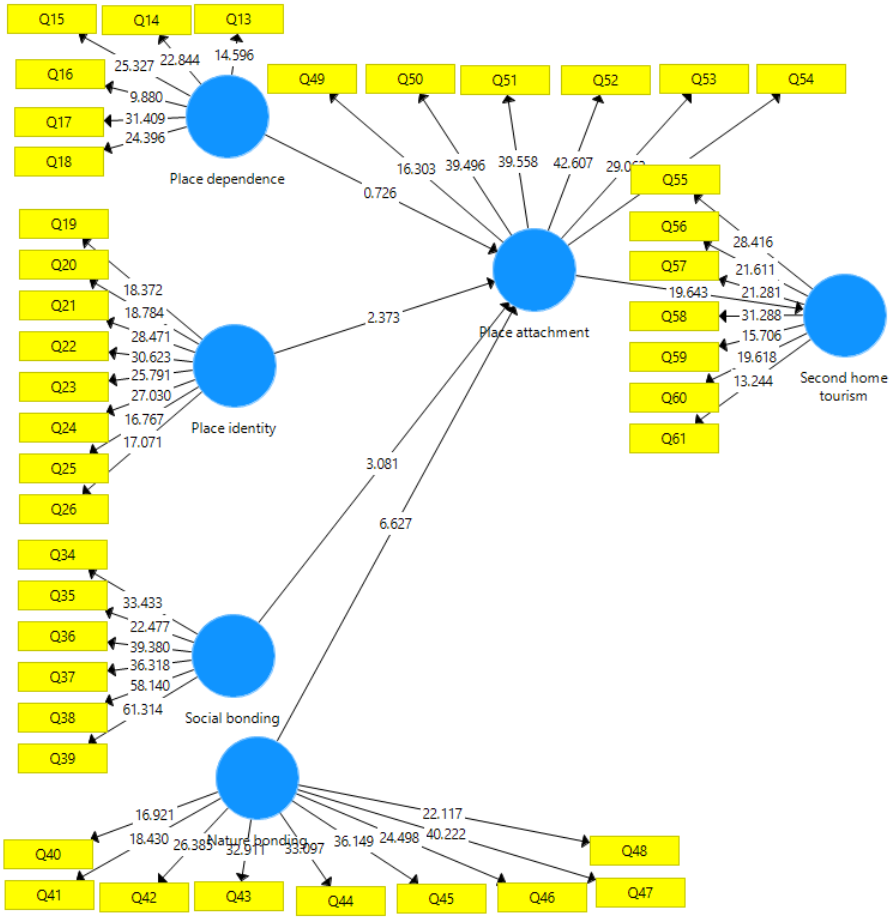


Figure 4. Primary measurement model in the screening mode of factor loads

Reliability Check- Reliability was assessed using Cronbach's alpha, Rho_A, and composite reliability. As shown in Table 5, all constructs exceeded the commonly used 0.70 threshold for internal consistency. Composite reliability was also above 0.70 for every construct, providing additional evidence that the measurement scales were reliable.

Convergent Validity- Convergent validity was assessed using average variance extracted (AVE). All constructs reported AVE values above 0.50 (Table 5), indicating that each construct explained more than half of the variance in its observed indicators and therefore demonstrated satisfactory convergent validity.

Table 3. Reliability and validity check

	Cronbach's Alpha	Rho _A	Composite Reliability	Average Variance Extracted (AVE)
Nature bonding	0.937	0.94	0.947	0.665
Place attachment	0.895	0.903	0.92	0.66
Place dependence	0.844	0.852	0.888	0.574
Place identity	0.898	0.901	0.918	0.584
Second home tourism	0.911	0.915	0.93	0.657
Social bonding	0.922	0.935	0.939	0.718

Examination of Direct Effects- The structural model was evaluated by examining the path coefficients, t-statistics, and p-values. A two-tailed t-statistic greater than 1.96 and a p-value below 0.05 were used as criteria for statistical significance. Nature bonding had a positive and significant effect on place attachment ($\beta = 0.475$, $t = 6.627$, $p < 0.001$). Place attachment also had a strong positive and significant effect on second-home tourism ($\beta = 0.757$, $t = 19.643$, $p < 0.001$).

Place identity (β = 0.181, t = 2.373, p = 0.018) and social bonding (β = 0.229, t = 3.081, p = 0.002) were also significant positive predictors of place attachment. In contrast, place dependence was not statistically significant (β = 0.054, t = 0.726, p = 0.468).

Table 4. The result of the path coefficient check

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Nature bonding - Place attachment	0.475	0.475	0.072	6.627	0
Place attachment - Second home tourism	0.757	0.764	0.039	19.643	0
Place dependence - Place attachment	0.054	0.053	0.074	0.726	0.468
Place identity - Place attachment	0.181	0.186	0.076	2.373	0.018
Social bonding - Place attachment	0.229	0.227	0.074	3.081	0.002

5. Discussion and Conclusion

Second home tourism is considered as an important part of tourism activity. In fact, second home tourism is one of the models of tourism development in rural areas. These houses are bought and built in rural areas for recreational and leisure purposes and are used temporarily in some days of the year and mostly during weekends, holidays and summer (Rezvani, 2008).

The findings provide a more nuanced picture of place attachment among second-home owners than a simple confirmation of the hypotheses. H1, which proposed a positive effect of place dependence on place attachment, was not supported (β = 0.054, t = 0.726, p = 0.468). This result is theoretically important because place dependence captures the functional or goal-directed relationship with a setting, whereas the other dimensions in the model capture symbolic, social, or affective bonds. Second-home owners use their properties intermittently, primarily for leisure and temporary residence, and second-home tourism has long been associated with escape, lifestyle, identity, and emotional meanings rather than with the necessity of using one particular place for everyday functions (Jaakson, 1986; Roca, 2013). The non-significant effect therefore suggests that, in this context, functional utility alone may be insufficient to generate strong place attachment. This finding does not imply that the physical qualities or amenities of Mazandaran are unimportant; rather, it indicates that their functional usefulness may be less salient than the meanings, relationships, and emotional experiences that owners associate with the destination.

H2 was supported: place identity had a positive and significant effect on place attachment (β = 0.181, t = 2.373, p = 0.018). This result is consistent with the view that people develop stronger attachment when a place becomes incorporated into their sense of self and acquires symbolic and evaluative meaning (Proshansky et al., 1983; Belanche et al., 2021). For second-home owners, the destination can function as more than a convenient location for recreation: it can represent a preferred lifestyle, memories, continuity, and a distinctive rural identity. The positive effect of social bonding (H3: β = 0.229, t = 3.081, p = 0.002) further indicates that attachment is also relational. This finding accords with research emphasizing community ties, family and friendship networks, shared histories, and social interaction as important foundations of place attachment (Kasarda & Janowitz, 1974; Mesch & Manor, 1998; Lewicka, 2011). Together, these results suggest that second-home attachment is partly produced through the meanings and relationships that owners develop around the destination, not simply through its physical functionality.

H4 received the strongest support among the four antecedents of place attachment: nature bonding had a positive and significant effect, with the largest path coefficient in the model (β = 0.475, t = 6.627, p < 0.001). This finding is theoretically consistent with the restorative role of natural environments described by Attention Restoration

Theory (Kaplan, 1995) and with evidence that affective connections to nature can produce meaningful bonds with environmental settings (Hinds & Sparks, 2008). Mazandaran provides a particularly relevant context for this mechanism because its tourism appeal includes the Caspian coastline, forests, wetlands, waterfalls, lakes, and mountainous landscapes. For owners who use their second homes as places of escape from urban routines, these natural qualities can become central to the emotional meaning of the destination. The result also helps reconcile the social-versus-physical debate identified in the literature: the physical environment matters, but the present findings suggest that its affective and experiential meaning (nature bonding) is more influential than its purely functional dimension (place dependence). Thus, the study's contribution is not simply that physical factors matter; it is that the type of relationship people develop with the physical environment appears to matter.

H5 was also strongly supported: place attachment had a positive and substantial effect on second-home tourism ($\beta = 0.757$, $t = 19.643$, $p < 0.001$). This result indicates that stronger emotional bonds with a destination are associated with greater second-home tourism and helps explain why second-home development can persist beyond purely economic or functional motivations. Taken together, the results show a clear hierarchy within the proposed model: nature bonding is the strongest antecedent of place attachment, followed by social bonding and place identity, whereas place dependence is not significant. The model therefore supports an interpretation of second-home demand that emphasizes affective, symbolic, social, and environmental meanings. This pattern is particularly relevant for rural destinations where the attractiveness of the landscape and the experience of rural life are central to the tourism product.

Practical implications follow directly from this pattern. First, destination marketing organizations should promote the distinctive natural and cultural identity of Mazandaran rather than relying primarily on functional amenities. Campaigns aimed at potential second-home buyers can emphasize the province's landscapes, rural heritage, local traditions, and opportunities for restorative leisure. Second, policymakers and destination managers should protect forests, wetlands, coastlines, and other natural assets because environmental degradation may weaken the nature-based bonds that underpin place attachment. Third, local authorities can support initiatives that facilitate constructive interaction between second-home owners and host communities, such as local cultural events, community-based tourism activities, and participatory destination initiatives. Finally, planning policies should recognize that second-home demand is not only a market for housing or recreation; it is also connected to emotional investment in place. Managing second-home development in ways that preserve environmental quality and strengthen local cultural and social relationships may therefore contribute to more sustainable rural tourism development.

Future research should examine the model across different rural and coastal destinations in Iran to determine whether the relative importance of nature, social, identity, and functional dimensions varies by destination type. Comparative studies could also examine permanent residents and second-home owners separately, test whether frequency and duration of second-home use moderate place attachment, and investigate how environmental degradation or changes in host-community relations affect the relationship between place attachment and second-home demand.

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Authors' contributions

The authors equally contributed to the preparation of this article.

Conflict of interest

The author declares no conflict of interest.

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Original Article

تحلیل رابطه میان دلبستگی به مکان و افزایش خانه‌های دوم در مقاصد گردشگری روستایی (مورد مطالعه: استان مازندران، ایران)

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چکیده

مبسوط

۱. مقدمه

در عصر حاضر با تسارع شهرنشینی و تغییر سبک زندگی به سمت فعالیت‌های پرشتاب، سلامت جسمی و روانی شهرنشینان با چالش‌های جدی مواجه شده است. خستگی ذهنی ناشی از استرس‌های زیست شهری، یکی از شکایات رایج در جوامع مدرن است که منجر به فرسایش منابع روان‌شناختی و اجتماعی افراد می‌گردد. طبق «نظریه بازیابی توجه» محیط‌های طبیعی و توانایی بازسازی تمرکز از طریق تعامل با طبیعت، ابزاری کلیدی برای کاهش استرس و بهبود وضعیت عاطفی هستند. در این راستا، گردشگری خانه‌های دوم به‌عنوان یکی از الگوهای مهم توسعه در مناطق روستایی ظهور کرده است. این پدیده که از اواسط دهه ۱۹۴۵ میلادی با انگیزه‌هایی نظیر تمایل به تفریحات سالم غیرشهری، بهبود زیرساخت‌های حمل‌ونقل و سرمایه‌گذاری شخصی رونق گرفته، فرصت‌های اقتصادی و اجتماعی-فرهنگی ویژه‌ای را برای مناطق با پتانسیل‌های طبیعت بکر فراهم آورده است. از این جهت؛ با توجه به اهمیتی که موضوع افزایش خانه‌های دوم در مناطق روستایی دارد و هم‌چنین با توجه به خلا علمی و شکاف پژوهش که در ارتباط با پژوهش‌های انجام شده پیشین در این زمینه وجود دارد، می‌توان به لزوم انجام این پژوهش پی برد. از این رو؛ هدف اصلی این مقاله تحلیل رابطه بین دلبستگی به مکان و افزایش خانه های دوم در مقاصد گردشگری روستایی استان مازندران می باشد. همچنین این مقاله ۴ هدف فرعی را دنبال می کند که عبارتند از: بررسی رابطه بین هویت مکانی و دلبستگی به مکان، بررسی رابطه بین وابستگی به مکان و دلبستگی به مکان، بررسی رابطه پیوند اجتماعی و دلبستگی به مکان، بررسی رابطه بین پیوند طبیعت و دلبستگی مکانی.

۲. مبانی نظری تحقیق

پژوهش حاضر بر پایه مفهوم «دلبستگی به مکان» استوار است؛ پیوند عاطفی و ادراکی که افراد با محیط‌های فضایی برقرار می‌کنند تا در آن‌ها احساس راحتی و امنیت یابند. از منظر پدیدارشناسان، این دلبستگی از طریق درک نمادهای روزمره و فعالیت‌های محیطی عمیق‌تر می‌شود. در این راستا، مدل سه‌گانه «فرد-فرآیند-مکان») و مدل دوبعدی دلبستگی (شامل هویت مکان و وابستگی به مکان) مبنای تبیین روابط در این تحقیق هستند. هویت مکانی، فرآیند تعریف خود از طریق تعلق به یک مکان خاص است، در حالی که دلبستگی مکانی از دو جنبه اصلی «طبیعت» (ابعاد بیوفیزیکی) و «جامعه» (ابعاد اجتماعی) تشکیل می‌شود. اگرچه مطالعات سنتی بر اهمیت محیط‌های اجتماعی در شکل‌گیری دلبستگی تاکید داشتند، اما شواهد اخیر نشان می‌دهند که محیط‌های فیزیکی و طبیعی نیز نقشی حیاتی و گاه تعیین‌کننده در شکل‌گیری این پیوند ایفا می‌کنند. در این زمینه تعاریف مفاهیم اصلی موجب درک بهتر موضوع می‌شود. هویت مکان، خودآگاهی از عضویت فرد در یک جامعه مرتبط با مکان است و در واقع به عنوان ارزش و احساسی تعریف می‌شود که فرد به سبب عضویت در یک جامعه پیدا می‌کند. اما وابستگی به مکان به رابطه قوی بین یک فرد و یک مکان خاص اشاره دارد که در آن کیفیت آن مکان و کیفیت مکان های جایگزین با آن مکان قابل مقایسه است. پیوند اجتماعی نیز شامل تمایل افراد برای عضویت در یک گروه، مانند دوستان و خانواده و همچنین ارتباطات عاطفی بر اساس خاطرات، علایق و نگرانی های مشترک است. طبیعت با بسیاری از جنبه‌های تأثیرگذار بر دلبستگی به مکان و هویت مکان ، مانند آب و هوا، تفریح، منظره و امکان درگیر شدن در سبک زندگی شهری یا روستایی مرتبط است. تماس صمیمانه با دنیای طبیعی نیز، به شکل گیری پیوندهای معنادار و ارزش های مثبت نسبت به محیط طبیعی کمک می کند.

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۳. روش تحقیق

این پژوهش از نظر ماهیت، مطالعه‌ای کمی و از نظر هدف، توصیفی-تحلیلی است. داده‌های پژوهش از طریق روش‌های کتابخانه‌ای، اسنادی و پیمایشی گردآوری شده‌اند. جامعه آماری هدف، مالکان خانه‌های دوم در مقاصد گردشگری روستایی استان مازندران هستند. جهت تحلیل مدل مفهومی و آزمون فرضیات، از مدل‌سازی معادلات ساختاری با استفاده از نرم‌افزار PLS استفاده شده است.

۴. یافته های تحقیق

تحلیل داده‌ها نشان داد که دلبستگی مکانی، متغیر وابسته اصلی در رابطه با گردشگری خانه‌های دوم است. نتایج مدل ساختاری حاکی از آن است که متغیرهای «هویت مکانی»، «پیوند اجتماعی» و «پیوند با طبیعت» تأثیر معناداری بر تقویت دلبستگی به مکان دارند. با این حال، برخلاف برخی پیش‌فرض‌های نظری، متغیر «وابستگی به مکان» تأثیر معناداری بر دلبستگی به مکان نشان نداد. این یافته‌ها تأکید می‌کنند که در مقاصد گردشگری، میزان کیفیت تعامل با طبیعت و هویت اجتماعی محیط، تعیین‌کننده اصلی سطح دلبستگی است. بنابراین اگر در مکانی به هویت مکان، پیوند اجتماعی و پیوند طبیعت در مکان بیشتر توجه شود، دلبستگی افراد نسبت به آن مکان افزایش یافته و در نتیجه باعث افزایش تعداد گردشگری خانه دوم در آن مکان می شود.

۵. بحث و نتیجه گیری

یافته‌های این تحقیق مؤید آن است که توسعه پایدار گردشگری خانه‌های دوم در مناطق روستایی، به‌ویژه در استان مازندران، مستلزم مدیریت هوشمندانه ابعاد محیطی و اجتماعی است. از آنجا که دلبستگی مکانی مستقیماً بر پذیرا بودن و افزایش گردشگری خانه‌های دوم اثر می‌گذارد، سیاست‌گذاران باید بر تقویت هویت مکانی و بهبود پیوندهای اجتماعی و طبیعی تمرکز کنند. در واقع، ایجاد محیط‌هایی که در آن‌ها فرد احساس تعلق و پیوند با طبیعت را تجربه کند، نه تنها سطح دلبستگی را افزایش می‌دهد، بلکه باعث تداوم حضور گردشگران و توسعه اقتصادی مناطق روستایی می‌گردد.

کلیدواژه ها: دلبستگی به مکان، گردشگری خانه دوم، گردشگری روستایی، مازندران.

تشکر و قدردانی

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Original Article

Explaining a Participatory Governance Framework for Sustainable Rural Tourism Development: A Qualitative Study in Western Mazandaran Province

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Abstract

Purpose- Sustainable rural tourism development requires the establishment of a governance system based on participation, institutional interaction, and local community empowerment. Despite the considerable tourism potential of western Mazandaran Province, the lack of a context-specific framework for participatory governance has posed challenges to the realization of sustainable development. Therefore, this study aims to explain a participatory governance framework for achieving sustainable rural tourism development in western Mazandaran Province.

Design/methodology/approach- This applied research adopts a qualitative approach. Data were collected through 25 semi-structured interviews with academic experts, managers, and practitioners in the fields of tourism and rural development. Participants were selected through purposive sampling, and interviews continued until theoretical saturation was reached. The data were analyzed using thematic analysis based on the thematic networks approach proposed by Attride-Stirling (2001).

Finding- The analysis of the data resulted in the extraction of 50 initial codes, 10 concepts, 5 basic themes, 3 organizing themes, and one global theme. The global theme of the study was identified as a participatory governance framework for sustainable rural tourism development based on institutional interaction, local community empowerment, and strategic management of natural and cultural resources. The findings showed that participatory governance can be effective when coordination and interaction among responsible institutions, genuine stakeholder participation, economic and social empowerment of local communities, integrated destination management, protection of natural and cultural resources, strategic planning, infrastructure development, and entrepreneurship promotion are pursued synergistically. Furthermore, the findings indicated that local community empowerment plays a driving role in enhancing participation, strengthening social capital, improving the quality of decision-making, and increasing the resilience of rural tourism destinations.

Practical Implications- Establishing integrated destination management mechanisms, strengthening coordination among responsible institutions, developing the capacities and skills of local communities, supporting local entrepreneurship and indigenous businesses, expanding stakeholder participation in decision-making processes, and protecting natural and cultural resources are among the most important strategies for achieving participatory governance and sustainable rural tourism development in the region.

Originality/value– The originality of this study lies in developing a context-specific participatory governance framework based on thematic analysis and tailored to the characteristics of western Mazandaran Province. By integrating institutional, managerial, and social dimensions, the proposed framework can serve as a practical basis for policymaking, planning, and managing sustainable rural tourism development at both regional and national levels.

Keywords- Participatory governance, Sustainable development, Rural tourism, Thematic Analysis, Western Mazandaran Province.

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1. Introduction

Tourism has become one of the most important sectors of the global economy and a major source of economic growth and development in recent decades. As one of the world's most dynamic economic activities, tourism plays a significant role in the economic and social development of regions and countries and is recognized in many countries as a leading industry and a major source of income and employment (Altassan, 2023; Javan & Mohammadi, 2025). Moreover, by strengthening local economies, improving public welfare, developing infrastructure, and supporting regional development, tourism makes a significant contribution to the achievement of sustainable development (Javan & Pourgharib, 2024).

Meanwhile, rural tourism has increasingly attracted the attention of policymakers and researchers as an effective strategy for sustainable development. Many rural areas face challenges such as weak governance, economic stagnation, declining employment opportunities, and environmental problems. Therefore, the development of rural tourism can play an important role in revitalizing rural communities by creating employment and income opportunities, diversifying local economies, preserving cultural and natural heritage, strengthening infrastructure, and improving social welfare (Javan & Jamini, 2025). Moreover, by strengthening economic structures and creating new development opportunities, rural tourism can contribute to regional development; however, realizing these potentials requires appropriate planning, effective management, and a reassessment of existing management mechanisms (Karampour et al., 2026). In this regard, rural tourism development can also improve the quality of life of local communities by diversifying economic activities, increasing household incomes, reducing migration, strengthening local identity, and protecting the environment(Naim Abadi et al., 2023; Lane & Kastenholz, 2015).

Despite these potentials, achieving sustainable tourism development is not limited to infrastructure development or the utilization of natural and cultural attractions; rather, it requires the active and empowered involvement of local communities throughout all stages of tourism planning, implementation, and management. Effective participation can be achieved when local communities possess the necessary capacities in areas such as education, tourism skills, entrepreneurship, human capital, access to financial resources, and social capacities. Such conditions enable local residents to move from passive recipients of services to key actors in tourism management and development. Research evidence also indicates that community-based tourism, by enhancing economic, social, and cultural empowerment, particularly among rural women, provides a basis for increasing participation, strengthening human capital, and achieving sustainable development (Shamsoddini & Dehghani, 2024).

Furthermore, sustainable rural tourism development requires the empowerment of local communities across economic, social, and environmental dimensions. Strengthening employment and income opportunities, enhancing local education and skills, increasing social participation, and promoting responsibility for environmental protection provide the necessary capacity for residents to participate effectively in tourism-related decision-making and create the conditions for participatory governance (Rezaei Tabar et al., 2025). In this regard, capacity building and empowerment through skills development, strengthening collaborative networks, enhancing local leadership, and increasing decision-making capacity not only strengthen local community support for tourism development but also constitute fundamental pillars of sustainable development and participatory governance in tourism destinations (Franco & Tracey, 2019; Khalid et al., 2019; Shafiei Sabet & Herati Fard, 2019).

In recent years, participatory governance has received increasing attention as one of the emerging approaches to tourism destination management. This approach emphasizes establishing institutional arrangements for collaboration, trust-building, transparency, continuous interaction, and the active participation of stakeholders in decision-making, planning, and management processes (Ghanbari Ghadikolaei et al., 2025). According to the collaborative governance model proposed by Ansell and Gash, the success of participatory governance depends on the development of face-to-face dialogue, mutual trust, shared commitment, a common

understanding of goals, appropriate institutional design, facilitative leadership, and the achievement of incremental outcomes. The realization of these components can help reduce conflicts, strengthen collaboration among stakeholders, and facilitate participatory decision-making, thereby enabling the sustainable management of tourism destinations (Ansell & Gash, 2008).

Western Mazandaran Province, comprising the counties of Chalus, Nowshahr, Kelardasht, Abbasabad, Tonekabon, and Ramsar, is considered one of the country's major tourism areas due to its rich natural and cultural attractions, including the Hyrcanian forests, the Caspian Sea coast, tourism-targeted villages, eco-lodges, and cultural heritage. Despite these potentials, rural tourism development in the region faces challenges such as fragmented management, weak institutional coordination, limited local community participation, uneven infrastructure development, pressure on natural resources, and the unequal distribution of tourism benefits. These challenges indicate that the issue of rural tourism in the region is not merely a lack of tourism potential; rather, it is also related to how relationships among actors, institutions, and local communities are organized within development-related decision-making and management processes.

Within the literature on participatory governance in tourism, previous studies have mainly emphasized the importance of local community participation, social capital, stakeholder empowerment, institutional coordination, destination management, and the protection of natural and cultural resources. However, the fundamental issue is not merely the identification of these components; rather, how they are interconnected and interact within an integrated governance system remains insufficiently explained. In other words, although existing studies have demonstrated that resident participation, institutional support, and local community empowerment are among the factors contributing to tourism sustainability, it remains unclear how these components are connected at the destination level, what mechanisms transform stakeholder participation into an effective capacity for tourism decision-making and management, and how interactions among formal institutions, local communities, and other stakeholders can simultaneously support local economic development, equitable benefit distribution, and the protection of natural and cultural resources. From this perspective, the existing research gap is not merely a geographical gap, but rather a conceptual gap in explaining how the components of participatory governance are organized and interact in the context of sustainable rural tourism development.

This research gap is particularly important in western Mazandaran Province, where the local economy's dependence on tourism, the simultaneous presence of multiple stakeholders, the involvement of numerous institutions, and the high sensitivity of natural and cultural resources have made tourism development a multidimensional and multilevel issue. Under such conditions, understanding the mechanisms of interaction among formal institutions, local communities, and other stakeholders, and explaining how participation, empowerment, institutional coordination, and sustainable destination management are interconnected, can provide a more appropriate basis for policymaking and planning for rural tourism.

Accordingly, the present study was conducted to explain a participatory governance framework for sustainable rural tourism development in western Mazandaran Province and seeks to answer the following question: What are the themes and conceptual relationships that constitute this framework, and how are they organized within an integrated structure? To address this question, the perspectives of experts and practitioners in the fields of tourism and rural development were analyzed using a qualitative approach and thematic analysis method to identify and explain the components and conceptual relationships shaping participatory governance in the study context.

2. Research Theoretical Literature

Governance has shifted in recent decades from traditional state-centered models toward network-based, participatory, and multilevel approaches. From this perspective, the management of public affairs is no longer the sole responsibility of the government; rather, a range of governmental institutions, the private sector, non-governmental organizations, and civil society participate in policymaking, decision-making, and program implementation processes. Within this framework, governance methods and instruments can be broadly categorized into hard and soft instruments. Hard or traditional instruments are primarily based

on laws, legal requirements, and hierarchical top-down structures, whereas soft instruments rely on interaction, dialogue, participation, trust-building, and collaboration among stakeholders and generally follow a bottom-up approach. Participatory governance methods and instruments fall within the category of soft instruments and, due to their greater reliance on collaboration and interaction, have demonstrated greater effectiveness in addressing complex development issues (Mirbagheri, 2023).

Participatory governance is one of the emerging approaches to governance that emphasizes the active participation of citizens and other stakeholders throughout all stages of policymaking, decision-making, implementation, and evaluation. This approach seeks to achieve more sustainable, legitimate, and effective agreements by fostering continuous interaction among government, the private sector, and civil society (Halim, 2018). From a theoretical perspective, participatory governance is also considered a subfield of governance theory, with its primary objective being to deepen citizen participation in governance processes through participatory decision-making mechanisms (Fischer, 2012).

Participation is now recognized as one of the key pillars of sustainable development, and managers and planners seek to enhance the effectiveness of development programs and projects by promoting public participation (Mirbagheri & Jalili, 2023). One of the most important components of participatory governance is the active and informed participation of local communities in governance processes. Such participation encompasses the responsible involvement of residents in policymaking, planning, decision-making, implementation, monitoring, and evaluation of development programs and, through interaction among government, the private sector, and local communities, provides a basis for achieving development objectives (Mirbagheri, 2023). Developing and establishing an appropriate framework for stakeholder participation in tourism is also of particular importance, as considering stakeholders' perspectives and demands not only enhances transparency in planning but also strengthens cohesion, mutual understanding, and collaboration among them (Bahadori et al., 2022).

Sustainable tourism development is also a comprehensive approach that simultaneously addresses the economic, social, cultural, institutional, and environmental dimensions. From this perspective, the conservation of natural and cultural resources, alongside the achievement of economic benefits and social participation, is considered one of the main objectives of development (Esmaeilzadeh, 2023). Furthermore, sustainable rural tourism aims to improve residents' quality of life by maintaining a balance among environmental protection, economic development, social justice, and the preservation of cultural identity (Khadem Hosseini et al., 2025).

Rural tourism is recognized as one of the most important strategies for the development and revitalization of rural areas and can contribute significantly to rural development by creating employment, diversifying economic activities, increasing household incomes, and reducing regional inequalities (Imani & Madani, 2024). However, sustainable rural tourism development is a multidimensional process influenced by the interaction of economic, social, managerial, environmental, and human factors. Research has shown that residents' positive perceptions of the economic, social, and environmental benefits of tourism play a decisive role in their support for sustainable tourism development (Demirović Bajrami et al., 2020). Moreover, achieving sustainable development requires the coordinated management of influential factors, the strengthening of infrastructure, environmental protection, and the formulation of targeted policies (Weng et al., 2021).

In rural areas, participatory governance is particularly important, as tourism development, in addition to creating economic opportunities, can have far-reaching social, cultural, and environmental impacts. The active participation of rural municipalities, Islamic village councils, local communities, investors, tourism practitioners, and executive agencies can help reduce conflicts, improve the quality of decision-making, and facilitate the sustainable use of resources. In recent years, the sustainable rural tourism development approach has also shifted from a primary focus on economic benefits toward participatory governance, social justice, local resilience, and network-based management.

On the other hand, recent studies have shown that sustainable rural tourism development without the effective participation of stakeholders, particularly

local communities, faces serious challenges in planning and governance processes. In contrast, the adoption of participatory governance and the strengthening of collaboration among stakeholders can facilitate the achievement of sustainable outcomes, enhance the perceived value of the destination, and improve the quality of tourism governance (Reina-Usuga et al., 2024). Furthermore, local community participation is considered one of the fundamental pillars of sustainable tourism development, as it not only improves the quality of tourism products and services but also creates employment opportunities, preserves cultural values, promotes the equitable distribution of benefits, and strengthens long-term collaboration among all stakeholders (Imani & Madani, 2024).

However, participation can be effective only when local communities possess the necessary capacities and capabilities. Local community empowerment encompasses education, the enhancement of tourism-related skills, entrepreneurship development, strengthening human capital, access to financial resources, and increasing social capacities. These processes enable local communities to move from the position of service recipients to that of key actors in tourism management and governance. In addition to enhancing participation, this process can contribute to strengthening resilience and self-reliance and promoting the sustainable development of tourism destinations.

Alongside participation and empowerment, tourism destination management is also considered one of the essential pillars of participatory governance. Within the framework of destination governance, destination management encompasses a set of mechanisms for policymaking, planning, institutional coordination, and stakeholder coordination aimed at enhancing destination competitiveness, promoting sustainable tourism development, and fostering coordination among responsible institutions, the private sector, and local communities. In this framework, integrated destination management, the designation of a clear responsible authority, intersectoral coordination, and the active participation of stakeholders are considered key components of destination governance (Ghaderi et al., 2023).

In contemporary approaches, tourism destination management extends beyond the development of tourism infrastructure and encompasses a range of strategic activities, including integrated planning, stakeholder coordination, conflict management, improving the tourism business environment, destination marketing, enhancing competitiveness, protecting natural and cultural resources, and continuously monitoring performance. Achieving these objectives requires the establishment of a destination governance system based on integrated management, stakeholder participation, and entrepreneurial approaches (Ghaderi et al., 2024).

2.1 Review of Literature

Recent studies indicate that participatory governance and stakeholder participation have become central to sustainable rural tourism development. Both domestic and international studies have examined the roles of local community participation, institutional capacities, destination management, empowerment, and resource conservation in tourism development from different perspectives. Reviewing these studies not only helps clarify the evolution of previous research but also reveals the existing research gaps.

Khaksar Shahmirzadi and Alipour (2026) conducted a mixed-methods study in Shahmirzad to examine local community participation in tourism development. The findings revealed a gap between the capacity of the local community and its actual role in tourism governance. Despite residents' support for participation, tourism development has not yet been institutionalized. The researchers emphasized strengthening participatory governance, institutional coordination, and participation-oriented planning. These findings are consistent with the present study in emphasizing the importance of local community participation and institutional interaction. Shamsoddini (2025) examined the role of local community participation in achieving sustainable rural tourism development. The results showed that the economic dimension of tourism was the most important factor influencing the sustainable development of rural communities, followed by the environmental, educational–recreational, and socio-cultural dimensions. The findings also emphasized that active local community participation, interaction between host communities and tourists, strengthening social capital, and participation-oriented planning are among the most important prerequisites for achieving sustainable rural tourism development and enhancing the resilience of local communities.

Tadayoni Nezhad et al. (2025) investigated the role of participatory governance dimensions in sustainable rural tourism development. The results indicated that local community participation and the effectiveness and efficiency of local management had positive and significant effects on sustainable rural tourism development, with these two variables explaining 34% of the variance in sustainable tourism development. The researchers concluded that strengthening genuine stakeholder participation, improving the efficiency of local management, participatory policymaking, and utilizing local capacities are among the most important requirements for achieving sustainable rural tourism development. Gholamian Sefiddarboni and Choobchian (2025) conducted a qualitative study based on the analysis of upstream policy documents to examine the synergy between good governance and participatory planning in implementing nature-based solutions. The findings showed that active stakeholder participation, transparency, interinstitutional collaboration, and multilevel governance are among the important factors contributing to the successful implementation of these solutions and sustainable development. This study is consistent with the present research in emphasizing the roles of participation, institutional coordination, and multilevel governance; however, the present study specifically focuses on participatory governance for sustainable rural tourism development in western Mazandaran Province. Imani and Madani (2024), in a study Index, examined the role of local community participation in rural tourism development and sustainable employment creation. The findings showed that active local community participation, strengthening social capital, coordination among local institutions, rural tourism development, and sustainable employment creation have mutually reinforcing relationships. The researchers also emphasized that achieving sustainable rural tourism development requires strengthening participatory mechanisms, empowering local communities, and supporting managerial institutions.

Chen et al. (2025) examined participatory governance structures in rural tourism. The results showed that despite the existence of similar formal structures and an emphasis on collaboration, actual governance structures varied across villages. The quality of relationships among actors, social capital, and collaboration mechanisms influenced the formation of participatory governance. This finding is consistent with the present study in emphasizing stakeholder interaction and the need to understand the actual governance mechanisms operating in rural destinations. Fan et al. (2024), in a study entitled Resident Participation in Sustainable Tourism Environmental Governance in Rural Destinations, examined the factors influencing residents' participation in environmental governance. The results showed that economic motivations, institutional opportunities, governance knowledge, and willingness to participate were the most important factors promoting local community participation in tourism governance. The findings also indicated that increasing residents' participation facilitates the sustainable development of rural tourism destinations. Reina-Usuga et al. (2024), in a study entitled Rural Tourism, Participatory Governance, and Perceived Value: A Systematic Review of Research, reviewed trends in research on participatory governance in rural tourism. The results showed that stakeholder participation, particularly that of local communities, is one of the key pillars of successful sustainable rural tourism. The findings further indicated that although attention to participatory governance has increased in recent years, effective mechanisms for involving tourists in decision-making processes and creating spaces for dialogue remain challenging. The researchers emphasized that sustainable rural tourism development requires inclusive, participatory, and collaborative approaches involving all stakeholders. Lukoseviciute et al. (2024), in a study entitled Participatory Development and Management of Ecological–Cultural Routes in Sustainable Tourism Destinations, employed a qualitative approach and stakeholder participation to develop a strategy for the sustainable development of ecological–cultural routes. The results showed that the successful development of sustainable tourism destinations requires participatory governance, collaboration among stakeholders, the simultaneous protection of natural and cultural resources, integrated planning, improvement of tourism infrastructure, and enhancement of visitor and local community experiences. Furthermore, active stakeholder participation plays an important role in formulating sustainable management strategies and protecting

the ecological and cultural capacities of destinations. Tong et al. (2024), in a study entitled Institutional Building, Tourism Empowerment, and Community Participation: A Pathway to Sustainable Rural Tourism Development, showed that sustainable rural tourism development can be achieved when governance systems, the economic and social empowerment of local communities, and stakeholder participation are strengthened simultaneously. The equitable distribution of benefits and institutional support were also identified as key factors contributing to the sustainability of tourism destinations.

A review of previous studies shows that most research has emphasized the roles of local community participation, participatory governance, stakeholder empowerment, destination management, and resource conservation in sustainable rural tourism development. However, most of these studies have examined only specific aspects of participatory governance, while relatively few have attempted to develop a comprehensive framework based on qualitative data and thematic analysis. Furthermore, no study was identified that has employed thematic analysis to explain the dimensions of participatory governance for sustainable rural tourism development while taking into account the specific characteristics of tourism-oriented villages in western Mazandaran Province.

3. Research Methodology

3.1 Geographical Scope of the Research

The study area, western Mazandaran Province, is located along the southern coast of the Caspian Sea and the northern slopes of the Alborz Mountains. In this study, western Mazandaran Province comprises the counties of Ramsar, Tonekabon, Abbasabad, Chalus, Nowshahr, Kelardasht, and Noor. The study area is bounded by Gilan Province to the west, the Caspian Sea to the north, and the Alborz highlands and Qazvin Province to the south. According to the results of the 2016 Population and Housing Census, the populations of the counties within the study area were 25,312 in Ramsar, 56,636 in Tonekabon, 17,345 in Abbasabad, 39,105 in Chalus, 45,759 in Nowshahr, 8,067 in Kelardasht, and 39,350 in Noor, representing a total population of 231,574 (Statistical Center of Iran, 2016).

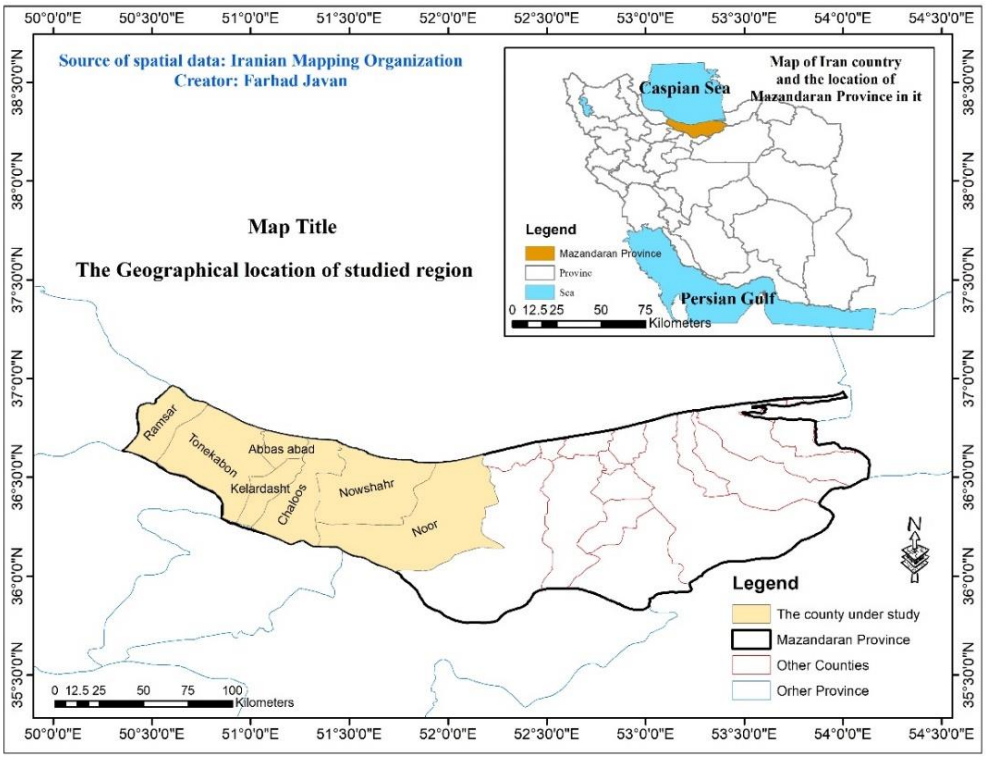


Figure 1. Geographical Location of the Study Area in Mazandaran Province, Iran

Administratively, the study area consists of seven counties, each with its own administrative structure and local management system. The demographic and spatial diversity of these counties, together with the distribution of tourism-oriented villages and the presence of multiple actors and institutions involved in tourism, provides a suitable context for examining participatory governance in sustainable rural tourism development. Figure 1 illustrates the geographical location of the study area and its county-level administrative divisions.

The study area is also considered one of the important tourism zones in northern Iran due to its simultaneous access to the Hyrcanian forests, the Caspian Sea coast, mountainous highlands, rivers, waterfalls, orchards, and agricultural lands. Moreover, the presence of tourism-targeted villages, eco-lodges, handicrafts, local rituals, and convenient accessibility through major transportation corridors has created considerable potential for rural tourism development. However, tourism development in the area faces challenges such as fragmented management, land-use change, pressure on natural resources, increasing waste generation, unequal distribution of tourism benefits, and limited participation of local communities in decision-making. These characteristics make the study area an appropriate context for examining a conceptual framework of participatory governance for sustainable rural tourism development.

3.2 Methodology

The present study is applied in terms of its purpose and qualitative in terms of its approach. It employs thematic analysis to explain a conceptual framework of participatory governance for the sustainable development of tourism-oriented villages in western Mazandaran Province. Thematic analysis is a well-established qualitative research method that enables the identification, analysis, and interpretation of patterns of meaning within textual data, thereby facilitating the extraction of themes, the explanation of relationships among them, and the development of a conceptual framework. In this study, the data were analyzed based on the thematic networks approach proposed by Attride-Stirling (2001).

The study participants consisted of experts, managers, and key stakeholders involved in rural tourism development in western Mazandaran Province. They included faculty members, experts from relevant organizations, local managers, rural administrators and members of Islamic village councils, managers of eco-lodges, private-sector practitioners, tourism guides, and researchers. Purposive and snowball sampling techniques were employed. In total, 25 participants took part in the study, and their composition based on professional position and relevance to rural tourism governance is presented in Table 1. Initially, participants were selected based on their specialized knowledge, executive or research experience, familiarity with rural tourism issues in western Mazandaran, and involvement in local development programs. Subsequently, additional participants were identified through referrals from the initial experts. Sampling continued until theoretical saturation was achieved, and following 25 semi-structured interviews, no new codes or concepts emerged in the final interviews.

The unit of analysis in this study was the perceptions and experiences of key stakeholders involved in rural tourism governance in tourism-oriented villages in western Mazandaran Province. Within this framework, the villages were considered the study context, while key stakeholders—including academic experts, managers and experts from relevant organizations, tourism and rural development practitioners, and other relevant actors—were considered the primary sources of research data.

Table 1. Composition of Study Participants by Professional Position

Participant Group	Number	Percentage
Faculty members and researchers in tourism and rural development	4	16
Managers and experts from government organizations related to tourism and rural development	5	20
Rural administrators of tourism-oriented villages	3	12
Members of Islamic village councils	3	12
Managers and owners of eco-lodges	4	16
Private-sector tourism practitioners and investors	3	12
Tourism guides and professional tourism practitioners	3	12
Total participants	**25**	**100**

The data collection instrument was a semi-structured interview. The interview questions were developed based on a review of the research literature, the research objectives, and the characteristics of rural tourism in western Mazandaran Province. The questions were then finalized after being reviewed and approved by experts in tourism, rural development, and qualitative research methodology. Each interview lasted between 45 and 75 minutes. With the participants' consent, all interviews were recorded, fully transcribed, and prepared for analysis.

Data analysis was conducted in six stages based on the thematic networks approach proposed by Attride-Stirling. First, the interview transcripts were read several times to develop an in-depth understanding of the data. Subsequently, during the open coding stage, initial codes were extracted and organized into preliminary concepts through the constant comparison method. The concepts were then categorized according to their semantic similarity into five basic themes and subsequently into three organizing themes. Finally, by integrating the organizing themes, the global theme of the study, entitled *A Conceptual Framework for Participatory Governance of Sustainable Tourism Development in Tourism-Oriented Villages in Western Mazandaran Province Based on Institutional Interaction, Local Community Empowerment, and Strategic Management of Natural and Cultural Resources*, was identified, and the thematic network was developed.

To enhance the credibility and trustworthiness of the findings, Lincoln and Guba's criteria, including credibility, transferability, dependability, and confirmability, were employed. To enhance credibility, the preliminary findings were shared with several participants, and the coding process was reviewed by experts in tourism and qualitative research methodology. Transferability was ensured by providing detailed descriptions of the participants and the research process, while dependability was established through documenting the data collection and analysis procedures. Confirmability was ensured through maintaining research documentation, continuously comparing the data, and using participants' quotations.

Finally, the conceptual framework of the study was developed based on the relationships among the initial concepts, basic themes, organizing themes, and the global theme. This framework provides a context-specific basis for explaining participatory governance in the sustainable development of tourism-oriented villages in western Mazandaran Province and can serve as a basis for policymaking, planning, and sustainable tourism management in the region.

4. Research Findings

The analysis of data obtained from 25 semi-structured interviews with experts, managers, and practitioners in rural tourism in western Mazandaran Province resulted in the identification of 50 initial codes during the open coding stage. These codes reflected the participants' key perceptions, experiences, and views regarding the requirements for participatory governance in sustainable rural tourism development. The codes were extracted from the interview transcripts through the open coding process based on conceptual similarities and served as the basis for developing the initial concepts in the subsequent stage. Table 2 presents the main initial codes extracted from the data, along with examples of participants' statements.

The analysis of the initial codes shows that participants' perspectives on participatory governance were not limited to a single dimension but encompassed a range of institutional, managerial, economic, social, cultural, and environmental dimensions. A considerable proportion of the codes emphasized the need for active participation of local stakeholders in tourism decision-making and planning processes. Codes such as resident participation, the role of rural municipalities and Islamic village councils, collaboration among executive institutions, and the participation of local investors indicate that, from the experts' perspective, the success of rural tourism development depends on establishing a participatory system and fostering effective interaction among local actors and responsible organizations.

Furthermore, another group of codes focused on the importance of local community empowerment and strengthening economic and human capacities. Local community training, the development of entrepreneurial skills, support for women and youth, the creation of sustainable employment opportunities, the development of eco-lodges, branding of local products, and the development of tourism value chains were among the issues that

participants identified as key prerequisites for enhancing the role of local communities in tourism development. These findings indicate that effective participation cannot be achieved without developing economic, social, and skills-based capacities.

On the other hand, a substantial proportion of the extracted codes focused on the conservation of natural and cultural resources and the establishment of sustainable management of tourism destinations. The protection of the Hyrcanian forests, conservation of water resources, preservation of agricultural land, management of villa development, control of unauthorized construction, preservation of local architecture and culture, waste management, and control of tourism carrying capacity indicate that, from the experts' perspective, tourism development can be achieved only when the principles of sustainability are observed and the region's natural and cultural assets are protected.

Alongside these issues, codes such as integrated destination management, strategic planning, the development of transportation and communication infrastructure, digital marketing, the use of smart technologies, networking among tourism practitioners, the establishment of local cooperatives, equitable benefit distribution, enhanced economic resilience, and improved quality of life among rural residents indicate that, from the participants' perspective, participatory governance requires institutional coordination, smart management, equity in benefit distribution, and the utilization of innovative capacities for sustainable tourism development.

Overall, the analysis of the initial codes indicates that participatory governance for sustainable rural tourism development in western Mazandaran Province rests on three fundamental dimensions: stakeholder participation and interaction, local community empowerment, and sustainable management of resources and tourism destinations. These initial codes provided an appropriate basis for integrating similar concepts and extracting the initial concepts in the subsequent stage of the analysis.

Table 2. Initial Codes Extracted from Expert Interviews on Participatory Governance in Sustainable Rural Tourism Development in Western Mazandaran Province

No.	Initial Code	Sample Interview Statement from Experts
1	Residents' participation in village tourism planning	Unless local residents have a role in the tourism planning process, no village plan can achieve genuine sustainability.
2	Active role of rural municipalities in tourism management	Rural municipalities should move beyond merely providing services and become key actors in organizing and managing village tourism.
3	Participation of Islamic village councils in tourism decision-making	The Islamic village council can serve as an important link between local residents and executive institutions in tourism-related decision-making.
4	Cooperation between rural municipalities and the Cultural Heritage, Tourism and Handicrafts Department	Without continuous coordination between the rural municipality and the Cultural Heritage Department, tourism initiatives will remain fragmented and ineffective.
5	Coordination among county-level executive organizations	One of the fundamental issues is that county-level executive organizations should move away from overlapping activities and act in a coordinated manner.
6	Local community trust in tourism managers	Without the trust of the local community, even the best tourism plans will encounter social resistance.
7	Transparency in the allocation of tourism funds	Transparency in the allocation of tourism funds is a prerequisite for gaining the trust of local residents and stakeholders.
8	Accountability of officials to rural residents' demands	Officials must be accountable to rural residents' demands because tourism development is meaningless without listening to local people.
9	Participation of local investors in tourism development	Local investors, due to their cultural and social knowledge of the villages, can play a more effective role in balanced tourism development.
10	Private-sector investment in eco-lodges	Private-sector investment in eco-lodges can both improve service

No.	Initial Code	Sample Interview Statement from Experts
		quality and create new economic opportunities.
11	Development of eco-lodges	Eco-lodges are successful when they are developed based on local identity and the actual needs of the destination.
12	Improvement of accommodation and hospitality services	If the quality of accommodation and hospitality services does not improve, tourists' length of stay and satisfaction will decline.
13	Training local communities in tourism	Training the local community is the foundation of informed participation in rural tourism development.
14	Training local tourism guides	Trained local guides can improve the tourist experience while providing an accurate representation of the village's culture and environment.
15	Strengthening rural entrepreneurship skills	Tourism development will not lead to sustainable employment unless the entrepreneurial spirit and skills of rural residents are strengthened.
16	Supporting women in tourism businesses	Rural women have considerable potential in producing and providing tourism services and products and should receive targeted support.
17	Youth participation in tourism activities	Rural youth can serve as a driving force for innovation and dynamism in tourism activities.
18	Creating sustainable employment in rural areas	If tourism cannot generate sustainable employment, its contribution to rural development will be temporary and limited.
19	Diversifying rural household income sources	Tourism becomes valuable when it can reduce rural households' dependence on a single source of income.
20	Marketing local products and handicrafts	Local products and handicrafts become economically viable when their marketing is strengthened alongside tourism development.
21	Branding indigenous products of western Mazandaran Province	Branding local products can strengthen the region's identity and enhance the destination's competitiveness.
22	Development of agricultural tourism	Agricultural tourism is an important regional potential that can offer tourists an authentic rural experience.
23	Development of forest tourism	The region's forests represent an important comparative advantage for tourism development, but such development must be strictly controlled.
24	Development of coastal tourism	Coastal tourism has considerable potential in western Mazandaran, provided that it is integrated with other rural tourism capacities.
25	Development of mountain tourism	Mountain tourism can create a more diverse pattern of tourist attraction throughout the year.
26	Conservation of the Hyrcanian forests	Any tourism plan in this region must regard the conservation of the Hyrcanian forests as a red line.
27	Conservation of local water resources and rivers	Water resources and local rivers are vital assets of rural communities, and tourism development should not place additional pressure on them.
28	Controlling unauthorized construction in villages	Unauthorized construction is one of the serious threats to the spatial and environmental identity of tourism-oriented villages.
29	Managing villa construction and land-use change	If villa construction and land-use change are not properly managed, tourism development will lead to the degradation of the foundations of rural communities.
30	Preservation of agricultural and orchard lands	The preservation of agricultural and orchard lands must be considered alongside tourism development to maintain the livelihood balance of rural communities.
31	Conservation of vernacular village architecture	Vernacular architecture is one of the key elements of destination attractiveness and should not be sacrificed to non-local construction patterns.
32	Preservation of local customs, traditions, and culture	If local culture is not preserved during tourism development, the destination will lose its most important identity asset.
33	Waste management in tourism-oriented	An increase in tourists without an appropriate waste management

No.	Initial Code	Sample Interview Statement from Experts
	villages	system will rapidly reduce the environmental quality of villages.
34	Management of tourism carrying capacity	Every village has a specific carrying capacity, and exceeding it can generate serious social and environmental consequences.
35	Reducing tourism-related environmental pollution	Tourism should be managed in a way that minimizes pollution and maximizes compatibility with the environment.
36	Improving access roads to tourism-oriented villages	Without adequate road access, many of the tourism potentials of villages will remain practically underutilized.
37	Development of tourism transportation infrastructure	Adequate transportation infrastructure is a prerequisite for the balanced distribution of tourists across villages and surrounding areas.
38	Development of communication and Internet infrastructure	Today, tourism development is almost impossible without efficient Internet and communication infrastructure.
39	Digital marketing of tourism destinations	A significant part of promoting tourism villages should be carried out through digital marketing and an effective presence in cyberspace.
40	Use of smart technologies in destination management	Smart technologies can contribute to better management of information and services and even help control tourist flows at destinations.
41	Networking among rural tourism practitioners	When rural tourism practitioners collaborate through a network, their learning capacity and influence can increase severalfold.
42	Establishment of rural tourism cooperatives	Tourism cooperatives can provide an appropriate mechanism for collective participation and benefit distribution at the village level.
43	Cooperation between farmers and tourism practitioners	Linking farmers with tourism practitioners can facilitate the development of more authentic local experiences and a stronger local economy.
44	Development of the value chain for local products and tourism	Real added value is created when local production, tourism services, and consumer markets are connected.
45	Equitable distribution of tourism benefits among residents	If tourism benefits are not distributed equitably among residents, dissatisfaction and local conflicts will emerge.
46	Enhancing the economic resilience of tourism-oriented villages	Tourism should contribute to increasing the economic resilience of villages rather than creating new and fragile dependencies.
47	Improving the quality of life of rural residents	The ultimate goal of tourism development should be improving the quality of life of rural residents, rather than merely increasing the number of tourists.
48	Strategic planning for tourism development in western Mazandaran Province	The region needs an integrated strategic plan to move tourism development beyond short-term and fragmented initiatives.
49	Integrated management of rural tourism destinations	Integrated destination management means that all local and external actors operate within a coordinated framework.
50	Establishment of a sustainable participatory governance system for rural tourism	Sustainable rural tourism development can be achieved when participatory governance is institutionalized and sustainably established across the region.

Based on the 50 initial codes extracted, the next step involved examining codes with conceptual similarities through a constant comparison process in terms of semantic similarity, content overlap, and thematic relationships, and organizing them into initial concepts. This process not only reduced the dispersion of the data but also enabled a transition from the descriptive level to conceptualization. Ultimately, 10 initial concepts were identified. As shown in Table 3, these concepts represent the main dimensions of participatory governance in sustainable rural tourism development in western Mazandaran Province.

The results presented in Table 3 show that the initial codes were organized into ten key concepts encompassing different dimensions of participatory governance. Concepts such as local community participation, local governance and management, institutional cooperation and networking, and trust and social capital highlight the importance of interaction and coordination among stakeholders in

tourism decision-making and management processes. In contrast, the concepts of human and economic capacity building, conservation of natural resources and local heritage, physical development management, destination innovation and marketing, and sustainable tourism governance emphasize the need to strengthen local capacities, ensure the sustainable use of resources, develop infrastructure, and enhance destination competitiveness. Overall, these concepts constitute the initial conceptual framework of the study and provided the basis for extracting the basic themes in the subsequent stage of the analysis.

Overall, the results of this stage indicate that the initial concepts identified represent the main dimensions of participatory governance in sustainable rural tourism development in western Mazandaran Province. In addition to covering institutional, social, economic, and managerial dimensions, these concepts also reflect the distinctive characteristics of the region, including the conservation of the Hyrcanian forests, management of villa development, expansion of eco-lodges, marketing of local products, and management of multifunctional destinations. These concepts provided the basis for extracting the basic themes in the subsequent stage of the analysis.

Table 3. Integration of Initial Codes and Formation of Initial Concepts

No.	Initial Concept	Integrated Initial Codes
1	Local community participation	Residents' participation, women's participation, youth participation, establishment of tourism cooperatives, cooperation between farmers and tourism practitioners
2	Local governance and management	Role of rural municipalities, role of Islamic village councils, cooperation between rural municipalities and the Cultural Heritage Department, integrated destination management, strategic planning
3	Institutional cooperation and networking	Coordination among executive organizations, intersectoral cooperation, networking among tourism practitioners, participation of local investors
4	Trust and social capital	Local community trust, sense of belonging, equitable distribution of benefits, reduction of local conflicts
5	Empowerment and human capital development	Local community training, tourism guide training, entrepreneurial skills, support for women, youth participation
6	Economic empowerment and development of local businesses	Sustainable employment, income diversification, eco-lodges, marketing of local products, branding of local products, value-chain development
7	Conservation of natural resources and local heritage	Conservation of the Hyrcanian forests, water resources, agricultural lands, vernacular architecture, local culture, waste management, tourism carrying capacity
8	Physical and environmental development management	Control of unauthorized construction, management of villa development, development of access roads, transportation infrastructure, communication infrastructure
9	Destination innovation and marketing	Digital marketing, smart technologies, improvement of service quality, forest, coastal, mountain, and agricultural tourism
10	Sustainable tourism governance	Economic resilience, improvement of quality of life, establishment of a participatory governance system, long-term tourism development planning

In the subsequent stage of the analysis, the 10 initial concepts were organized into five basic themes based on their semantic proximity, conceptual relationships, and role in explaining participatory governance. This level of analysis reduced the complexity of the concepts while revealing the main dimensions of the phenomenon under investigation and providing a coherent framework for explaining participatory governance in sustainable rural tourism development in western Mazandaran Province. As shown in Table 4, the basic themes were formed by integrating conceptually related concepts and served as the basis for extracting the organizing themes in the next stage of the analysis.

The results presented in Table 4 show that the initial concepts were organized into five basic themes that explain the main dimensions of

participatory governance in sustainable rural tourism development. Local participation and governance emphasizes cooperation and coordination among local stakeholders and institutions, while social capital and local community empowerment highlights the role of trust, training, and human capacity building in enhancing residents' participation and sense of responsibility. In addition, tourism-based local economic development emphasizes the creation of sustainable employment, development of local businesses, and strengthening of the tourism value chain. Sustainable management of tourism destinations, in turn, reflects the need for integrated planning, infrastructure development, innovation, and the use of modern technologies. Finally, resource conservation and sustainable governance indicate that the continuity of tourism development depends on protecting natural and cultural assets and establishing a sustainable governance system. overall, the basic themes extracted from the data indicate that participatory governance in sustainable rural tourism development in western Mazandaran Province results from the interaction of institutional, social, economic, managerial, and environmental dimensions. These themes, while synthesizing the initial concepts, provide a coherent framework for explaining the conceptual framework of participatory governance and demonstrate that tourism development in the region requires not only local community participation but also institutional coordination, human capital empowerment, strengthening of the local economy, smart destination management, and conservation of natural and cultural resources. These findings provided the basis for extracting the organizing themes in the next stage of the analysis.

Table 4. Formation of the Basic Themes of the Study

No.	Basic Theme	Related Initial Concepts
1	Local Participation and Governance	Local community participation; local governance and management; institutional cooperation and networking
2	Social Capital and Local Community Empowerment	Trust and social capital; empowerment and human capital development
3	Tourism-Based Local Economic Development	Economic empowerment and development of local businesses
4	Sustainable Management of Tourism Destinations	Physical and environmental development management; destination innovation and marketing
5	Resource Conservation and Sustainable Governance	Conservation of natural resources and local heritage; sustainable tourism governance

In the subsequent stage of the analysis, the five basic themes were classified into three organizing themes based on their conceptual relationships, semantic overlap, and role in explaining participatory governance. At this level of analysis, an attempt was made to organize the basic themes into broader dimensions so that the conceptual structure of the conceptual framework for participatory governance in sustainable rural tourism development could be explained with greater coherence. As shown in Table 5, the organizing themes reveal the linkages among the basic themes and provide the basis for the formation of the study's global theme.

The results presented in Table 5 indicate that the organizing themes represent the overarching dimensions of participatory governance in sustainable rural tourism development in western Mazandaran Province. Institutional interaction and governance emphasizes the establishment of institutional mechanisms, coordination among organizations, and the active participation of stakeholders in decision-making processes. Economic empowerment and destination competitiveness highlights the role of strengthening economic capacities, developing local businesses, promoting entrepreneurship, and enhancing the competitiveness of tourism destinations in achieving sustainable development. Moreover, sustainable destination management and resource conservation emphasizes integrated planning, smart destination management, and the protection of natural and cultural resources as prerequisites for tourism sustainability. overall, the analysis of the organizing themes indicates that participatory governance in sustainable rural tourism development in western Mazandaran Province results from the interaction of three

complementary and interdependent dimensions. Participatory governance and institutional interaction provide the institutional and social foundations necessary for stakeholder participation and coordination among local institutions. Economic empowerment and destination competitiveness strengthen the economic and entrepreneurial capacities of local communities and create the basis for sustainable development of the tourism economy. Sustainable destination management and resource conservation, meanwhile, provide the managerial and environmental framework required to protect natural and cultural assets and guide tourism development. The coordinated interaction of these three dimensions constitutes the foundation for developing the conceptual framework of participatory governance for sustainable rural tourism development in western Mazandaran Province and provides the basis for identifying the overarching theme in the final stage of the analysis.

Table 5. Organizing Themes of the Study

No.	Organizing Theme	Related Basic Themes
1	Institutional Interaction and Governance	Local Participation and Governance; Social Capital and Local Community Empowerment
2	Empowerment and Local Economic Development	Tourism-Based Local Economic Development
3	Strategic Management and Resource Conservation	Sustainable Tourism Destination Management; Resource Conservation and Sustainable Governance

In the next stage of the analysis, the three organizing themes were integrated based on their conceptual linkages and complementary roles in explaining the phenomenon under study, leading to the identification of the overarching theme. The overarching theme represents the highest level of abstraction in thematic analysis and captures the central concept emerging from the interaction of all organizing themes. Accordingly, the overarching theme of the study was identified as: *"A Conceptual Framework for Participatory Governance of Sustainable Tourism Development in Tourist-Oriented Villages of Western Mazandaran Province Based on Institutional Interaction, Local Community Empowerment, and Strategic Management of Natural and Cultural Resources."* this overarching theme constitutes the final conceptual framework of the study and explains that achieving sustainable tourism development in the study area requires coordinated interaction among management institutions, empowerment of the local community, and strategic management of natural and cultural resources.

The findings indicate that the overarching theme emerged from the interaction of three organizing themes, suggesting that sustainable tourism development in the rural areas of western Mazandaran Province depends less on the expansion of physical infrastructure or an increase in tourist numbers than on the quality of the governance system, the extent of stakeholder participation, and the way natural and cultural resources are managed. Within this framework, institutional interaction and governance provide the basis for coordination among executive agencies, effective participation of local communities, strengthening the role of rural municipalities and Islamic village councils, transparency, accountability, and mutual trust, thereby creating the conditions necessary for integrated destination management. Local community empowerment strengthens the capacity of local residents to actively participate in tourism development by enhancing human, social, and economic capital through education, the development of entrepreneurial skills, support for local businesses, greater participation of women and young people, and the use of indigenous knowledge. Alongside these two dimensions, strategic management of natural and cultural resources emphasizes integrated planning, the protection of Hyrcanian forests, water resources, agricultural lands, vernacular architecture and local culture, control of unauthorized construction, management of tourism carrying capacity, development of infrastructure in accordance with environmental capacity, and the equitable distribution of tourism benefits.

Overall, the findings from this stage indicate that the conceptual framework of participatory governance for sustainable rural tourism development constitutes an integrated and multidimensional system shaped by the mutual interaction of three dimensions: institutional

interaction, local community empowerment, and strategic management of natural and cultural resources. These dimensions have complementary and mutually reinforcing relationships, such that the effectiveness of each dimension depends on strengthening the others, while weaknesses in any one of them may undermine the efficiency of the governance system and the sustainability of tourism development. Accordingly, the overarching theme suggests that achieving sustainable tourism development in the rural areas of western Mazandaran Province requires the establishment of a participatory governance system grounded in stakeholder participation, institutional coordination, local community empowerment, and strategic management of natural and cultural resources.

In the subsequent stage of the thematic analysis, the relationships among the basic themes, organizing themes, and the overarching theme were presented in the form of a thematic network to provide an integrated representation of the conceptual structure of the extracted framework. The thematic network resulted from the integration of the findings obtained through the preceding stages and illustrates how the initial data derived from the interviews, through successive stages of coding, conceptualization, and thematic organization, led to a coherent conceptual framework for explaining participatory governance in sustainable rural tourism development. In addition to illustrating the hierarchical relationships among the different levels of analysis, the thematic network reveals the interdependence and interaction among the key components of the framework.

As shown in Figure 2, the overarching theme of the research is positioned at the highest level of the thematic network, entitled A Conceptual Framework of Participatory Governance for Sustainable Tourism Development in Tourist-Oriented Villages of Western Mazandaran Province Based on Institutional Interaction, Local Community Empowerment, and Strategic Management of Natural and Cultural Resources. This theme emerged from the synergy among the three organizing themes and indicates that achieving sustainable tourism development is possible only through the simultaneous interaction of institutional, social, economic, and environmental dimensions.

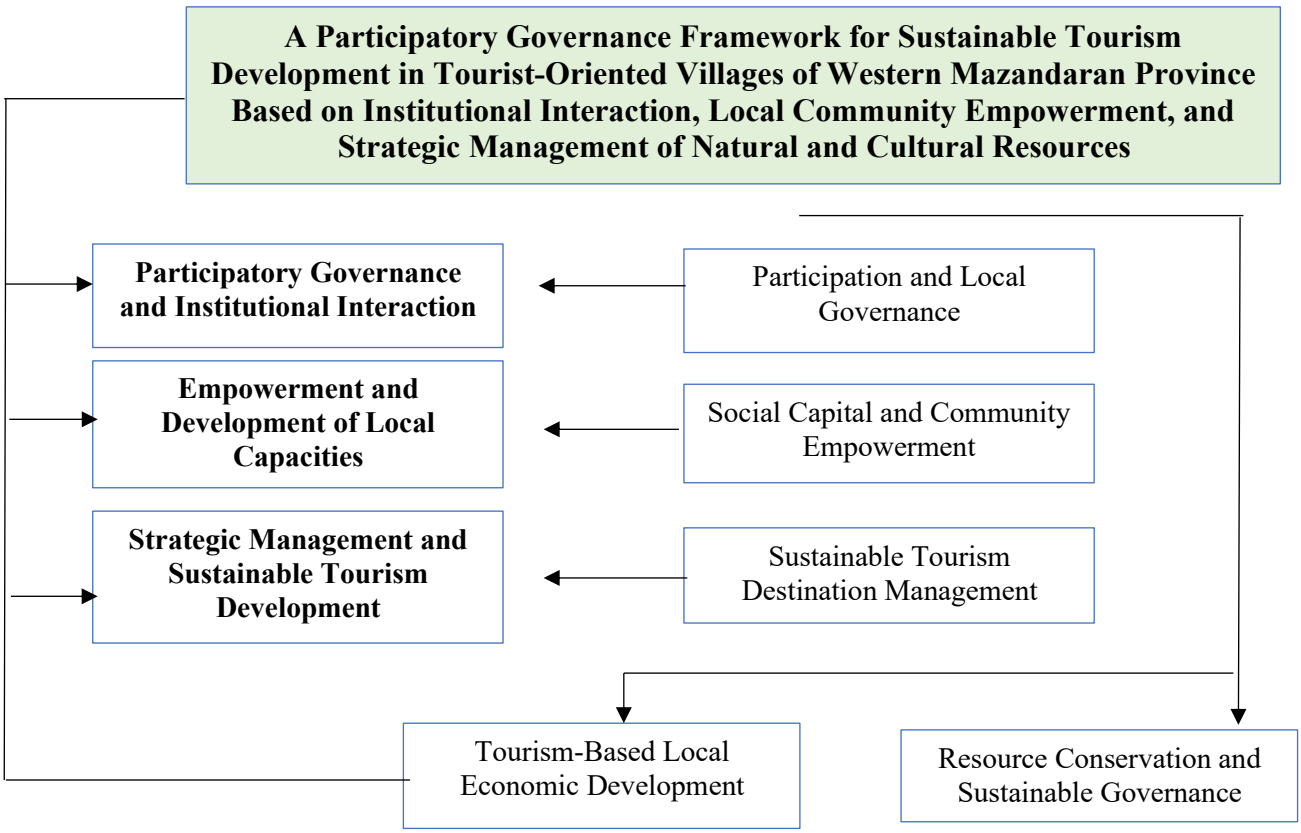


Figure 2. Thematic Network of the Participatory Governance Framework for Sustainable Tourism Development in Tourist-Oriented Villages of Western Mazandaran Province

Within this structure, participatory governance and institutional interaction are grounded in two basic themes, namely stakeholder participation and interaction and transparent, trust-based governance. These themes highlight the role of coordination among local institutions, active community participation, transparency, and mutual trust in shaping a participatory governance system. Empowerment and development of local capacities, drawing on the basic theme of local empowerment and capacity development, emphasizes the development of human capital, enhancement of skills, entrepreneurship, strengthening of local businesses, and increasing the capacity of local communities to participate in tourism development. In contrast, strategic management and sustainable tourism development comprises two basic themes, namely tourism development management and support and sustainability and conservation of natural resources, highlighting the need for strategic planning, development of appropriate infrastructure, utilization of tourism potentials, and protection of the region's natural and cultural resources.

The thematic network further indicates that these three dimensions have a mutually reinforcing and complementary relationship, and none of them can independently ensure the realization of participatory governance. Effective stakeholder participation cannot be sustained without local community empowerment and continuous institutional support; empowerment, in turn, cannot achieve the desired effectiveness without strategic management and appropriate economic opportunities; and tourism planning and management will face considerable challenges in the absence of social trust, meaningful participation, and the protection of natural and cultural resources. Therefore, the thematic network presented in this study delineates the final conceptual framework and demonstrates that sustainable rural tourism development in western Mazandaran Province requires synergy among institutional interaction, local community empowerment, and strategic management of natural and cultural resources

5. Discussion and Conclusion

The present study showed that participatory governance in sustainable rural tourism development in western Mazandaran Province cannot be regarded merely as a managerial mechanism for increasing stakeholder participation; rather, it should be understood as a form of network governance whose effectiveness depends on the quality of interaction among local institutions, rural communities, the private sector, and governmental agencies. From this perspective, the findings indicate that the main challenge of tourism governance in the study area is not simply the presence or absence of stakeholders in decision-making processes, but rather the establishment of mechanisms for coordination, trust-building, shared responsibility, and transforming participation into collective action. This interpretation is consistent with Gash and Ansell's (2008) emphasis on face-to-face dialogue, trust, shared commitment, and institutional design, while the findings of the present study further highlight the importance of coordination across different levels of governance and its linkage with the specific conditions of rural destinations. Therefore, participatory governance in western Mazandaran can contribute to sustainable development only when it moves beyond symbolic participation and becomes an effective mechanism for collaboration among diverse stakeholders.

In the first dimension, namely participatory governance and institutional interaction, the findings revealed that the multiplicity of organizations responsible for tourism, natural resources, the environment, cultural heritage, and local governance may, in the absence of effective coordination mechanisms, lead to fragmented decision-making, institutional overlap, and reduced policy effectiveness. This finding is consistent with the results of Shamsoddini (2025), Tadayoni Nezhad et al. (2025), and Imani and Madani (2024), who emphasized the importance of participation, local management effectiveness, social capital, and institutional coordination. However, the present findings suggest that institutional coordination is not merely one of the contributing factors; rather, it provides the enabling context for the activation of other components of participatory governance. Without coordination among institutions, even greater participation by the local community does not necessarily result in coherent decision-making or sustainable outcomes. Accordingly, from an implementation perspective, establishing an inter-institutional coordination mechanism at the

destination level, clearly defining the roles and responsibilities of relevant agencies, and creating a regular platform for the participation of local community representatives, the private sector, and government institutions can be considered among the key requirements for tourism governance in the region.

In the second dimension, namely local community empowerment, the findings showed that participation can lead to sustainable outcomes only when it is accompanied by the enhancement of knowledge, skills, social capital, and economic capacities. Accordingly, local community participation should not be limited merely to attendance at meetings or expressing opinions on tourism projects; rather, it should contribute to greater decision-making capacity, access to resources, entrepreneurship, and an equitable share of tourism benefits. This finding is consistent with Fan et al. (2024), who highlighted the role of resident participation, institutional opportunities, and governance knowledge, as well as with the findings of Reina-Usuga et al. (2024) concerning the need for inclusive stakeholder participation. At the same time, the present study indicates that empowerment should be viewed as the link between participation and local economic development, since participation without the necessary capacity for action and decision-making may become limited and ineffective. Accordingly, tourism skills training, support for local businesses, facilitation of access to financial resources, strengthening collaborative networks, and increasing the role of women and local groups in decision-making can be considered important practical measures in this regard.

In the third dimension, namely strategic management, sustainable development, and resource conservation, the findings showed that rural tourism development cannot be sustainable without simultaneously considering its economic, social, environmental, and cultural dimensions. The Hyrcanian forests, the Caspian Sea coastline, rivers, natural landscapes, and local culture of western Mazandaran are not merely resources for tourism exploitation; rather, they constitute strategic assets of the destination. This interpretation is consistent with the findings of Lukoseviciute et al. (2024) regarding the need for integrated planning and the simultaneous conservation of natural and cultural resources. It is also in line with the findings of Tong et al. (2024), who argue that sustainable rural tourism development results from the interaction of governance, empowerment, institutional support, and equitable benefit distribution. Accordingly, tourism policymaking in the region should be based on environmental carrying capacity, control of tourism pressures, conservation of natural and cultural heritage, and assessment of the impacts of development.

Overall, a comparison of the findings of the present study with those of previous research indicates that, while the results confirm the importance of participation, empowerment, institutional coordination, and resource conservation, they place greater emphasis on the need to integrate these components within a comprehensive governance system. In other words, the main contribution of the present study cannot be reduced to demonstrating the separate importance of each of these factors; rather, its explanatory value lies in revealing the interrelationships among them. Institutional interaction provides the foundation for participation, empowerment transforms participation into actual capacity for action, and strategic management directs this capacity toward resource conservation and sustainable development. Accordingly, weakness in any one of these dimensions may undermine the effectiveness of the others.

Accordingly, the most important policy implication of the study is the shift from sectoral and centralized management toward network-based and participatory governance in rural tourism in western Mazandaran Province. At the institutional level, establishing a coordination mechanism among relevant agencies and creating a regular platform for stakeholder dialogue are essential. At the local level, empowering residents through training, support for local businesses, and strengthening their participation in decision-making should be prioritized. At the destination-management level, tourism development programs should be aligned with environmental protection requirements, cultural heritage conservation, and the carrying capacity of rural areas. Moreover, a more equitable distribution of tourism benefits and a stronger role for local communities in decision-making can contribute to enhancing trust in, and the legitimacy of, the governance system.

Based on the findings of the study, the following practical recommendations are proposed to strengthen participatory governance and promote sustainable rural tourism development in western Mazandaran Province. First, tourism authorities and local governments should establish a rural tourism governance coordination task force at the regional level to facilitate regular interaction among government agencies, village managers, Islamic village councils, local communities, and the private sector, while clearly defining the roles and responsibilities of each stakeholder. Second, the Provincial Department of Cultural Heritage, Tourism and Handicrafts, together with local authorities, should expand community-based training and empowerment programs focusing on tourism skills, entrepreneurship, marketing, and management of local businesses, while facilitating local stakeholders' access to financial and institutional support. Third, to ensure meaningful participation by local communities, mechanisms should be established to involve village representatives in decision-making concerning tourism projects, investments, and the distribution of tourism benefits. Fourth, the agencies responsible for environmental protection, natural resources, and cultural heritage, in cooperation with local authorities, should incorporate the environmental and cultural carrying capacities of tourist-oriented villages into tourism planning and strengthen systems for monitoring the environmental and cultural impacts of tourism activities. Finally, supporting small-scale businesses, ecotourism accommodations, handicrafts, and local products, together with transparent mechanisms for distributing tourism benefits, can strengthen the link between local community participation, economic development, and destination sustainability.

Finally, the present study shows that sustainable rural tourism development in western Mazandaran Province is not the outcome of the independent performance of a single institution or policy, but rather the result of the interaction among three dimensions: participatory governance and institutional interaction, local community empowerment, and strategic management of sustainable development. Accordingly, the conceptual framework developed in this study emphasizes the need for synergy among these three dimensions and demonstrates that tourism sustainability can be strengthened when social participation, institutional coordination, and resource conservation are integrated within a coherent management system. This approach can contribute to enhancing the resilience of tourist-oriented villages, improving the quality of life of local communities, and ensuring the long-term conservation of the region's natural and cultural assets.

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Author Contributions

The authors contributed equally to the development and preparation of this research.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the authorship or publication of this article.

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Original Article

تبیین چارچوب حکمرانی مشارکتی در توسعه پایدار گردشگری روستایی: مطالعه‌ای کیفی در غرب استان مازندران

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چکیده مبسوط

۱. مقدمه

گردشگری روستایی در دهه‌های اخیر به‌عنوان راهبردی برای توسعه پایدار نواحی روستایی مورد توجه قرار گرفته است؛ زیرا از طریق ایجاد اشتغال و درآمد، تنوع‌بخشی اقتصادی، تقویت زیرساخت‌ها، حفظ میراث طبیعی و فرهنگی و ارتقای کیفیت زندگی می‌تواند به توسعه جوامع محلی کمک کند. بااین‌حال، تحقق این ظرفیت‌ها تنها به توسعه زیرساخت و افزایش گردشگران وابسته نیست، بلکه به نحوه تعامل دولت، جامعه محلی، بخش خصوصی و سایر ذی‌نفعان نیز بستگی دارد. در این میان، حکمرانی مشارکتی با تأکید بر مشارکت ذی‌نفعان، تعامل نهادی، اعتماد، شفافیت، توانمندسازی و تصمیم‌گیری جمعی، زمینه مناسبی برای مدیریت پایدار گردشگری روستایی فراهم می‌کند. غرب استان مازندران با برخورداری از جنگل‌های هیرکانی، سواحل دریای خزر، چشم‌اندازهای کوهستانی، روستاهای گردشگرپذیر، اقامتگاه‌های بوم‌گردی و میراث فرهنگی، از مناطق مهم گردشگری کشور است؛ اما با چالش‌هایی همچون مدیریت پراکنده، ضعف هماهنگی نهادی، مشارکت محدود جامعه محلی، توسعه نامتوازن زیرساخت‌ها، فشار بر منابع طبیعی و توزیع نابرابر منافع مواجه است. ازاین‌رو، مسئله اصلی پژوهش، چگونگی سازمان‌یابی مؤلفه‌های حکمرانی مشارکتی و تعامل میان آن‌ها برای تحقق توسعه پایدار گردشگری روستایی است. بر این اساس، پژوهش حاضر با هدف تبیین چارچوب حکمرانی مشارکتی توسعه پایدار گردشگری در روستاهای گردشگرپذیر غرب استان مازندران انجام شده است.

۲ .مبانی نظری تحقیق

مبنای نظری پژوهش بر مفاهیم حکمرانی مشارکتی، توسعه پایدار گردشگری روستایی، توانمندسازی جامعه محلی و مدیریت پایدار مقصد استوار است. حکمرانی مشارکتی با گذار از الگوی دولت‌محور به الگویی شبکه‌ای و تعاملی، بر مشارکت دولت، جامعه محلی، بخش خصوصی و سایر ذی‌نفعان در سیاست‌گذاری، تصمیم‌گیری، اجرا و ارزیابی تأکید دارد و اعتماد، گفت‌وگو، تعهد مشترک، شفافیت و هماهنگی نهادی را از الزامات آن می‌داند. توسعه پایدار گردشگری روستایی نیز رویکردی چندبعدی است که ابعاد اقتصادی، اجتماعی، فرهنگی و زیست‌محیطی را هم‌زمان مورد توجه قرار می‌دهد. در این چارچوب، مشارکت محلی زمانی به پایداری منجر می‌شود که با توانمندسازی اقتصادی و اجتماعی، آموزش، ارتقای مهارت، دسترسی به منابع و تقویت سرمایه اجتماعی همراه باشد. همچنین، مدیریت پایدار مقصد مستلزم برنامه‌ریزی یکپارچه، هماهنگی ذی‌نفعان، زیرساخت متناسب، نوآوری و حفاظت از منابع طبیعی و فرهنگی است. مرور مطالعات پیشین نشان می‌دهد که مشارکت محلی، هماهنگی نهادی، توانمندسازی، مدیریت مقصد و حفاظت از منابع، عناصر کلیدی توسعه پایدار گردشگری روستایی‌اند؛ بااین‌حال، این مؤلفه‌ها اغلب به‌صورت جداگانه بررسی شده‌اند. بنابراین، خلأ اصلی پژوهش حاضر، ارائه تبیینی یکپارچه از تعامل این مؤلفه‌ها در قالب چارچوبی بومی و متناسب با ویژگی‌های روستاهای گردشگرپذیر غرب استان مازندران است.

۲. روش تحقیق

پژوهش حاضر از نظر هدف، کاربردی و از نظر رویکرد، کیفی است و با روش تحلیل مضمون انجام شده است. مشارکت‌کنندگان شامل خبرگان دانشگاهی، مدیران و کارشناسان مرتبط با گردشگری و توسعه روستایی، دهیاران، اعضای شوراهای اسلامی، مدیران اقامتگاه‌های بوم‌گردی، فعالان بخش خصوصی، سرمایه‌گذاران، راهنمایان گردشگری و پژوهشگران بودند. نمونه‌گیری به‌صورت هدفمند و گلوله‌برفی انجام شد و پس از ۲۵ مصاحبه نیمه‌ساختاریافته

*. نویسندهٔ مسئول:
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و دستیابی به اشباع نظری پایان یافت. واحد تحلیل، ادراک و تجربه ذی‌نفعان کلیدی حکمرانی گردشگری روستایی در روستاهای گردشگرپذیر غرب استان مازندران بود. داده‌ها از طریق مصاحبه‌های ۴۵ تا ۷۵ دقیقه‌ای گردآوری و پس از پیاده‌سازی، با استفاده از الگوی شبکه مضامین آترید-استرلینگ تحلیل شدند. در این فرایند، کدهای اولیه استخراج و کدهای مشابه در قالب مفاهیم، مضامین پایه، سازمان‌دهنده و مضمون فراگیر سازمان‌دهی شدند. برای افزایش اعتبار یافته‌ها نیز معیارهای اعتبار، انتقال‌پذیری، قابلیت اطمینان و تأییدپذیری به‌کار گرفته شد.

۳. یافته‌های تحقیق

نتایج تحلیل ۲۵ مصاحبه به استخراج ۵۰ کد اولیه، ۱۰ مفهوم، ۵ مضمون پایه، ۳ مضمون سازمان‌دهنده و یک مضمون فراگیر منجر شد. مفاهیم اولیه شامل مشارکت و حکمرانی محلی، همکاری و شبکه‌سازی نهادی، اعتماد و سرمایه اجتماعی، توانمندسازی سرمایه انسانی و اقتصادی، حفاظت از منابع طبیعی و میراث بومی، مدیریت محیطی، نوآوری و بازاریابی مقصد و حکمرانی پایدار گردشگری بود. پنج مضمون پایه شامل مشارکت و حکمرانی محلی، سرمایه اجتماعی و توانمندسازی جامعه، توسعه اقتصاد محلی مبتنی بر گردشگری، مدیریت پایدار مقصد و حفاظت از منابع شناسایی شد که در سه مضمون سازمان‌دهنده تعامل و حکمرانی نهادی، توانمندسازی و توسعه اقتصاد محلی و مدیریت راهبردی و حفاظت از منابع قرار گرفتند. تحلیل شبکه مضامین، مضمون فراگیر پژوهش را «چارچوب مفهومی حکمرانی مشارکتی توسعه پایدار گردشگری در روستاهای گردشگرپذیر غرب استان مازندران مبتنی بر تعامل نهادی، توانمندسازی جامعه محلی و مدیریت راهبردی منابع طبیعی و فرهنگی» نشان داد. در این چارچوب، تعامل نهادی موجب هماهنگی، مشارکت، شفافیت و اعتماد؛ توانمندسازی جامعه محلی از طریق آموزش، مهارت‌آموزی و حمایت از کسب‌وکارهای بومی، موجب تقویت مشارکت ساکنان؛ و مدیریت راهبردی با تأکید بر برنامه‌ریزی یکپارچه، زیرساخت متناسب، کنترل ساخت‌وساز، ظرفیت برد و حفاظت از منابع، زمینه توسعه پایدار را فراهم می‌کند. یافته‌ها نشان داد این سه بعد به‌صورت متقابل و مکمل عمل کرده و ضعف هر یک، اثربخشی سایر ابعاد را کاهش می‌دهد.

۴. بحث و نتیجه‌گیری

یافته‌های پژوهش نشان می‌دهد که حکمرانی مشارکتی در توسعه پایدار گردشگری روستایی غرب مازندران فراتر از حضور ذی‌نفعان در تصمیم‌گیری است و به‌صورت نظامی شبکه‌ای، بر تعامل نهادی، توانمندسازی جامعه محلی و مدیریت راهبردی منابع استوار است. این یافته با مطالعات پیشین درباره مشارکت محلی، سرمایه اجتماعی، هماهنگی نهادی و مدیریت پایدار مقصد همسو بوده و بر ضرورت پیوند هم‌زمان این مؤلفه‌ها تأکید دارد. در این چارچوب، هماهنگی میان نهادهای گردشگری، منابع طبیعی، محیط‌زیست، میراث فرهنگی و مدیریت محلی برای کاهش موازی‌کاری و افزایش اثربخشی تصمیمات ضروری است. همچنین، مشارکت جامعه محلی زمانی به توسعه پایدار منجر می‌شود که با آموزش، توانمندسازی، حمایت از کسب‌وکارهای بومی و توزیع عادلانه منافع همراه باشد. توسعه گردشگری نیز باید متناسب با ظرفیت‌های محیطی و فرهنگی روستاها و با اولویت حفاظت از منابع هدایت شود.

در مجموع، توسعه پایدار گردشگری روستایی در غرب مازندران حاصل تعامل سه بعد حکمرانی مشارکتی و تعامل نهادی، توانمندسازی جامعه محلی و مدیریت راهبردی منابع طبیعی و فرهنگی است. بنابراین، تقویت هماهنگی بین‌نهادی، مشارکت واقعی روستاها در تصمیم‌گیری، حمایت از کسب‌وکارهای بومی و اقامتگاه‌های بوم‌گردی، حفاظت از منابع و استقرار مدیریت یکپارچه مقصد، مهم‌ترین الزامات سیاستی پژوهش محسوب می‌شوند. چارچوب پیشنهادی می‌تواند مبنایی برای سیاست‌گذاری توسعه پایدار گردشگری روستایی در منطقه باشد و در پژوهش‌های آینده با روش‌های کمی و مدل‌سازی معادلات ساختاری اعتبارسنجی شود.

کلیدواژه‌ها: حکمرانی مشارکتی، توسعه پایدار، گردشگری روستایی، تحلیل مضمون، غرب استان مازندران.

تشکر و قدردانی

مطالعه حاضر حامی مالی نداشته و حاصل فعالیت علمی نویسندگان است.

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Original Article

Planning Pathways Towards Zero-Energy Urban Development in Hot and Dry Climates: A Simulation-Based Study of Semnan, Iran

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Abstract

Purpose- This study investigates how building-level energy-efficiency and solar-energy measures can inform planning pathways toward zero-energy urban development in hot and dry climates, using Semnan, Iran, as a case study.

Design/methodology/approach- This applied study adopts a quantitative, simulation-based approach. A single-story residential case-study building with a floor area of 260 m² in Semnan was modeled using DesignBuilder and the EnergyPlus simulation engine. First, the annual energy consumption of the building was estimated under the baseline condition. Subsequently, selected energy-efficiency and solar-energy strategies, including improved glazing and the use of solar energy, were incorporated into the building model, and the resulting energy performance was compared with the baseline scenario. The simulation results were then interpreted to identify their implications for planning toward zero-energy urban development in hot and dry climates.

Finding- The baseline simulation resulted in an annual energy-consumption intensity of 103.61 kWh/m²/year. After the modeled improvement measures were applied, this value decreased to 56.62 kWh/m²/year, corresponding to a 45.3% reduction. The results indicate that improving building energy performance can provide a measurable evidence base for planning interventions in hot and dry climates. However, the reduction should not be interpreted as city-wide zero-energy achievement because the analysis is limited to a single building. The study therefore frames building-scale simulation as an initial step that can support subsequent multi-building and urban-scale energy planning.

Practical implications- The findings suggest that zero-energy urban development in hot and dry climates should be approached progressively, beginning with reductions in building energy demand and complemented by renewable-energy integration. For Semnan, climate-responsive building-envelope measures, improved glazing, and photovoltaic integration can be considered within a broader planning framework. Future research should test these strategies across multiple building types and urban scales and incorporate economic, spatial, and occupant-related variables.

Keywords: Zero-Energy Urban Development, Solar Energy, Urban Energy Planning, Hot and Dry Climate.

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1. Introduction

Climate change, increasing energy demand, and the environmental consequences of fossil fuel dependency have become major challenges for sustainable development. The building sector plays a significant role in global energy consumption and greenhouse gas emissions, making energy efficiency and renewable energy integration essential components of climate mitigation strategies (IEA, 2023; UNEP, 2023).Consequently, sustainable urban development approaches increasingly emphasize reducing energy demand, improving energy performance, and transitioning toward low-carbon energy systems. The concept of zero-energy development has emerged as an important framework for addressing these challenges. Initially developed at the building scale, zero-energy approaches aim to minimize energy demand through efficient design strategies and compensate remaining energy requirements through renewable energy generation (Maszal et al., 2011). However, recent perspectives suggest that achieving zero-energy objectives requires moving beyond individual buildings toward integrated urban systems in which buildings, infrastructure, renewable resources, and planning decisions interact (Reinhar & Cerezo Davila, 2016).

At the urban scale, energy consumption is influenced by multiple interconnected factors, including building characteristics, urban morphology, land-use patterns, and energy infrastructure. Therefore, zero-energy urban development requires coordinated strategies that integrate architectural solutions with urban planning frameworks. Such an integrated perspective is particularly important in regions where climatic conditions strongly influence energy demand.

Hot and dry climate regions face specific challenges related to energy consumption due to high solar radiation, elevated summer temperatures, and significant cooling requirements. In these regions, climate-responsive design strategies, including improved building envelopes, optimized glazing systems, shading strategies, and passive design principles, can contribute significantly to reducing energy demand (Givoni, 1998; Santamouris, 2016). At the same time, the high solar potential of these regions creates important opportunities for renewable energy integration, particularly photovoltaic systems. Iran, due to its geographical location and considerable solar resources, has significant potential for renewable energy development. However, many cities located in hot and dry regions continue to experience high energy consumption due to inefficient building design and limited integration of renewable energy technologies. Therefore, developing context-specific strategies that respond to local climatic conditions is necessary for improving urban energy sustainability.

Semnan city represents an appropriate case for investigating these challenges. Located in a hot and dry climatic region of Iran, Semnan experiences high solar availability while simultaneously facing increased cooling energy demands. Understanding how building-level interventions can reduce energy consumption and support renewable energy integration can provide valuable insights for sustainable planning strategies in this city and other similar climatic contexts.

Building energy simulation has become an important method for evaluating the effectiveness of energy-efficient strategies before their implementation. Simulation tools such as EnergyPlus and DesignBuilder enable researchers to analyze the relationship between building characteristics, climatic conditions, and energy performance (Crawly et al., 2001; Attia et al., 2012). These approaches provide quantitative evidence for comparing alternative scenarios and identifying effective strategies for reducing energy consumption.

However, previous studies indicate a methodological gap between building-scale simulation and urban-scale planning. While building energy models provide detailed information regarding technical performance, urban planning studies often require broader interpretations related to policies, regulations, and spatial development strategies (Reinhar & Cerezo Davila, 2016; Huang et al., 2017). Therefore, connecting simulation-based evidence with planning-oriented approaches remains an important research challenge.

In this context, the main research gap addressed by this study is the limited integration between building-scale energy simulation results and planning pathways toward zero-energy urban

development, particularly in hot and dry climate regions. Although previous studies have investigated energy-efficient buildings and renewable energy systems, fewer studies have explored how simulation outcomes can inform urban planning strategies. Therefore, this study aims to identify planning pathways toward zero-energy urban development in hot and dry climates through a simulation-based assessment of a representative residential building in Semnan, Iran. The study uses DesignBuilder and EnergyPlus simulation tools to evaluate baseline energy performance and examine the potential contribution of energy-efficiency and solar-energy strategies.

The main research question is: How can building-scale energy simulation results contribute to identifying planning pathways toward zero-energy urban development in hot and dry climate cities such as Semnan? The objectives of this research are:To evaluate the baseline energy performance of a representative residential building in Semnan using building energy simulation.To assess the potential impact of energy-efficiency and solar-energy strategies on reducing energy consumption.To interpret simulation results as evidence for developing planning strategies toward zero-energy urban development.The innovation of this study lies in establishing a connection between simulation-based building assessment and urban planning perspectives. Rather than considering energy-efficient buildings as isolated technical solutions, this research demonstrates how building-scale evidence can support broader planning decisions in climate-sensitive urban environments.

2. Research Theoretical Literature

2.1. Zero-Energy Urban Development

From Energy-Efficient Buildings to Sustainable Urban Systems. The concept of "zero-energy" has shifted from focusing solely on individual high-performance buildings to encompassing broader, integrated urban sustainability frameworks. While zero-energy buildings (ZEBs) aim to balance annual energy consumption with local renewable production—primarily through demand reduction and on-site generation—this approach is now expanding to the neighborhood and city scales (Marique & Reiter, 2014).

Achieving zero-energy urban development requires moving beyond isolated technological solutions toward a holistic strategy that incorporates urban morphology, energy infrastructure, and planning policies. Because buildings are the primary drivers of urban energy demand, optimizing their performance remains a critical foundation (Koutra et al., 2018).

However, the transition to sustainable urban systems depends on effectively integrating building-level design, technological innovation, and systemic policy frameworks to optimize the interactions between buildings, renewable energy potential, and urban planning.

2.2. Building-Scale and Urban-Scale Approaches in Energy Planning

Energy studies in the built environment can generally be categorized into two interconnected scales: building-scale and urban-scale approaches. Building-scale approaches primarily focus on the physical characteristics and operational performance of individual buildings. These studies examine factors such as building orientation, envelope characteristics, glazing systems, insulation, thermal performance, energy systems, and renewable energy integration. Building Energy Modeling (BEM) and simulation tools such as EnergyPlus and DesignBuilder have become important methods for evaluating the influence of design strategies on energy consumption. At this scale, simulation-based studies allow researchers and designers to compare alternative scenarios before implementation. By modifying building characteristics and evaluating energy outcomes, simulation approaches provide evidence for selecting effective energy reduction strategies. Recent research demonstrates that building energy simulation can support decision-making by identifying optimal combinations of energy efficiency measures and renewable energy technologies (Reinhar & Cerezo Davila, 2016).

However, achieving urban energy goals requires considering interactions among multiple buildings and urban components. Urban-scale approaches examine larger systems, including building stocks, urban morphology, land-use patterns, energy infrastructure, and renewable energy distribution. Urban Building Energy Modeling (UBEM) has emerged as an approach for extending building energy simulation toward neighborhoods and cities. Unlike individual building models, UBEM evaluates energy performance across groups of buildings and provides information useful for

urban planners and policymakers (Ferrando et al., 2020).

Despite the importance of urban-scale approaches, detailed urban energy modeling requires extensive data and computational resources. Therefore, building-scale simulation studies remain valuable as an initial step for identifying effective strategies and generating evidence that can inform broader planning decisions (Li et al., 2017).

Accordingly, this research adopts a building-scale simulation approach while interpreting its findings from an urban planning perspective. The study considers the simulated building as an experimental unit for identifying energy reduction strategies that can contribute to planning pathways toward zero-energy urban development.

2.3. Simulation-Based and Planning-Based Approaches

Energy planning research has increasingly incorporated simulation methods as tools for evaluating the consequences of design and policy decisions. Simulation-based approaches enable researchers to analyze the relationship between climatic conditions, building characteristics, energy demand, and renewable energy potential. Building simulation tools provide quantitative assessments of energy performance by modeling physical characteristics and operational conditions. These tools are particularly useful in regions with specific climatic challenges because they allow the evaluation of climate-responsive strategies before their implementation. In hot and dry climates, where cooling demand represents a major component of energy consumption, simulation-based assessment can help identify appropriate design solutions (Pan et al., 2023; Bian et al., 2025).

On the other hand, planning-based approaches focus on translating technical findings into strategies, regulations, and decision-making frameworks. Urban planners require evidence-based information to develop policies related to building standards, renewable energy adoption, urban form, and sustainable development. Recent research emphasizes the importance of linking simulation outputs with planning processes. Simulation results alone cannot achieve urban sustainability objectives unless they are translated into actionable planning strategies. Therefore, the integration of simulation-based assessment and planning-based interpretation represents an important pathway for achieving zero-energy development goals (Stermieri et al., 2020; Ang et al., 2020).

Based on this perspective, the present study establishes a connection between building energy simulation and urban planning by using simulation results as evidence for identifying planning implications in Semnan city.

2.4. Energy-Efficient Strategies in Hot and Dry Climates

Climatic conditions significantly influence building energy performance. Hot and dry regions are characterized by high solar radiation, significant temperature differences between day and night, low humidity, and high cooling requirements during warm seasons. Therefore, building design strategies in these regions should consider local climatic characteristics to minimize energy demand (Elnagar & Köhler, 2020; Tungnung, 2025).

Passive design strategies, including appropriate building orientation, thermal insulation, optimized glazing systems, shading devices, and climate-responsive envelope design, can reduce heat gain and improve indoor thermal conditions. These strategies are particularly important because reducing energy demand is considered the first step toward achieving zero-energy performance (Sartori et al., 2012; Torcellini et al., 2006).

In addition to passive strategies, renewable energy technologies, especially photovoltaic systems, provide opportunities for compensating remaining energy demand. The combination of demand reduction strategies and renewable energy generation represents a fundamental principle of zero-energy development (Tungnung, 2025).

For cities located in hot and dry climates, such as Semnan, integrating climate-responsive design with solar energy utilization can provide a practical pathway toward reducing dependence on conventional energy sources.

2.5. Solar Energy Potential and Zero-Energy Development

Solar energy is one of the most promising renewable resources for hot and dry regions due to high solar radiation availability. The integration of photovoltaic systems into buildings allows renewable energy production at the point of consumption and can contribute to reducing dependence on fossil fuels (Biyik et al., 2017; Belloni et al., 2024).

However, the effectiveness of solar energy integration depends on several factors, including building characteristics, available roof area, orientation, energy demand patterns, and climatic conditions. Therefore, solar technologies should not be considered independently but as part of an integrated energy strategy combining energy efficiency and renewable generation (Biyik et al., 2017; Belloni et al., 2024; Taşer et al., 2023).

In zero-energy development approaches, renewable energy generation is usually considered after reducing unnecessary energy demand. Consequently, improving building performance and integrating solar systems should be addressed simultaneously. This approach is particularly relevant for cities in hot and dry climates where solar availability is high but energy demand for cooling remains considerable (Abdul-Zahra & Al Jubori, 2021; Mirlohi et al., 2020).

2.6. Conceptual Framework of the Study

Based on the reviewed theoretical concepts, this study proposes a conceptual framework linking climatic conditions, building energy strategies, simulation analysis, and urban planning implications.

The framework consists of four main components:

1. Climatic Context: Hot and dry climate characteristics of Semnan, including high solar radiation and cooling demand.
2. Building Energy Strategies: Climate-responsive design measures and renewable energy integration, including improved glazing, energy-efficient building characteristics, and solar energy utilization.
3. Simulation-Based Evaluation: Assessment of energy performance using DesignBuilder and EnergyPlus simulation tools.
4. Planning Implications: Translation of simulation results into planning pathways and policy recommendations toward zero-energy urban development.

This framework assumes that building-scale simulation results can provide evidence for developing broader planning strategies. Although a single-building simulation cannot represent the entire urban energy system, it can identify effective strategies and provide a foundation for future multi-scale energy planning studies

2.7. Research background

Building-Scale Approaches in Zero-Energy Development- Previous research has largely focused on the building scale, investigating how design, passive strategies, and renewable technologies impact energy performance. Studies emphasize that optimizing the building envelope (insulation, glazing, and shading) is a crucial first step to reducing energy demand before integrating renewable sources.

Recent advancements, such as those highlighted by Kaitouni et al. (2025), show a significant evolution: modern buildings are no longer just designed for efficiency and comfort, but also to minimize life-cycle carbon emissions and interact with the urban environment. Driven by stricter regulations and digital tools, buildings are transitioning from passive consumers to “active prosumers” within smart grids. This enables them to achieve net-zero or even net-positive energy status, contributing to the broader concept of zero-energy communities.

-Zhao et al., (2025) in research titled: “Global warming likely compromises the annual performance of zero-energy buildings while the urban heat island effect exacerbates the impact” showed that total energy demand for space heating and cooling is predicted to increase by 24% and 38% under the RCP4.5 and RCP8.5 scenarios from 2021 to 2100, driven by global warming and the UHI effect. For extreme climates under the RCP4.5 scenarios, peak cooling and heating demands are expected to be 33% and 66% higher than the 80-year average, while rising to 39% and 71% under the RCP8.5 scenarios, respectively. Furthermore, current climate-based designs are unlikely to enable renewable energy generation to meet zero-energy requirements by 2100. This framework is therefore essential for enhancing the accuracy and reliability of energy system design for ZEBs.

-Li & Feng (2025) in an article:” Pathways to urban net zero energy buildings in Canada: A comprehensive GIS-based framework using open data” indicate that electrification and solar energy adoption in commercial districts, along with targeted retrofitting in residential zones, can significantly reduce energy use. This study provides a physics-based framework and robust methodology for Canadian cities to achieve net-zero energy goals, which offers valuable insights for policymakers, urban planners, and energy engineers to support decision-making and urban sustainability.

- Gondal (2024) in an article titled: "Low-speed wind energy devices to facilitate nearly zero energy buildings in urban Pakistan" showed that conventional wind turbines, effective in harnessing wind energy, face limitations in urban areas due to the requisite wind speeds. Micro wind turbines, notably vertical axis wind turbines (VAWT), present a promising solution for achieving net-zero energy buildings in urban settings. VAWTs exhibit advantages such as higher efficiency and lower cut-in speeds. Despite their promise, challenges such as reliability, cost and environmental impact persist.

-Taher Ahmadi et al., (2023) in an article titled: "Multi-objective optimization of energy demand and net zero energy building design based on climatic conditions (Case study: Tehran)" showed that climatic conditions and the appropriate selection of architectural parameters are very important and vital in reducing building energy consumption. Based on the results, the use of energy optimization solutions in Tehran leads to a 25.3% reduction in energy consumption. In addition, there is a significant potential for the use of photovoltaic systems in Tehran to provide energy for homes.

-Rezaeinasab et al., (2023) in an article titled: "Investigating the potential of designing net-zero energy buildings using photovoltaic installation with considering urban development plans requirements" showed that in a residential 3-story building the optimized configuration of the building envelope and systems can reduce electricity consumption by 20%. The rooftop PV account for 87.2% and PV installation on the southern façade contributed to 12.8% of total electricity generation. PV installation on the south façade and roof covers 88.2% of the building's electricity demand.

Urban-Scale Approaches in Zero-Energy Development- Urban-scale studies approach energy sustainability from a broader perspective by considering relationships among buildings, urban form, infrastructure, and energy systems. Unlike building-scale studies that focus primarily on individual performance, urban-scale approaches examine how multiple components of the urban system interact to influence energy consumption and renewable energy potential.

Previous research has investigated the influence of urban morphology, building density, land-use patterns, and spatial organization on urban energy performance. These studies indicate that planning decisions, including building arrangement, orientation, and urban structure, can affect solar access, energy demand, and opportunities for renewable energy integration (Zheng & Niu, 2021).

Simulation-Based Studies:

Evaluating Energy Performance Through Modeling- Simulation-based approaches have become one of the most widely used methods for assessing energy performance in buildings and urban environments. These approaches enable researchers to analyze the effects of alternative design strategies under controlled conditions and provide quantitative estimates of energy consumption (Ferrari & Zagarella, 2018).

Energy simulation tools such as EnergyPlus, DesignBuilder, TRNSYS, and similar platforms have been used extensively to evaluate the impacts of building envelope modifications, renewable energy integration, and climate-responsive design strategies. The main advantage of simulation-based methods is their ability to compare different scenarios without requiring physical implementation (Li et al., 2017; Reinhart & Cerezo Davila, 2016).

In recent years, simulation approaches have expanded from individual buildings toward urban energy modeling. Urban Building Energy Modeling (UBEM) has provided opportunities to analyze energy performance at neighborhood and city scales. However, the complexity of urban-scale modeling means that many studies continue to rely on representative building simulations as an initial step for understanding energy reduction opportunities (Reinhart & Cerezo Davila, 2016). The literature indicates that simulation results are most valuable when they are connected to decision-making processes. Without interpretation within a planning framework, simulation outputs remain technical assessments rather than practical strategies for sustainable urban development (Hwang & Lim, 2026).

Planning-Based Studies: Translating Energy Evidence into Urban Strategies- Planning-based studies focus on how energy objectives can be incorporated into urban development policies and spatial decision-making. These studies examine issues such as energy-efficient urban design, renewable energy planning, sustainability

regulations, and governance mechanisms (Torabi Moghadam & Lombardi, 2019; OECD, 2022).

Research in this field highlights that achieving zero-energy urban development requires coordination between technical solutions and planning frameworks. Building standards, incentive programs, renewable energy policies, and urban regulations influence the adoption of energy-efficient strategies (Amaral et al., 2018; Horak et al., 2025).

However, many planning-oriented studies provide conceptual frameworks without detailed quantitative assessment of energy performance. This creates a gap between theoretical planning recommendations and measurable energy outcomes. Therefore, integrating simulation-based evidence with planning-based approaches can provide a more comprehensive pathway. Simulation can identify effective energy reduction strategies, while planning frameworks can determine how these strategies can be implemented at broader scales (Torabi Moghadam & Lombardi, 2019; Horak et al., 2025).

Research Gap- Based on the reviewed studies, previous research can be categorized into two main groups:

First, building-scale simulation studies have provided detailed assessments of energy efficiency strategies and renewable energy technologies. However, many of these studies remain limited to individual buildings and do not sufficiently address their implications for urban planning. Second, urban-scale planning studies have explored pathways toward sustainable and zero-energy urban development. However, many of these studies lack detailed simulation-based evidence regarding the effectiveness of specific building-level interventions. Therefore, a methodological gap exists between building energy simulation and urban planning. Particularly in hot and dry climate regions, there is a need for approaches that use building-scale simulation results as evidence for developing planning pathways toward zero-energy urban development. This study attempts to address this gap by connecting a simulation-based assessment of a representative residential building in Semnan with broader planning implications. The research does not consider a single building simulation as a complete representation of urban energy performance; rather, it uses the results as an evidence-based foundation for identifying strategies that can support future zero-energy urban development.

3. Research Methodology

3.1 Geographical Scope of the Research

This study is applied research based on a quantitative and simulation-based approach. The research aims to evaluate the potential of energy-efficiency and solar-energy strategies in reducing building energy consumption and to interpret their implications for zero-energy urban development in hot and dry climates (Figure 1).

Unlike survey-based studies that examine social perceptions or behavioral patterns, this research focuses on the physical performance of buildings through energy simulation. Therefore, the methodological framework is based on modeling, scenario development, simulation, and comparative analysis of energy performance.

The research process consists of four main stages:

Identification of climatic characteristics and energy challenges in Semnan city as a representative hot and dry climate region (Figure 2).

Development of a baseline energy model for a representative residential building.

Simulation of energy performance after applying energy-efficiency and solar-energy strategies.

Interpretation of simulation results to identify planning pathways toward zero-energy urban development.

The overall methodological framework establishes a connection between building-scale energy assessment and urban planning implications.

The case study of this research is Semnan city, located in the central part of Iran. The city is characterized by a hot and dry climate, with high solar radiation availability and significant cooling requirements during warm seasons (Figure 3).

The climatic conditions of Semnan create both challenges and opportunities for sustainable energy development. On one hand, high temperatures during summer increase cooling energy demand. On the other hand, considerable solar potential provides opportunities for renewable energy generation, particularly through photovoltaic technologies. Due to these climatic characteristics, Semnan represents an appropriate case for investigating how climate-responsive building strategies and solar energy utilization can contribute to reducing energy consumption and supporting pathways toward zero-energy urban development (Figure 4).

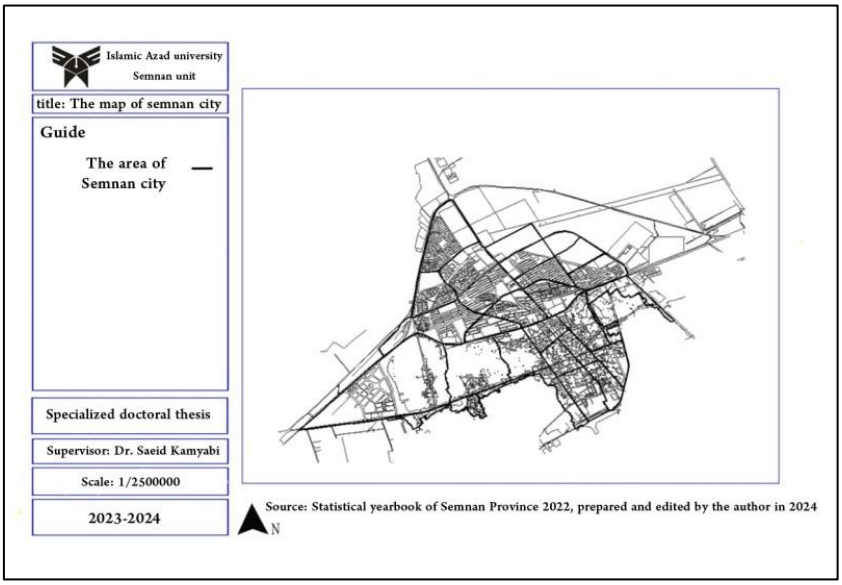


Figure 1. Map of Semnan city

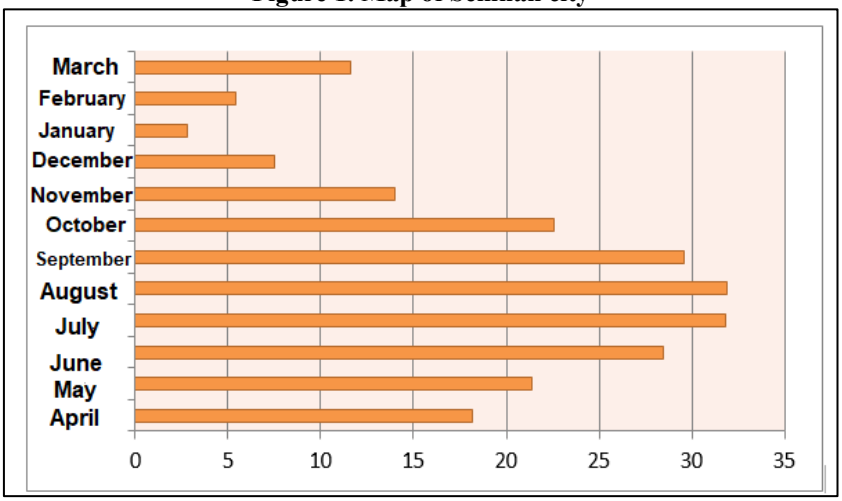


Figure 2. Average monthly temperature of Semnan city in degrees Celsius, based on the 2021 Statistical Yearbook
(Source: Ehteshamfar et al., 2024: 4)

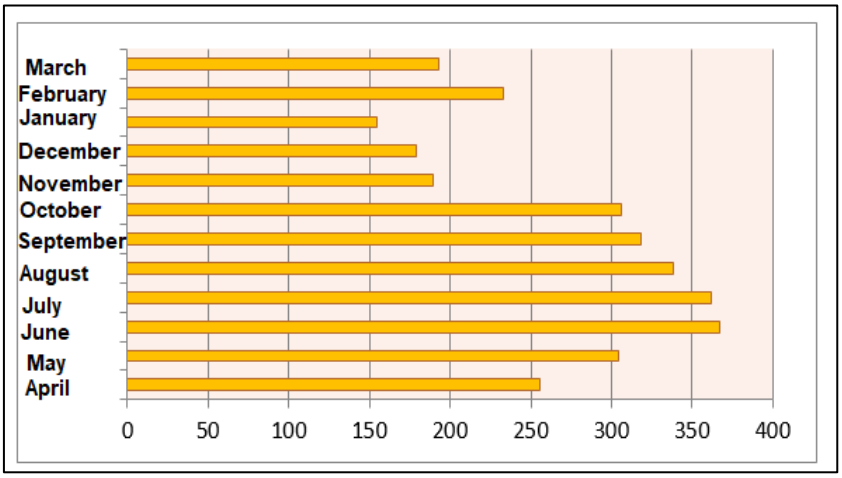


Figure 3. Sunshine hours in Semnan city, source: Statistical Yearbook 2021
(Source: Ehteshamfar et al., 2024: 4)

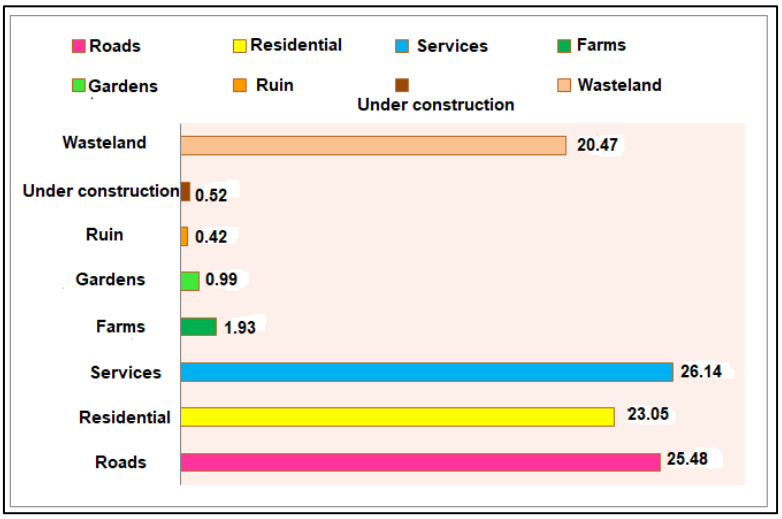


Figure 4. Percentage of land use in Semnan city, source: Statistical Yearbook 2021
(Source: Ehteshamfar et al., 2024: 4).

3.2. Methodology

To evaluate energy performance, a representative residential building located in Semnan was selected as the simulation case. The selected building represents a typical residential unit in the study area and has a total floor area of approximately 210 m².The building is a single-story residential building consisting of three bedrooms, a living room, kitchen, and bathroom spaces. The physical characteristics of the building, including its geometry and functional layout, were used to develop the simulation model. The building model was developed in DesignBuilder software, which uses the EnergyPlus simulation engine for dynamic energy performance analysis. The model was established to evaluate annual energy consumption under the climatic conditions of Semnan. The selected building was considered suitable for this study because its characteristics reflect common residential patterns in Semnan, including a single-story layout, typical residential functions, and a floor area consistent with local housing conditions. Therefore, it provides an appropriate case for evaluating the potential impact of energy-efficiency and solar-energy strategies in a hot and dry climatic context (Figure 5 and Table 1).

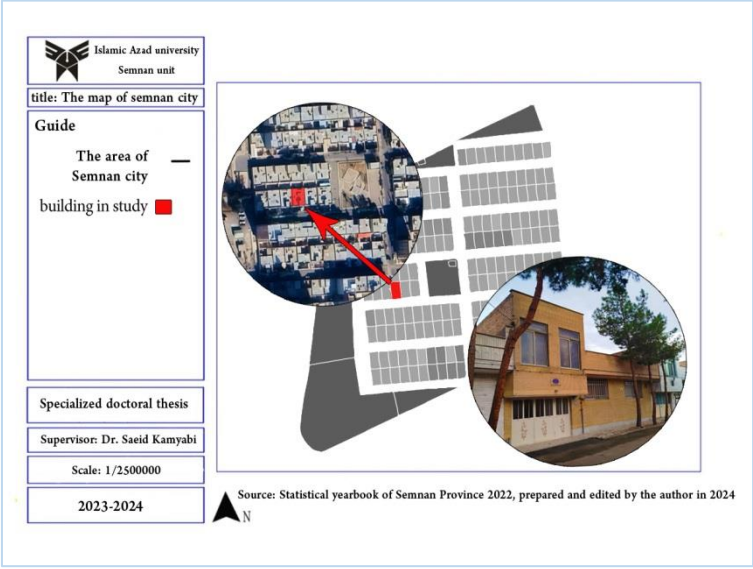


Figure 5. Building in study

Table 1. Specifications of the Case Study Building

Geographical Location	Landuse	Building Orientation	Number of Floors	Roof Type	Floor Area	Façade Material	Window Area	Occupancy	Occupancy Hours
Janbazan TownSemnan, Iran.	Residential	North-South	1	Flat	210 m 2	Steel Frame Brick	5m2 North 7m2 South	4	06:00 AM to 11:00 PM
Electrical Appliances	Lighting Type	Cooling System	Heating System	Natural Ventilation	Mechanical Ventilation	Opening Direction	Glazing Type	External Shading	Internal Shading
TV, Computer, Refrigerator, Washing Machine	22 × 100W Lamps	Water Cooler	Gas Heater	Windows	Water Cooler	South-facing	Single-glazed	Balcony	Venetian Blinds

3.3. Simulation Process

The simulation process was conducted using DesignBuilder and EnergyPlus. EnergyPlus is a widely used building energy simulation engine capable of evaluating heating, cooling, lighting, and overall energy performance based on building characteristics and climatic conditions. The simulation process included two main scenarios. Climatic data for Semnan city were extracted in EPW format using Climate Consultant software, based on the ASHRAE Standard 55-2004, and subsequently integrated into DesignBuilder for further analysis. (Figure 6)

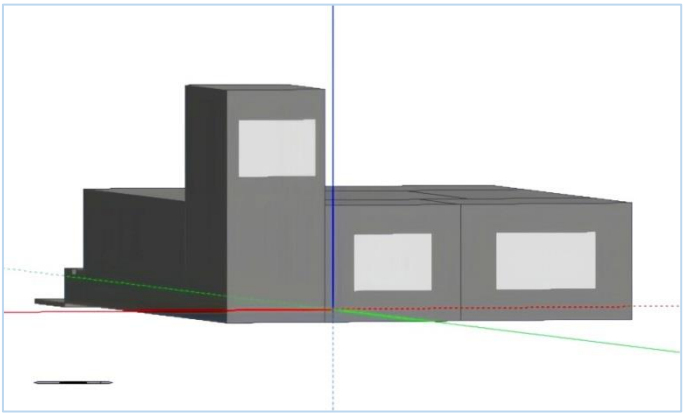


Figure 6. Simulation of the studied building in Design Builder software and its output

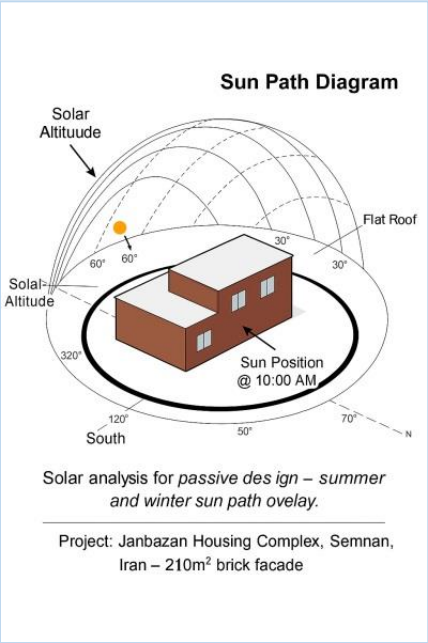


Figure 7. Simulation of the Solar path within the case study building

Scenario 1: Baseline Condition

In the baseline scenario, the selected residential building was simulated under its existing design conditions. This scenario represents the initial energy performance of the building before applying improvement strategies.

The purpose of this stage was to determine the annual energy consumption level and identify the potential for energy reduction.

Scenario 2: Improved Energy Performance Scenario

To minimize overall energy consumption, a multi-faceted approach involving passive design, HVAC optimization, and electrical load reduction was implemented. On the architectural level, energy efficiency was enhanced through optimal building orientation, strategic floor planning based on winter solar radiation, and the maximization of the Window-to-Wall Ratio (WWR) for daylighting, while ensuring thermal comfort via high-thermal-mass walls with integrated insulation. The building envelope was further optimized using double-glazed windows and climate-responsive shading devices. Regarding mechanical and thermal management, energy demand was mitigated by employing high-efficiency HVAC systems, utilizing heat recovery ventilation, and implementing nocturnal ventilation strategies to exploit nighttime cooling. Additionally, thermal loads were managed through precise thermostat setpoint adjustments and the use of external moist spaces for pre-cooling. Finally, electrical energy use was curtailed by installing low-power appliances, incorporating occupancy sensors, and integrating daylight harvesting controls to reduce reliance on artificial lighting (Figure 7).

3.4. Energy Performance Evaluation Criteria

The main evaluation indicator in this research was annual energy consumption intensity, expressed as kilowatt-hours per square meter per year (kWh/m²/year).

This indicator allows comparison between different building conditions and provides a standardized measure for evaluating energy performance.

The effectiveness of the proposed strategies was evaluated based on the reduction percentage between baseline and improved scenarios using the following equation:

The obtained results were subsequently analyzed from an urban planning perspective to identify how building-level energy improvements can contribute to broader zero-energy development strategies.

3.5. Analytical Framework of the Research

Based on the theoretical framework, this research proposes an analytical pathway linking climate characteristics, building strategies, simulation results, and planning implications.

The analytical framework consists of four interconnected components:

- Climate Context.

- Hot and dry climatic conditions of Semnan.
- Energy-Efficient Building Strategies.
- Climate-responsive design and solar energy integration.
- Simulation-Based Assessment.
- Design Builder/ Energy Plus evaluation of energy performance.
- Planning Implications.
- Identification of strategies supporting zero-energy urban development.

This framework highlights that building-scale simulation results can serve as evidence for developing urban planning strategies. However, the study recognizes that a single-building simulation cannot fully represent the energy performance of an entire city. Therefore, the findings are interpreted as a basis for identifying planning pathways rather than a direct estimation of city-wide zero-energy achievement.

3.6. Research Limitations Related to Methodology

The simulation-based approach provides detailed information about the energy performance of the selected building; however, several limitations should be acknowledged.
First, the study focuses on a representative residential building and does not include the entire building stock of Semnan. Second, the simulation does not incorporate economic analysis, occupant behavior variations, or urban-scale energy modeling. Third, the transfer of building-level results to urban planning requires further investigation through multi-building and neighborhood-scale simulations.
Despite these limitations, the methodology provides an evidence-based approach for identifying effective energy strategies and establishing a connection between building simulation and urban planning decisions.

4. Research Findings

Baseline Energy Performance of the Residential Building- The first stage of the simulation process evaluated the baseline energy performance of the selected residential building under the climatic conditions of Semnan.
The results of the baseline simulation showed that the annual energy consumption of the building was 103.61 kWh/m²/year. This value represents the energy demand of the building before applying energy-efficiency and renewable energy strategies. The baseline results indicate that residential buildings in hot and dry climates may experience considerable energy demand due to climatic conditions, particularly high cooling requirements during warm seasons. The obtained energy consumption level highlights the importance of applying climate-responsive design strategies and renewable energy solutions to reduce dependence on conventional energy sources.
From a planning perspective, identifying the baseline energy performance of representative buildings provides an initial evidence base for understanding energy challenges within the urban environment. Since buildings constitute one of the main components of urban energy consumption, improving their performance can contribute to broader strategies for sustainable and zero-energy urban development.

Energy Performance After Applying Improvement Strategies- In the second stage of the simulation, energy-efficiency and solar-energy strategies were incorporated into the building model to evaluate their potential contribution to reducing energy consumption.
The applied strategies included improvement of glazing performance through double-glazing systems, integration of solar energy through photovoltaic panels, and other energy reduction measures considered compatible with the climatic characteristics of Semnan.
The simulation results demonstrated a significant improvement in the energy performance of the building after applying the proposed strategies. The annual energy consumption decreased from 103.61 kWh/m²/year in the baseline scenario to 56.62 kWh/m²/year in the improved scenario.
This reduction indicates that climate-responsive building strategies combined with renewable energy integration can substantially decrease energy demand in hot and dry regions.

Comparative Analysis of Energy Performance- The comparison between the baseline and improved scenarios demonstrates the effectiveness of the proposed strategies.

Interpretation of Results for Zero-Energy Urban Development- Although the simulation was conducted at the building scale, the results provide important implications for urban energy planning.
The findings indicate that improving the energy performance of individual buildings can represent an important component of broader zero-energy urban development pathways. In cities with hot

and dry climates, such as Semnan, building design strategies that respond to local climatic conditions can reduce energy demand and increase the feasibility of renewable energy integration. The results also demonstrate the importance of considering buildings as active components of urban energy systems. Instead of viewing energy consumption only as an operational issue, urban planning approaches can incorporate building performance criteria into development policies and regulations.

Therefore, the simulation outcomes of this study can be interpreted as evidence supporting several planning directions:

- ✓ promoting energy-efficient building standards;
- ✓ encouraging climate-responsive architectural design;
- ✓ increasing integration of solar energy technologies;
- ✓ developing policies that support low-energy and zero-energy buildings.

However, these findings should not be interpreted as indicating that the entire city of Semnan can achieve zero-energy status based only on a single-building simulation. Rather, they provide a methodological pathway for connecting building-level evidence with future urban-scale energy planning.

Summary of Findings- The main findings of the simulation analysis can be summarized as follows:

The baseline simulation indicated that the selected residential building consumed 103.61 kWh/m²/year under Semnan's hot and dry climatic conditions.

Applying energy-efficiency and solar-energy strategies reduced annual energy consumption to 56.62 kWh/m²/year.

The improved scenario achieved approximately 45.3% reduction in energy consumption intensity.

The results confirm the potential of integrating climate-responsive building strategies and renewable energy technologies as part of pathways toward zero-energy urban development.

The findings provide a building-scale evidence base that can support future urban planning strategies in hot and dry climate regions.

In the next step, the impact of various factors on the building's energy consumption is examined to minimize the building's energy consumption. Measures such as double-glazed windows, the use of solar panels, etc (Table 2).

Table 2. Energy calculation of the selected building after applying the solutions (Source: Research findings)

Energy	MJ	Cubic meter	Unit of consumption	Number of days
Gas	38234	37.68	10	365
Electricity	14762		91	365
		210	m^2	=A
MJ/m^2	203.83			=E actual
$kwh/year/m^2$	56.62			Equivalent

5. Discussion and Conclusion

The transition toward zero-energy urban development requires integrated approaches that connect building performance assessment, renewable energy utilization, and urban planning strategies. This study aimed to identify planning pathways toward zero-energy urban development in hot and dry climates through a simulation-based assessment of a representative residential building in Semnan, Iran.

Using DesignBuilder and the EnergyPlus simulation engine, the energy performance of the selected residential building was evaluated under baseline and improved conditions. The baseline simulation indicated an annual energy consumption of 103.61 kWh/m²/year. After applying energy-efficiency and solar-energy strategies, including improved glazing performance and photovoltaic integration, annual energy consumption decreased to 56.62 kWh/m²/year. This represents approximately 45.3% reduction in energy consumption intensity.

The findings demonstrate that climate-responsive building strategies and renewable energy integration can significantly improve energy performance in hot and dry regions. The results support the theoretical assumption that achieving zero-energy development requires prioritizing energy demand reduction before increasing renewable energy generation.

The main contribution of this research is establishing a connection between building-scale simulation and urban planning perspectives. While previous studies have often focused either on

technical optimization at the building scale or conceptual strategies at the urban scale, this study demonstrates how simulation-based evidence can support planning decisions and policy development.

From a planning perspective, the findings suggest that zero-energy urban development in cities such as Semnan should be approached as a gradual and multi-scale process. Improving building energy performance, strengthening climate-responsive building regulations, encouraging solar energy integration, and developing supportive energy policies are essential steps toward sustainable urban development.

However, several limitations should be acknowledged. First, the research was based on a single representative residential building, and therefore the results cannot directly represent the energy performance of the entire city. Second, the study focused primarily on physical energy performance and did not consider economic aspects, occupant behavior, or social factors influencing energy consumption. Third, the simulation framework was conducted at the building scale and did not include neighborhood or city-scale energy modeling.

Future studies can extend this research by applying urban building energy modeling approaches to multiple building types and urban areas. Further research can also incorporate economic evaluation, life-cycle assessment, occupant behavior analysis, and spatial planning factors to develop more comprehensive zero-energy urban development frameworks.

Overall, this study demonstrates that building energy simulation can provide valuable evidence for developing sustainable planning pathways in hot and dry climates. Although achieving zero-energy status at the urban scale requires broader investigation, the integration of simulation-based assessment with planning strategies represents an important step toward climate-responsive and energy-efficient urban development.

Relationship Between Simulation Findings and Zero-Energy Urban Development- The findings of this study demonstrate that building-scale energy simulation can provide valuable evidence for developing pathways toward zero-energy urban development in hot and dry climates. The reduction of annual energy consumption from 103.61 kWh/m²/year in the baseline scenario to 56.62 kWh/m²/year after applying improvement strategies indicates the significant potential of climate-responsive design and renewable energy integration.

These findings support the theoretical perspective that achieving zero-energy development should begin with reducing energy demand before focusing on energy generation. Previous studies have emphasized that energy efficiency measures, including improved building envelopes, optimized glazing systems, and passive design strategies, represent fundamental steps toward reducing dependence on conventional energy sources. In this study, the improvement of building energy performance demonstrates that individual buildings can act as important components of broader urban energy systems. Since buildings represent a major share of urban energy consumption, improving their performance can contribute to the overall sustainability objectives of cities.

However, the results also confirm that zero-energy urban development cannot be achieved solely through isolated building interventions. Instead, building-scale improvements should be integrated with urban planning policies, renewable energy strategies, and regulatory frameworks.

From Building-Scale Simulation to Urban Planning Implications- One of the main contributions of this research is establishing a connection between building-scale simulation and urban planning perspectives.

Previous studies can generally be divided into two groups. The first group focuses on detailed building simulations and evaluates the effect of technical strategies on energy consumption. The second group examines urban energy planning but often lacks detailed quantitative evidence regarding the effectiveness of specific interventions.

This study attempts to bridge this gap by using simulation results from a representative residential building as evidence for identifying planning pathways. Although the simulation does not represent the entire energy system of Semnan, it demonstrates how building performance analysis can inform planning decisions.

The findings suggest that urban energy planning in hot and dry climates should not only consider large-scale renewable energy infrastructure but also address the energy performance of individual buildings. Therefore, policies related to building

regulations, energy-efficient construction practices, and renewable energy integration should be considered as essential components of zero-energy urban development strategies.

The Role of Climate-Responsive Strategies in Hot and Dry Regions- The results highlight the importance of considering local climatic conditions in energy planning. Semnan, as a city located in a hot and dry climate region, experiences environmental conditions that increase cooling demand. Therefore, energy strategies that ignore climatic characteristics may have limited effectiveness.

The improvement achieved in the simulation scenario indicates that climate-responsive building design can play an important role in reducing energy demand. Strategies such as improving glazing performance and utilizing solar energy are particularly relevant in regions with high solar radiation availability.

These findings are consistent with the broader theoretical understanding that sustainable development strategies should be adapted to local environmental conditions rather than applying universal solutions. In hot and dry regions, the combination of passive design approaches and renewable energy technologies provides a practical pathway for improving energy performance.

Implications for Sustainable Urban Planning in Semnan- The findings of this research have several implications for urban planning in Semnan and similar cities.

First, energy performance criteria should receive greater attention in urban development policies. Traditional planning approaches often focus on land use, transportation, and physical growth, while building energy performance is considered mainly at the architectural scale. Integrating energy considerations into planning regulations can support more sustainable urban development.

Second, renewable energy utilization should be incorporated into urban development strategies. The high solar potential of hot and dry regions creates opportunities for distributed solar energy systems, particularly photovoltaic integration in residential buildings.

Third, planning policies should encourage the transition from conventional buildings toward energy-efficient and low-energy buildings through standards, incentives, and supportive regulations. The findings suggest that zero-energy urban development should be considered as a gradual process rather than an immediate outcome. This process begins with improving the energy performance of individual buildings and gradually expands toward neighborhood and city-scale energy systems.

Comparison with Previous Research- The findings of this study are consistent with previous research emphasizing the importance of simulation-based evaluation for improving building energy performance. Similar studies have demonstrated that energy simulation tools can effectively evaluate alternative design strategies and support evidence-based decision-making.

However, unlike studies that focus only on technical optimization at the building scale, this research emphasizes the planning implications of simulation outcomes. The main contribution is not only identifying energy reduction potential but also interpreting how such results can support urban planning strategies toward zero-energy development.

Therefore, the study contributes to the existing literature by providing a conceptual connection between simulation-based assessment and planning-based decision-making, particularly in hot and dry climatic contexts.

Scientific Contribution of the Study- The scientific contribution of this research can be summarized in three aspects:

- First, the study provides empirical evidence regarding the potential of energy-efficiency and solar-energy strategies in a hot and dry climate context.
- Second, it proposes an integrated perspective that connects building energy simulation with urban planning objectives.
- Third, it demonstrates that building-scale assessments can serve as an initial evidence base for developing broader zero-energy urban development pathways.

The research therefore contributes to the ongoing discussion on how technical energy assessments can be translated into planning strategies for sustainable urban development.

5.1. Planning and Policy Implications

Integrating Building Energy Performance into Urban Planning Policies- The findings of this study indicate that improving building energy performance can serve as an important pathway toward zero-energy urban development in hot and dry climates. Although energy consumption is often considered primarily a building-level issue, the results demonstrate that building characteristics

and energy performance have direct implications for urban sustainability.

Therefore, urban planning policies in cities such as Semnan should incorporate building energy performance criteria into development frameworks. Traditional urban planning approaches that focus mainly on land use, density, and physical expansion should be complemented by energy-oriented considerations.

Integrating energy performance indicators into building regulations, development plans, and urban sustainability programs can support a gradual transition toward low-energy and zero-energy urban development.

Promoting Climate-Responsive Building Regulations- The simulation results demonstrate the importance of applying climate-responsive design strategies in reducing energy demand. Therefore, one of the main planning implications of this study is the necessity of strengthening energy-oriented building regulations in hot and dry regions.

Planning authorities can encourage:

- Improvement of building envelope performance;
- Application of efficient glazing systems;
- Appropriate consideration of building orientation;
- Integration of shading strategies;
- Improvement of thermal insulation standards.

These measures can reduce cooling demand and improve building performance without relying solely on energy supply solutions.

For cities with climatic characteristics similar to Semnan, building regulations should be adapted to local environmental conditions rather than applying generalized standards.

Supporting Solar Energy Integration in Urban Development- The results of this study highlight the potential contribution of solar energy integration to reducing building energy demand. Considering the high solar availability in hot and dry regions, photovoltaic systems can become an important component of urban energy strategies.

From a planning perspective, solar energy integration can be supported through:

- Developing incentives for rooftop photovoltaic installation;
- Encouraging renewable energy integration in new residential developments;
- Considering solar accessibility in urban design decisions;
- Supporting local renewable energy programs.

However, solar energy should be considered as part of an integrated strategy. Renewable energy generation alone cannot achieve zero-energy goals without simultaneous reduction of energy demand through efficient building design.

Developing a Multi-Scale Energy Planning Approach- The findings of this research emphasize the importance of connecting different planning scales. The building-scale simulation provided evidence regarding effective energy strategies; however, achieving zero-energy urban development requires extending these strategies toward neighborhood and city scales.

Therefore, future urban energy planning in Semnan should consider a multi-scale approach:

❖ Building scale:

Improving individual building energy performance through efficient design and renewable energy integration.

❖ Neighborhood scale:

Evaluating energy interactions among groups of buildings and identifying opportunities for shared renewable energy systems.

❖ Urban scale:

Developing comprehensive energy planning frameworks, regulations, and sustainability policies.

This multi-scale perspective can help overcome the gap between technical building solutions and broader urban planning objectives.

Institutional and Economic Support for Energy Transition- The transition toward zero-energy urban development requires not only technical solutions but also institutional and economic support. Energy-efficient strategies often require initial investment, and therefore supportive mechanisms are necessary to encourage adoption.

Policy measures may include:

- Providing financial incentives for energy-efficient construction;
- Supporting renewable energy investments;
- Encouraging energy performance assessment during building approval processes;
- Increasing awareness among designers, developers, and residents.

Such measures can facilitate the adoption of energy-efficient practices and accelerate the transition toward sustainable urban development.

Planning Framework for Semnan and Similar Hot and Dry Cities- Based on the findings of this research, a planning pathway for hot and dry cities can be proposed:

- Step 1: Assessment of existing building energy performance;

- Step 2: Identification of climate-responsive improvement strategies;
- Step 3: Simulation-based evaluation of proposed interventions;
- Step 4: Integration of effective strategies into building regulations and urban policies;
- Step 5: Expansion from individual buildings toward neighborhood and urban energy planning.

This framework demonstrates that zero-energy urban development should be considered as a progressive planning process rather than a single technological intervention.

Implications for Rural and Regional Planning Contexts- Considering the focus of planning studies on regional sustainability, the findings also have implications beyond urban boundaries. Many small towns and rural settlements located in hot and dry regions share similar climatic challenges and energy consumption patterns. The integration of climate-responsive design and renewable energy strategies can contribute to improving energy resilience in these areas. Therefore, the proposed approach can provide a transferable framework for other settlements with similar environmental conditions.

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Author Contributions

The authors contributed equally to the development and preparation of this research.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the authorship or publication of this article.

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Original Article

مسیرهای برنامه‌ریزی برای گذار به توسعه شهری با انرژی صفر در اقلیم‌های گرم و خشک: مطالعه‌ای شبیه‌سازی‌محور در شهر سمنان، ایران

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چکیده مبسوط

۱. مقدمه

رشد شهرنشینی، افزایش تقاضای انرژی و پیامدهای زیست‌محیطی مصرف سوخت‌های فسیلی، ضرورت حرکت به سوی الگوهای توسعه شهری کم‌کربن و انرژی‌کارآمد را افزایش داده است. در این میان، بخش ساختمان یکی از مهم‌ترین مصرف‌کنندگان انرژی به شمار می‌رود و عملکرد انرژی آن تحت تأثیر عواملی همچون ویژگی‌های کالبدی، فرم و جهت‌گیری ساختمان، مصالح، اقلیم و الگوی بهره‌برداری قرار دارد. مفهوم توسعه شهری انرژی‌صفر نیز از تمرکز صرف بر ساختمان‌های منفرد فراتر رفته و به سمت رویکردهای یکپارچه در مقیاس محله و شهر حرکت کرده است. این موضوع در شهرهای واقع در اقلیم گرم و خشک اهمیت بیشتری دارد؛ زیرا تابش خورشیدی فراوان، دمای بالای تابستان و نیاز قابل‌توجه به سرمایش، هم‌زمان ظرفیت و چالش مهمی برای برنامه‌ریزی انرژی ایجاد می‌کند. با وجود ظرفیت مناسب انرژی خورشیدی در ایران، ناکارآمدی پوسته ساختمان و محدود بودن استفاده از انرژی‌های تجدیدپذیر، دستیابی به توسعه شهری انرژی‌صفر را با چالش مواجه کرده است. ازاین‌رو، پژوهش حاضر با هدف بررسی نقش شبیه‌سازی عملکرد انرژی ساختمان در شناسایی مسیرهای برنامه‌ریزی برای توسعه شهری انرژی‌صفر در اقلیم گرم و خشک، شهر سمنان را به‌عنوان مطالعه موردی انتخاب کرده است.

۲. مبانی نظری تحقیق

مبانی نظری پژوهش بر پیوند میان برنامه‌ریزی انرژی شهری، عملکرد انرژی ساختمان و توسعه انرژی‌صفر استوار است. مطالعات پیشین نشان می‌دهند که دستیابی به شهرهای انرژی‌کارآمد مستلزم توجه هم‌زمان به کاهش تقاضای انرژی، بهبود عملکرد ساختمان‌ها، استفاده از انرژی‌های تجدیدپذیر و سیاست‌گذاری فضایی است. مدل‌سازی انرژی ساختمان (BEM) و ابزارهایی مانند EnergyPlus و DesignBuilder امکان ارزیابی کمی عملکرد انرژی و مقایسه سناریوهای مختلف را فراهم می‌کنند. در مقیاس بزرگ‌تر، مدل‌سازی انرژی ساختمان‌های شهری (UBEM) می‌تواند این رویکرد را به سطح محله و شهر تعمیم دهد. در اقلیم گرم و خشک، راهبردهایی نظیر جهت‌گیری مناسب، عایق‌کاری حرارتی، بهینه‌سازی سطح و نوع پنجره‌ها، سایه‌اندازی، پوسته اقلیم‌پاسخ، تهویه طبیعی و استفاده از سامانه‌های خورشیدی اهمیت ویژه‌ای دارند. بر این اساس، چارچوب مفهومی پژوهش شامل چهار مؤلفه اصلی «زمینه اقلیمی»، «راهبردهای انرژی ساختمان»، «ارزیابی مبتنی بر شبیه‌سازی» و «پیامدهای برنامه‌ریزی» است. خلأ اصلی مطالعات پیشین نیز در فاصله میان نتایج کمی شبیه‌سازی ساختمان و تبدیل این نتایج به مسیرهای عملی برنامه‌ریزی شهری شناسایی شده است.

۳. روش تحقیق

پژوهش از نظر هدف، کاربردی و از نظر روش، کمی و مبتنی بر شبیه‌سازی است. فرآیند تحقیق در چهار مرحله انجام شد: شناسایی شرایط اقلیمی، ایجاد مدل پایه، تعریف سناریوی بهبودیافته و تفسیر نتایج در چارچوب برنامه‌ریزی شهری. شهر سمنان به دلیل قرارگیری در اقلیم گرم و خشک، تابش خورشیدی مناسب و نیاز قابل‌توجه به سرمایش به‌عنوان مطالعه موردی انتخاب شد. برای ارزیابی، یک ساختمان مسکونی یک‌طبقه نماینده با زیربنای تقریبی ۲۱۰ مترمربع در شهرک جانبازان سمنان مدل‌سازی شد. شبیه‌سازی دینامیکی با استفاده از نرم‌افزار DesignBuilder و موتور EnergyPlus انجام گرفت. در سناریوی پایه، مشخصات واقعی ساختمان شامل جهت‌گیری شمالی–جنوبی، پوسته، پنجره‌ها، سیستم‌های گرمایش و سرمایش، تجهیزات و الگوی حضور ساکنان لحاظ شد. در سناریوی بهبودیافته، مجموعه‌ای از راهبردهای اقلیم‌پاسخ و انرژی‌کارآمد، از جمله بهبود جهت‌گیری، افزایش جرم حرارتی و عایق‌کاری،

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پنجره‌های دوجداره، سایه‌اندازی خارجی، سیستم‌های کارآمد تهویه و سرمایش، تهویه شبانه، تنظیم دمای ترموستات، کاهش مصرف تجهیزات و روشنایی، استفاده از نور روز و انرژی خورشیدی مورد ارزیابی قرار گرفت. شاخص اصلی ارزیابی، شدت مصرف سالانه انرژی بر حسب کیلووات‌ساعت بر مترمربع در سال بود.

۴ .یافته‌های تحقیق

نتایج شبیه‌سازی نشان داد که شدت مصرف سالانه انرژی در سناریوی پایه ۶۱/۱۰۳ کیلووات‌ساعت بر مترمربع در سال است. اعمال مجموعه راهبردهای بهبودیافته، این مقدار را به ۶۲/۵۶ کیلووات‌ساعت بر مترمربع در سال کاهش داد که بیانگر ۳/۴۵ درصد کاهش مصرف انرژی نسبت به وضعیت پایه است. نتایج بر اهمیت ترکیب راهبردهای کاهش تقاضا با بهبود پوسته ساختمان، ارتقای شیشه‌ها، سایه‌اندازی و استفاده از انرژی خورشیدی تأکید دارد. از منظر برنامه‌ریزی، یافته‌ها نشان می‌دهند که تدوین استانداردهای انرژی‌کارآمد ساختمان، تقویت معماری اقلیم‌پاسخ، تسهیل ادغام سامانه‌های خورشیدی و حمایت از سیاست‌های مرتبط با ساختمان‌های کم‌مصرف و انرژی‌صفر می‌تواند در مسیر کاهش مصرف انرژی شهری مؤثر باشد. بااین‌حال، به دلیل محدود بودن مطالعه به یک ساختمان نماینده، نتایج شبیه‌سازی را نمی‌توان مستقیماً به کل شهر سمنان تعمیم داد یا بر مبنای آن ادعای تحقق انرژی‌صفر در مقیاس شهری مطرح کرد.

۵ .بحث و نتیجه‌گیری

یافته‌های پژوهش نشان می‌دهد که توسعه شهری انرژی‌صفر در اقلیم گرم و خشک، بیش از آنکه صرفاً به افزایش تولید انرژی تجدیدپذیر وابسته باشد، نیازمند کاهش تقاضای انرژی و ارتقای عملکرد ساختمان‌هاست. نتایج حاصل از شبیه‌سازی نشان داد که ترکیب راهبردهای اقلیم‌پاسخ و انرژی‌کارآمد می‌تواند کاهش قابل‌توجهی در مصرف انرژی ایجاد کند و مبنایی کمی برای تصمیم‌گیری و سیاست‌گذاری فراهم آورد. مهم‌ترین دستاورد پژوهش، ایجاد پیوند میان ارزیابی عملکرد انرژی در مقیاس ساختمان و الزامات برنامه‌ریزی شهری است. بر این اساس، مسیر پیشنهادی شامل پنج گام است: ارزیابی عملکرد موجود ساختمان‌ها، شناسایی راهبردهای اقلیمی مناسب، آزمون و مقایسه راهبردها از طریق شبیه‌سازی، تبدیل راهبردهای مؤثر به ضوابط و سیاست‌های اجرایی، و در نهایت تعمیم نتایج از مقیاس ساختمان به محله و شهر. بنابراین، تقویت مقررات انرژی ساختمان، ارتقای پوسته و شیشه، توجه به جهت‌گیری و سایه‌اندازی، حمایت از نصب سامانه‌های خورشیدی و ایجاد مشوق‌های مالی و اجرایی می‌تواند زمینه‌ساز حرکت تدریجی به سوی توسعه شهری انرژی‌صفر باشد. پژوهش حاضر در عین حال بر ضرورت مطالعات آتی در مقیاس چندساختمانی و شهری، با استفاده از مدل‌سازی UBEM و در نظر گرفتن ابعاد اقتصادی، چرخه عمر، رفتار بهره‌برداران و برنامه‌ریزی فضایی تأکید دارد.

کلیدواژه‌ها: توسعه شهری بدون انرژی، انرژی خورشیدی، برنامه‌ریزی انرژی شهری، اقلیم گرم و خشک.

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Review Article

Social Life Cycle Assessment of Rice Production: A Systematic Review and Implications for Sustainable Rural Development

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Abstract

Purpose- Rice production plays a fundamental role in ensuring food security and sustaining rural livelihoods worldwide. Despite its economic importance, rice production systems are often associated with social challenges such as inadequate working conditions, income inequality, and occupational health risks.

Design/methodology/approach- This study systematically reviews the application of Social Life Cycle Assessment (S-LCA) in rice production systems with a focus on its contribution to sustainable rural social development. A systematic review was conducted following the PRISMA protocol. Relevant studies were retrieved from international scientific databases, and after screening, the selected studies were analyzed based on stakeholder groups, social indicators, assessment approaches, and reported social impacts.

Finding- The resuls reveal that occupational health and safety, fair wages, labor rights, and the well-being of farmers are the most frequently assessed social issues. Organic and socially oriented production systems generally demonstrate better social performance than conventional systems. However, concerns such as child labor, labor exploitation, and unequal access to economic opportunities remain evident. Most existing studies focus primarily on workers and farmers, while broader dimensions of rural social development, including social resilience and community participation, receive considerably less attention. The limited number of available studies and methodological heterogeneity highlight the need for greater standardization in future S-LCA research.

Originality/value- The results emphasize the importance of incorporating social dimensions into agricultural policies and demonstrate the potential of S-LCA as a decision-support tool for promoting socially sustainable rice production systems. This study provides an integrated synthesis of S-LCA applications in rice production and explicitly links social life cycle assessment outcomes to sustainable rural social development.

Keywords- Rice production; Social life cycle assessment; Social sustainability; Sustainable rural development; Rural livelihoods; Sustainable agriculture.

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1. Introduction

Sustainable development has emerged as one of the most influential global paradigms for improving human well-being while safeguarding natural resources. Since its formal introduction in the Brundtland Report, the concept has emphasized balancing environmental, economic, and social dimensions to meet present needs without compromising the ability of future generations to meet their own needs (Akinsemolu & Onyeaka, 2025). Within this framework, the social dimension of sustainability encompasses issues such as social equity, public welfare, equitable access to resources, and food security, all of which play a fundamental role in achieving long-term sustainability (Eghbali et al., 2021).

Sustainable rural development comprises economic, environmental, and social dimensions. Among these, social sustainability represents a key pillar, emphasizing equitable resource distribution, community cohesion, livelihood security, and workers' well-being. Neglecting this dimension may result in increasing inequalities and the erosion of social capital within rural communities. Agriculture plays a critical role in this regard, not only as a source of food and employment but also as a driver of social stability, poverty reduction, and livelihood improvement in rural areas (Salahi Esfahani, 2018). Consequently, the sustainability of agricultural systems extends beyond productivity enhancement and requires simultaneous attention to social welfare, employment security, and the quality of life of rural populations.

Among agricultural commodities, rice (*Oryza sativa* L.) occupies a particularly important position. More than 3.5 billion people, nearly half of the world's population, rely on rice as a staple food source. Rice cultivation is practiced on over 160 million hectares worldwide and contributes substantially to food security and rural livelihoods, particularly in tropical and subtropical regions (FAO, 2024). In many rice-producing areas, rice serves as the backbone of rural employment, household income, and agricultural identity. Consequently, any changes occurring within rice production, processing, or distribution systems may directly affect the social well-being of rural communities. Evaluating such impacts within a social sustainability framework is therefore essential for achieving sustainable rural development.

Social Life Cycle Assessment (S-LCA) provides a suitable framework for addressing this challenge. By identifying and assessing social impacts across different stakeholder groups—including workers, farmers, and local communities—S-LCA enables the detection of social strengths and weaknesses throughout the rice production chain and supports evidence-based policymaking toward sustainable rural development (Benoît-Norris et al., 2011; Petti et al., 2018). In this context, S-LCA should not be viewed merely as a technical assessment tool; rather, it can serve as a decision-support approach for rural development planning and policy formulation. Through the systematic identification of vulnerable groups, social inequalities, and critical hotspots within production systems, S-LCA facilitates the design of more effective development interventions and social support policies (Benoît-Norris et al., 2011; Petti et al., 2018; Wei et al., 2022).

Despite the strategic importance of rice production for food security and rural livelihoods, previous research has predominantly focused on its environmental and economic dimensions, whereas social impacts have received comparatively limited attention (Nabavi-Pelesaraei et al., 2019). Issues such as wage inequality, poor working conditions, and health risks associated with pesticide exposure remain significant social concerns throughout rice production systems. The continued neglect of these issues may contribute to unsustainable policy decisions and exacerbate social disparities between rural producers and urban consumers (Kalvani et al., 2022). Furthermore, the fragmented and heterogeneous nature of existing studies has limited the ability of policymakers and rural development planners to identify and prioritize key social challenges within rice production systems effectively.

In response to these concerns, S-LCA has been developed as a component of Life Cycle Sustainability Assessment (LCSA) to evaluate the social and human impacts of products and services throughout their life cycles (Zarauz et al., 2025). Together with Environmental Life Cycle Assessment (LCA) and Life Cycle Costing (LCC), S-LCA contributes to the comprehensive assessment of sustainability across environmental, economic, and social dimensions (Wei et al.,

2022). Existing guidelines emphasize stakeholder groups such as workers, farmers, local communities, consumers, and society at large, while addressing issues including working conditions, health and safety, welfare, food security, and social justice (Petti et al., 2018).

Nevertheless, the application of S-LCA within agriculture, particularly in rice production systems, remains comparatively limited and is still at an early stage of methodological development (Vinci et al., 2023). Many existing studies rely on generalized indicators and pay insufficient attention to the social and cultural complexities inherent in rice production systems (Jørgensen et al., 2008). Moreover, methodological challenges persist, including the lack of consensus regarding functional units, difficulties in defining system boundaries, the qualitative nature of many social indicators, and limited availability of reliable social data (Garfí et al., 2025). These challenges are especially important in agricultural systems, where social impacts are strongly shaped by local institutional, cultural, and socioeconomic conditions (Mancini et al., 2023).

Current research gaps can be classified into three major categories. First, methodological inconsistencies remain regarding functional units, system boundaries, and assessment approaches. Second, limitations associated with social data availability and the quantification of qualitative variables constrain the robustness of assessments. Third, conflicts of interest among different stakeholder groups within rice value chains create additional challenges for comprehensive social evaluation.

Given these limitations, systematic review studies can play an important role in synthesizing existing knowledge and identifying research trends, methodological challenges, and knowledge gaps regarding S-LCA applications in rice production. The diversity of social indicators, inconsistencies in methodological choices, and insufficient coverage of stakeholder groups have reduced the comparability and transferability of findings, thereby limiting their usefulness for policymaking. As a result, the absence of a comprehensive synthesis hinders efforts to improve farmers' welfare, reduce social vulnerability, and enhance social sustainability in rice-producing regions.

Therefore, this study aims to provide a systematic and comparative review of the application of S-LCA in rice production systems. Specifically, it seeks to identify commonly used social indicators, examine stakeholder representation, analyze methodological heterogeneity, and highlight key research gaps. Furthermore, the study aims to explore similarities and differences in functional units, system boundaries, and indicator quantification approaches to enhance conceptual consistency and improve the comparability of future studies. Ultimately, the research seeks to contribute to the practical use of S-LCA findings in rural development policymaking, the improvement of farmers' quality of life, and the strengthening of social sustainability within agricultural systems.

The specific objectives of this study are:

1. To identify and classify the most frequently used social indicators in S-LCA studies related to rice production, with particular emphasis on indicators affecting social sustainability and rural well-being;
2. To comparatively analyze stakeholder vulnerability patterns across different rice production systems;
3. To examine methodological heterogeneity in functional units, system boundaries, and indicator quantification approaches; and
4. To provide recommendations for improving conceptual consistency, enhancing study comparability, and adapting S-LCA frameworks to support sustainable rural development policies.

2. Research Theoretical Literature

2.1. Social Sustainability

Although sustainable development has become one of the most widely used concepts in development studies since the publication of the Brundtland Report, scholarly and policy attention has historically focused more on its economic and environmental dimensions, while the social dimension has received comparatively less consideration (WCED, 1987; Littig & Griessler, 2005). However, numerous scholars argue that neither economic nor environmental sustainability can be maintained in the absence of social sustainability, as it is ultimately human societies that are responsible for conserving resources, sustaining productive activities, and transferring development achievements to future generations (Sachs, 1999; Vallance et al., 2011).

Within the rural development literature, social sustainability extends beyond improvements in

welfare indicators or poverty reduction. It refers to the capacity of rural communities to maintain social cohesion, reproduce social capital, improve quality of life, ensure equitable access to opportunities, and facilitate meaningful participation in decision-making processes (Dempsey et al., 2011). From this perspective, sustainable rural development cannot be reduced to agricultural productivity growth or income expansion. Rather, it requires conditions under which different social groups can benefit equitably from development outcomes and maintain resilience in the face of economic, social, and environmental challenges (McKenzie, 2004).

Agriculture, as the dominant economic activity in many rural regions, plays a decisive role in shaping the various dimensions of social sustainability. Employment opportunities, livelihood security, occupational health, income distribution, food security, and the quality of social relationships within rural communities are often closely linked to the organization and functioning of agricultural systems. Consequently, assessing social sustainability in agriculture involves more than measuring isolated social outcomes; it seeks to understand how production systems influence human well-being, social justice, and the development capacity of local communities (Missimer et al., 2017). Evidence from other agricultural activities also confirms that rural sustainability depends on the simultaneous consideration of social, economic, and environmental dimensions, and that agricultural production can contribute differently to each of these dimensions across rural communities (Dehban Nejadian et al., 2023).

The social dimension of sustainability becomes particularly important in the production chains of strategic agricultural commodities such as rice. Beyond its role in ensuring food security, rice production supports the employment, income, and livelihoods of millions of rural households worldwide. Therefore, changes in the production, processing, and distribution of rice may generate substantial social consequences for local communities. Assessing working conditions, occupational health and safety, livelihood security, income distribution, and other social indicators throughout the rice value chain can thus be regarded as an integral component of sustainable rural development assessment.

Moreover, the social sustainability of agricultural communities is influenced not only by production-related conditions but also by their wider spatial and socio-economic relationships. Evidence from a rice-producing rural area in Guilan, Iran, showed that rural–urban linkages significantly affected the social, economic, and cultural dimensions of rural households' lifestyles, including behavioral patterns, income-related activities, consumption patterns, and cultural change (Asheri-Gafsheh & Yasouri, 2024). These findings highlight the importance of considering the broader rural development context when interpreting the social consequences of agricultural production systems.

In recent years, increasing attention has been devoted to developing tools capable of systematically evaluating the social dimensions of production systems. Among these tools, Social Life Cycle Assessment (S-LCA) has emerged as one of the most prominent approaches for assessing the social impacts associated with products and services throughout their life cycles. Understanding the capabilities and limitations of this approach, however, requires a thorough examination of its conceptual and theoretical foundations, which are discussed in the following section.

2.2. Social Life Cycle Assessment

Social Life Cycle Assessment (S-LCA) emerged from the recognition that evaluating the sustainability of products and services solely through economic and environmental indicators provides an incomplete understanding of development outcomes. Although conventional Life Cycle Assessment (LCA) approaches have been successful in quantifying environmental impacts, many social consequences associated with the production, distribution, consumption, and disposal of products have remained beyond the scope of such assessments. Consequently, efforts to develop a systematic framework for assessing social impacts throughout product life cycles gained momentum in the late 1990s and were further strengthened through the publication of the UNEP/SETAC guidelines (UNEP/SETAC, 2009; UNEP, 2020).

The theoretical foundations of S-LCA can be traced to the intersection of three major intellectual traditions. First, the sustainable development paradigm emphasizes the simultaneous consideration of economic, environmental, and

social dimensions of development (WCED, 1987). Second, the human development approach views development as a process of expanding human capabilities, freedoms, and quality of life rather than merely increasing economic growth (Sen, 1999). Third, the literature on social justice and fundamental human rights highlights the importance of labor rights, equal opportunities, human dignity, and equitable access to resources (ILO, 2008; Benoît-Norris et al., 2011). In essence, S-LCA seeks to operationalize these principles within production and consumption systems.

Unlike Environmental Life Cycle Assessment, which primarily focuses on material and energy flows, S-LCA is concerned with people, social relationships, and institutional structures. Its central focus is therefore on stakeholders who are directly or indirectly affected by a product system. According to the UNEP guidelines, key stakeholder groups include workers, consumers, local communities, value chain actors, society, and children, each of whom is evaluated through a set of social impact subcategories and indicators (UNEP, 2020).

A distinctive characteristic of S-LCA is that it does not limit the assessment of social impacts to individual firms or production units. Rather, it seeks to evaluate social consequences throughout the entire life cycle of a product. From this perspective, an agricultural commodity is not merely the outcome of on-farm activities but the product of a complex network of economic, social, and institutional relationships extending from input supply to final consumption. Consequently, issues such as occupational health and safety, fair wages, employment security, discrimination, social participation, community well-being, and even intergenerational equity can be considered part of a product's social impacts (Petti et al., 2018).

The relevance of this approach is particularly evident in agriculture, where production systems are closely linked to the livelihoods, employment, and well-being of rural populations. Many social challenges in agricultural systems—including precarious employment, poor working conditions, income inequalities, limited access to support services, and the vulnerability of disadvantaged social groups—are often inadequately captured by conventional economic and environmental assessments. In this regard, S-LCA provides a valuable framework for revealing the social dimensions of agricultural development and their implications for rural communities (Jørgensen et al., 2008; Petti et al., 2018).

Despite its considerable potential, S-LCA remains less methodologically mature than Environmental Life Cycle Assessment. The complexity of social phenomena, the context-specific nature of social indicators, the difficulty of quantifying many social variables, and the diversity of conceptual frameworks have led researchers to adopt a wide range of assessment approaches (Dreyer et al., 2010; Mancini et al., 2023). Although this diversity complicates direct comparisons among studies, it also highlights the importance of understanding the theoretical foundations and methodological assumptions underlying different S-LCA applications.

One of the most significant methodological distinctions within the S-LCA literature concerns the contrast between performance-based and risk-based approaches. This distinction influences not only the methods used to collect and analyze data but also the interpretation of social impacts and the policy implications derived from assessment results. Therefore, understanding these two approaches is essential for analyzing and comparing S-LCA studies conducted within rice production systems.

2.3. Performance-Based and Risk-Based Approaches in S-LCA

One of the most important methodological and theoretical debates within the Social Life Cycle Assessment (S-LCA) literature concerns the measurement and interpretation of social impacts. Unlike many environmental indicators that can be directly quantified through physical measurements, social impacts are inherently complex, multidimensional, and highly dependent on local institutional and socio-cultural contexts. Consequently, different approaches have been developed to assess social impacts, among which performance-based and risk-based approaches are the most widely applied (Jørgensen et al., 2008; Benoît-Norris et al., 2011).

The performance-based approach focuses on the assessment of actual social conditions within a specific production system. Under this approach, researchers collect primary data through field surveys, interviews, questionnaires, audits, or

direct observations to evaluate the existing social performance of stakeholders. Indicators such as actual wages paid to workers, working hours, occupational accident rates, job satisfaction, access to social protection, and levels of social participation are commonly examined. Therefore, the results generated by performance-based assessments reflect the observed realities experienced by stakeholders within a particular context and provide a relatively direct representation of social conditions (Dreyer et al., 2010).

In contrast, the risk-based approach emphasizes the likelihood of adverse social impacts occurring within a product system. Rather than measuring actual performance, this approach relies on secondary databases, national statistics, international indicators, and contextual information to estimate the probability of social risks. For example, the likelihood of child labor, gender discrimination, labor rights violations, or unsafe working conditions may be assessed based on country-level or sector-level data. Consequently, the outputs of risk-based assessments primarily represent levels of social vulnerability and risk exposure rather than confirmed social outcomes within a specific production unit (UNEP, 2020; Benoît-Norris et al., 2011).

The distinction between these approaches extends beyond differences in data collection methods and reflects two fundamentally different levels of social analysis. Performance-based assessments concentrate on experienced social realities, whereas risk-based assessments seek to identify potential social hotspots and vulnerabilities. As a result, findings derived from the two approaches should not be regarded as interchangeable. Instead, each provides a distinct type of information that can support decision-making and policy formulation in different ways (Parent et al., 2010).

Performance-based approaches are particularly useful for evaluating the actual social conditions of workers, farmers, and local communities within a specific production system. However, they often require extensive fieldwork, significant financial resources, and access to reliable primary data. Risk-based approaches, on the other hand, facilitate broader geographical comparisons and enable the rapid identification of potential social concerns across regions and supply chains. Nevertheless, they may not fully capture the social realities experienced by stakeholders at the local level (Mancini et al., 2023).

From a rural development perspective, the distinction between performance-based and risk-based approaches is especially important. Policymakers seeking to design effective social interventions require a clear understanding of whether assessment results represent actual social conditions or merely indicate the probability of social problems occurring. Misinterpreting these two forms of evidence may lead to inappropriate policy responses and ineffective development strategies. Therefore, identifying the assessment approach adopted in a study is essential for interpreting findings, comparing research outcomes, and deriving meaningful policy implications.

In the context of rice production systems, both approaches can provide valuable insights into social sustainability. Performance-based studies may reveal the real conditions of farmers, agricultural workers, and local communities, whereas risk-based studies can identify structural vulnerabilities embedded within broader supply chains and institutional environments. Accordingly, a comprehensive understanding of social sustainability in rice production requires consideration of both approaches and recognition of their complementary roles in supporting sustainable rural development.

Table 1. Comparison of Performance-Based and Risk-Based Approaches

Comparison criterion	Performance-based approach	Risk-based approach
Assessment basis	Actual social conditions	Probability of social impacts
Data source	Primary and field data	Secondary databases and indicators
Unit of analysis	Production unit or specific value chain	Sector, region, or country
Nature of results	Observed performance	Potential risk level
Dependence on local data	High	Relatively low
Main application	Assessment of existing conditions	Identification of social hotspots
Suitable for	Evaluating stakeholder performance	Screening and prioritizing social risks

2.4. Analytical Framework of the Study

A systematic review of Social Life Cycle Assessment (S-LCA) studies requires an analytical framework that goes beyond the descriptive comparison of indicators and methodological choices. Accordingly, the present study developed a conceptual framework that explicitly links S-LCA assessment in rice production systems with stakeholder conditions, social hotspots, policy responses, social sustainability outcomes, and ultimately sustainable rural development.

As illustrated in Figure 1, the framework begins with the social assessment of the rice production chain through S-LCA. At this stage, two elements are considered simultaneously: stakeholder identification and the analytical orientation adopted by the assessment. The relevant stakeholder groups may include rice farmers, farm workers, rural households, local communities, intermediaries and traders, and consumers. The assessment itself may follow either a performance-based approach, which evaluates actual social conditions and performance gaps against reference standards, or a risk-based approach, which identifies potential social risks according to their likelihood, severity, and priority.

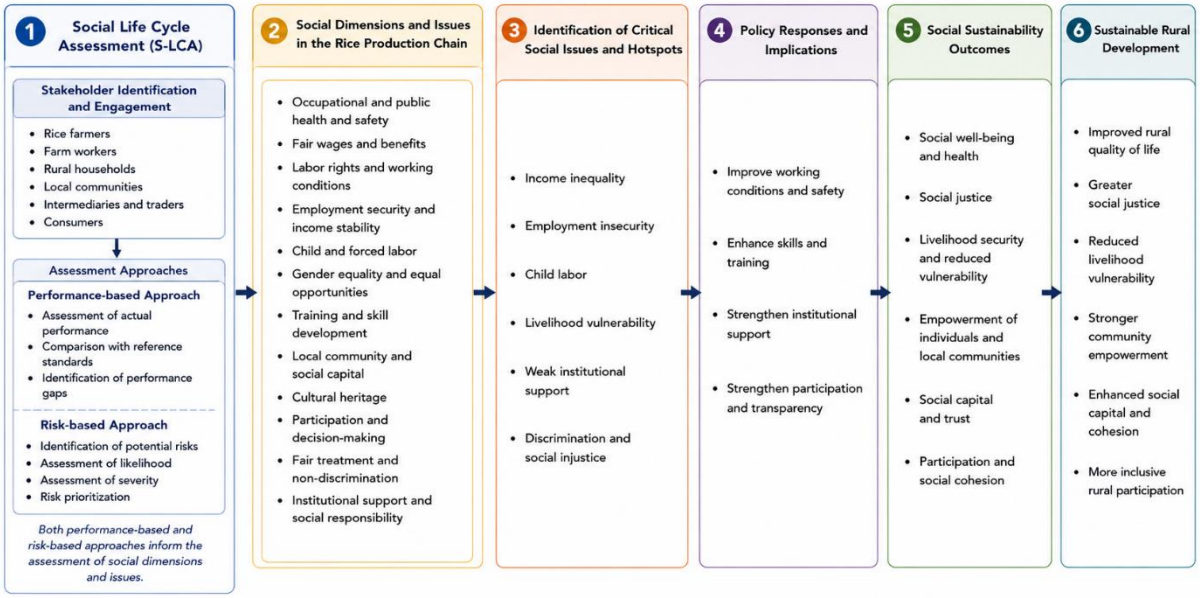


Figure 1. Conceptual framework linking S-LCA of rice production to social sustainability and sustainable rural development.

The outputs of these assessments are interpreted through a set of social dimensions relevant to rice production systems, including occupational and public health and safety, fair wages and benefits, labor rights and working conditions, employment security and income stability, child and forced labor, gender equality and equal opportunities, training and skill development, local-community relations and social capital, cultural heritage, participation in decision-making, non-discrimination, and institutional support and social responsibility. These dimensions provide the analytical basis for identifying critical social issues and hotspots within the rice production chain. The relevance of these dimensions is also supported by evidence from rural communities in Guilan. Previous research has identified social capital, educational and health conditions, financial constraints, cultural norms, and gender-related and institutional inequalities as important barriers to rural women's participation. These findings suggest that participation, gender equality, access to resources, social capital, and institutional support are closely linked in shaping the social sustainability and development capacity of rural communities (Asheri-Gafsheh et al., 2024).

The framework assumes that weaknesses detected within these dimensions may translate into broader social challenges such as income inequality, employment insecurity, child labor, livelihood vulnerability, inadequate institutional support, discrimination, and social injustice. Identification of these hotspots

therefore constitutes the link between S-LCA findings and policy-oriented interpretation. Rather than treating social indicators as isolated assessment outputs, the framework connects them to potential interventions, including improvements in occupational safety and working conditions, enhancement of training and skills, strengthening of institutional support, and greater participation and transparency within the rice value chain.

The proposed relationships further suggest that such interventions can contribute to broader social sustainability outcomes, including improved social welfare and health, greater social justice, enhanced livelihood security and reduced vulnerability, empowerment of individuals and local communities, strengthened social capital and trust, and increased participation and social cohesion. These outcomes, in turn, represent key components of sustainable rural development.

Thus, the framework establishes a sequential analytical pathway from S-LCA assessment → stakeholder and methodological characterization → identification of social dimensions and hotspots → policy implications → social sustainability outcomes → sustainable rural development. This pathway was used to guide the comparative interpretation of the selected studies and to evaluate not only which social indicators and stakeholder groups were addressed, but also how the reported S-LCA findings could contribute to broader rural development objectives.

3. Research Methodology

3.1. Systematic Review Strategy

The present study employed a systematic review approach to provide a structured analysis of the existing literature on the application of Social Life Cycle Assessment (S-LCA) in rice production systems. To enhance transparency, reproducibility, and methodological rigor while minimizing selection bias, the review process was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). The review focused on identifying eligible peer-reviewed studies addressing S-LCA applications in rice production systems, examining their methodological approaches, and synthesizing common patterns, methodological challenges, and research gaps within the field.

A systematic literature search was conducted in two major scientific databases, Scopus and Web of Science. These databases were selected because of their extensive coverage of peer-reviewed literature related to life cycle assessment, sustainability studies, and agricultural sciences. The search was performed within article titles, abstracts, and author keywords using combinations of relevant search terms connected by the Boolean operators AND and OR.

The same search terms and Boolean operators were applied in both Scopus and Web of Science. The exact search strings used in each database were as follows:

Scopus:

("rice*" OR "paddy*" OR "rice cultivation*" OR "paddy farming*" OR "rice production*" OR "paddy rice*") AND ("social life cycle assessment*" OR "S-LCA*" OR "social LCA*" OR "SLCA*")

Web of Science:

("rice*" OR "paddy*" OR "rice cultivation*" OR "paddy farming*" OR "rice production*" OR "paddy rice*") AND ("social life cycle assessment*" OR "S-LCA*" OR "social LCA*" OR "SLCA*")

The final database search was conducted on January 1, 2026, covering the ten-year period from January 1, 2016 to January 1, 2026. The search retrieved18 records from Scopus and 14 records from Web of Science, resulting in 32 records before duplicate removal. After the records retrieved from the two databases were combined, 14 duplicate records were identified and removed. Consequently, 18 unique records remained for title and abstract screening.

The titles and abstracts of these 18 unique records were then screened against the predefined eligibility criteria. At this stage, nine records were excluded because they did not directly address the systematic application of S-LCA to rice cultivation or rice production systems. The full texts of the remaining nine studies were subsequently assessed for eligibility. Following full-text assessment, two studies were excluded due to insufficient methodological information, leaving seven studies for inclusion in the final systematic review.

Inclusion Criteria- The following criteria were applied:

- Articles published in peer-reviewed scientific journals;

- Studies directly addressing the application of S-LCA in rice cultivation or rice production systems;
- Studies providing sufficient methodological information to evaluate the S-LCA framework, analytical scope or system boundary, social indicators, and assessment procedures; functional or reference units were extracted when explicitly reported;
- Publications written in English.

Exclusion Criteria- The following records were excluded:

- Conference papers, technical reports, theses, dissertations, book chapters, books, and other non-peer-reviewed publications;
- Studies referring to social issues without systematically applying an S-LCA framework;
- Publications written in languages other than English.

No supplementary backward or forward citation searching was conducted, and no review protocol was prospectively registered for this systematic review.

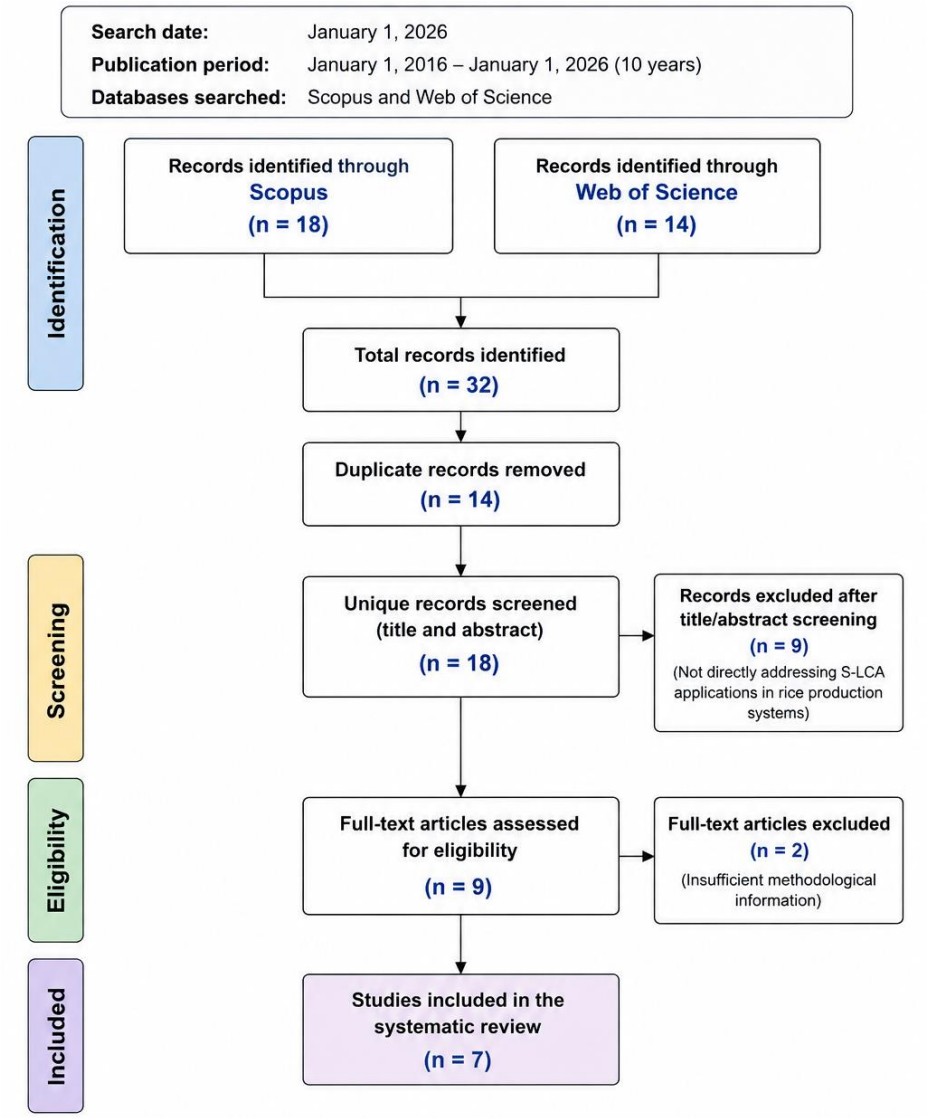


Figure 2. PRISMA flow diagram of study identification, screening, and selection.

The relatively small number of eligible studies should be interpreted in light of the deliberately narrow scope of the review. The search was restricted to studies that explicitly applied, or directly addressed, an S-LCA framework in relation to rice cultivation or rice production systems, rather than to the much broader literature on social sustainability, environmental LCA, or

general sustainability assessment in rice production. In addition, eligibility required publication in a peer-reviewed journal and sufficient methodological information to evaluate the assessment framework, analytical scope or system boundary, social indicators, and assessment procedures. Functional or reference units were recorded when explicitly reported by the original studies. Consequently, studies that discussed social issues in rice production without systematically applying an S-LCA framework were excluded. The final number of seven studies therefore reflects both the specificity of the research question and the still limited development of S-LCA applications in rice production, rather than an intentionally restricted sample size. The complete identification, screening, eligibility assessment, and selection process is presented in Figure 2 following the PRISMA framework.

3.2. Data Extraction and Analysis

To facilitate systematic comparison, key information from each selected study was extracted using a predefined data extraction form and subsequently organized into a structured database. Extracted variables included authorship, publication year, geographical scope, study type, stakeholder groups, social indicators, functional units, system boundaries, and methodological approaches.

The analysis was conducted using a comparative qualitative approach aimed at identifying common patterns, structural differences, and methodological gaps among the selected studies. In addition to descriptive synthesis, study quality was evaluated according to three main criteria:

1. Methodological consistency, particularly regarding the definition of functional units and system boundaries;
2. Quality and limitations of social data, including the approaches used to transform qualitative variables into measurable indicators;
3. Representation and balancing of stakeholder interests throughout the rice value chain.

These criteria were selected because they directly influence the robustness, comparability, and policy relevance of S-LCA studies and therefore provide an appropriate basis for evaluating the current state of the literature.

To operationalize the quality appraisal, each included study was assessed separately against the three predefined criteria using a three-level qualitative rating system: Strong, Moderate, and Limited. A rating of Strong indicated that the criterion was clearly and comprehensively addressed; Moderate indicated generally adequate reporting with identifiable methodological or data-related limitations; and Limited indicated substantial restrictions in coverage or reporting. The quality appraisal was used to support the interpretation and comparative synthesis of the evidence and was not applied as an additional exclusion criterion.

4. Research Findings

4.1. Overview of S-LCA Applications in Selected Studies

A systematic review of the selected studies revealed that although Social Life Cycle Assessment (S-LCA) was adopted as a common assessment framework across all investigations, substantial heterogeneity exists in its operationalization with respect to conceptual frameworks, functional unit definition, system boundary selection, stakeholder identification, and quantification approaches.

From a conceptual perspective, four studies explicitly referred to the UNEP/SETAC guidelines and structured their analyses according to the stakeholder categories and subcategories proposed by this framework (Kalvani et al., 2022; Wei et al., 2022; Sharaai et al., 2022; Prasara-A & Gheewala, 2025). In the study by Prasara-A and Gheewala (2025), the “Reference Scale Approach” was explicitly introduced and justified as a suitable method for evaluating the social performance of agricultural products. In contrast, Mancini et al. (2023) and Vinci et al. (2023) primarily relied on risk-based approaches and the PSILCA database, which adopts a large-scale, supply-chain-oriented perspective. Although Phantha et al. (2021) did not explicitly classify their assessment approach within the S-LCA literature, their framework was stakeholder-oriented and based on indicator scoring. These differences indicate that only one study explicitly identified its S-LCA approach, whereas in the remaining studies the approach could only be inferred from the assessment methodology employed.

Considerable heterogeneity was observed in the definition and reporting of functional or reference units across the reviewed studies. Phantha et al. (2021) explicitly defined the reference unit as one

hectare of paddy rice growing area, while Prasara-A and Gheewala (2025) similarly adopted one hectare of plantation as the reference unit. In contrast, Wei et al. (2022) employed a system-level functional unit, defining it as the complete life cycle of the rice industry, whereas Mancini et al. (2023) used an economic modeling basis of one euro of representative food product. Kalvani et al. (2022), Sharaai et al. (2022), and the S-LCA component of Vinci et al. (2023) did not explicitly report a standardized functional or reference unit for their social assessments. Thus, the reviewed literature ranges from land-based physical reference units to economic and system-level units, while several studies do not explicitly define such a unit. This heterogeneity in functional-unit definition and reporting limits direct comparison of social performance and risk results across studies.

Substantial variation was also found in the definition of system boundaries. Three studies focused primarily on the farm production stage (Phantha et al., 2021; Kalvani et al., 2022; Sharaai et al., 2022). One study expanded the system boundary to include cultivation, transportation, collection, and consumption stages (Prasara-A & Gheewala, 2025). Wei et al. (2022) defined the system boundary from cultivation to product recycling at the national scale, while Mancini et al. (2023) modeled upstream supply chains within the context of international trade. Similarly, Vinci et al. (2023) conducted their analysis at the global supply-chain level using PSILCA data. Consequently, three studies adopted farm-gate boundaries, two employed value-chain boundaries, and two considered full life-cycle or macro-scale system boundaries.

With regard to stakeholder selection, workers were considered a primary stakeholder group in all reviewed studies. Farmers or farm owners were treated as independent stakeholder categories in four studies, while local communities were explicitly included in five studies. Consumers received comparatively limited attention across the reviewed studies. They were explicitly represented in Wei et al. (2022), while Prasara-A and Gheewala (2025) incorporated consumer-related aspects through the local-community stakeholder group at the consumption stage. In contrast, Mancini et al. (2023) excluded the consumer stakeholder category because of data limitations. This pattern suggests that the current literature remains largely production-oriented, with relatively limited attention paid to downstream actors in the rice value chain.

From the perspective of data sources and quantification approaches, three studies relied primarily on field surveys and questionnaire-based data collection (Phantha et al., 2021; Kalvani et al., 2022; Sharaai et al., 2022), whereas two studies employed secondary databases and large-scale modeling approaches (Mancini et al., 2023; Vinci et al., 2023). Wei et al. (2022) combined quantitative indicators with weighting and regional aggregation techniques, while Prasara-A and Gheewala (2025) applied a reference-scale scoring method. Overall, four studies adopted semi-quantitative approaches, two employed risk-based social assessment methods, and one utilized a combined weighting and aggregation framework.

In summary, although all reviewed studies applied the concept of Social Life Cycle Assessment, methodological convergence remains limited. Differences in functional unit definition, system boundary selection, data sources, and quantification methods indicate that the current literature is still in a phase of conceptual consolidation and requires greater methodological harmonization to improve the comparability and transferability of findings. These inconsistencies can be observed across all methodological dimensions, from conceptual frameworks to quantification procedures, reflecting the diversity of approaches currently employed in S-LCA studies of rice production systems.

Table 2. Quality appraisal of the included studies based on the three predefined criteria

Study	Methodological consistency	Social data quality	Stakeholder representation
Phantha et al. (2021)	Moderate	Strong	Moderate
Kalvani et al. (2022)	Strong	Strong	Moderate
Sharaai et al. (2022)	Moderate	Strong	Moderate
Wei et al. (2022)	Strong	Moderate	Strong
Mancini et al. (2023)	Strong	Moderate	Moderate

Study	Methodological consistency	Social data quality	Stakeholder representation
Vinci et al. (2023)	Moderate	Moderate	Limited
Prasara-A & Gheewala (2025)	Strong	Strong	Strong

Quality Appraisal of the Included Studies- The criterion-specific quality appraisal of the seven included studies is presented in Table 2, highlighting differences in methodological consistency, social data quality, and stakeholder representation across the reviewed studies.

The quality appraisal revealed considerable variation across the included studies. Methodological consistency was generally strong in studies that explicitly defined the reference or functional unit, system boundary, and S-LCA framework, whereas some studies provided less standardized methodological reporting. Social data quality was strongest in field-based studies employing primary stakeholder data, questionnaire validation, and explicit characterization procedures, while studies relying mainly on secondary databases or proxy indicators were rated as moderate in this criterion. Stakeholder representation also varied substantially; most studies concentrated on workers, farmers, and local communities, whereas broader stakeholder coverage, particularly consumers and value-chain actors, was less consistently addressed. These differences were taken into account when interpreting and comparing the findings across studies.

4.2. Analysis of Selected Studies from the Perspective of Social Sustainability and Rural Development

The review of the selected studies indicates that although most investigations were originally designed to assess social impacts within the framework of Social Life Cycle Assessment (S-LCA), a considerable proportion of the indicators employed are directly associated with the broader concepts of social sustainability and sustainable rural development. This relationship is particularly evident in indicators such as income, job satisfaction, occupational health and safety, fair wages, food security, land-use rights, local employment, social participation, and access to technology.

In the study conducted by Phantha et al. (2021), three stakeholder groups, namely workers, local communities, and rice farmers, were assessed. For farmers, indicators such as food security, income satisfaction, land-use rights, and women's participation in farm decision-making were considered. For local communities, local employment opportunities, participation in cultural activities, and the absence of social conflicts associated with rice cultivation were evaluated. These indicators demonstrate that S-LCA in this study extended beyond the assessment of working conditions and incorporated several livelihood, participatory, and community-related dimensions of rural life.

Kalvani et al. (2022), through a comparative assessment of rice production systems in Iran and Malaysia, demonstrated that geographical, institutional, and production-related differences can substantially influence the social performance of stakeholders. The principal stakeholder groups included workers, local communities, and farmers. Indicators such as occupational health and safety, discrimination, wages, forced labor, labor relations, land rights, water rights, access to credit, technological support, living standards, income, and employment opportunities were evaluated. The results revealed that the social performance of both workers and farmers was generally higher in Malaysia than in Iran. This difference was primarily attributed to lower production costs and higher rice productivity in Malaysia. Furthermore, the weaker performance observed among Iranian farmers was associated with lower income satisfaction, lower productivity, and higher production costs.

Similarly, Sharaai et al. (2022), in their assessment of rice production systems in Selangor, Malaysia, focused on three stakeholder groups: rice mill workers, farmers, and local communities. Their findings indicated that farmers exhibited the lowest social performance among the stakeholder groups considered. Key challenges included income generation, occupational health and safety, access to agricultural technologies, and living standards. Only 36% of farmers reported satisfaction with their income, while merely 38% indicated that they had not experienced health and safety concerns. These findings suggest that farmers' income and occupational well-being remain among the most critical social vulnerability points within rice production systems from a rural development perspective.

Among the reviewed studies, Wei et al. (2022) established the strongest linkage between S-LCA and rural development. Their framework incorporated stakeholders such as farmers, agricultural value-chain actors, consumers, rural areas, and society as a whole. The assessment included indicators related to fair wages, health and safety, social security, access to material and non-material resources, safe and healthy living conditions, social participation, local employment, technological development, and the contribution of agriculture to regional economic development. Notably, this study explicitly linked social assessment outcomes to China's Rural Revitalization Strategy and organized its impact assessment around three key dimensions: high-quality agricultural development, desirable rural living conditions, and rural well-being. This approach represents one of the clearest examples of integrating S-LCA into a broader rural development framework.

At the macro level, Mancini et al. (2023) identified rice as one of the food products associated with considerable social risks within European consumption systems. The study reported significant risks related to fair wages, forced labor, social benefits, illiteracy, and community health and safety. These findings suggest that the assessment of social sustainability in rice production should not be confined to production sites alone, as international supply chains and trade relationships may also transmit substantial social risks.

Although not exclusively focused on rice, the study by Prasara-A and Gheewala (2025) evaluated rice alongside sugarcane, cassava, and maize within an S-LCA framework. Six stakeholder groups were considered, including farm owners, workers, machinery contractors, suppliers, collectors/processors, and local communities. For rice production, indicators such as land rights, water rights, net profit, governmental financial support, knowledge transfer, marketing support, occupational health and safety, women's empowerment, labor availability, access to machinery, job satisfaction, social participation, and food security were assessed. The breadth of stakeholder representation in this study highlights that social assessments become more closely aligned with rural development objectives when they extend beyond farm-level actors and incorporate the wider network of local stakeholders.

Finally, the review conducted by Vinci et al. (2023) demonstrated that the application of S-LCA within rice production systems remains considerably less developed than environmental life cycle assessment. The authors highlighted child labor, forced labor, fair wages, working hours, labor rights, discrimination, health and safety, access to material resources, and migration as some of the most important social issues requiring further investigation. This observation is consistent with the limited number of eligible studies identified in the present review and supports the interpretation that S-LCA applications in rice production remain an emerging and comparatively underdeveloped field of research. Overall, the reviewed studies differ substantially in the extent to which they engage with rural development concerns. Studies such as Phantha et al. (2021), Kalvani et al. (2022), and Sharaai et al. (2022) primarily focused on field-based assessments of production-oriented stakeholders. In contrast, Wei et al. (2022) and Prasara-A and Gheewala (2025) expanded the scope of analysis to encompass broader dimensions of agricultural development, rural well-being, and local stakeholder networks. Meanwhile, Mancini et al. (2023) and Vinci et al. (2023) emphasized social risks at broader supply-chain and international levels. Therefore, while the existing literature demonstrates considerable potential for linking S-LCA with social sustainability and rural development, it still lacks an integrated analytical framework capable of directly connecting technical S-LCA indicators with core rural development objectives, including livelihood security, social welfare, social justice, empowerment, and community participation.

4.3. Geographical Differences and Production Systems

The reviewed studies indicate that the social performance of rice production systems is strongly influenced by geographical conditions, institutional structures, and production system characteristics. Although all studies adopted the S-LCA framework to assess social impacts, differences in economic, social, and policy contexts resulted in substantial variation in outcomes across regions. The selected studies were conducted at different geographical scales, including cross-country,

regional, and production-system comparisons, each highlighting distinct aspects of social performance.

At the international level, Kalvani et al. (2022) demonstrated that differences in labor market structures, levels of mechanization, governmental support mechanisms, and access to social services between Iran and Malaysia resulted in variations in indicators related to working conditions, employment security, and stakeholder well-being. These findings suggest that social performance is not solely determined by technical production characteristics but is also strongly shaped by institutional quality, support policies, and the broader level of social development within a country. Consequently, direct comparisons of S-LCA results across countries without considering institutional and social differences may lead to misleading conclusions.

At the regional scale, Wei et al. (2022) reported that provinces with stronger economic and social infrastructures achieved higher social performance scores within rice production systems across 31 provinces of China. This finding highlights that even within a single governance system, regional development levels, access to public services, employment opportunities, and infrastructure quality can significantly influence social assessment outcomes. Therefore, regional disparities constitute an important explanatory factor for variations in the social performance of rice production systems.

In addition to geographical differences, production systems also influenced several social indicators. Phantha et al. (2021) found that the main difference between conventional and organic rice farming occurred among rice farmers. The social performance score for rice farmers was higher under organic farming (0.93) than under conventional farming (0.65), primarily because of better performance in food security and income satisfaction. In contrast, workers achieved the same social performance score in both systems (0.96), while local communities also showed identical performance (1.00). These findings indicate that the transition from conventional to organic production did not uniformly improve all social dimensions, but mainly affected farmer-related livelihood indicators.

Overall, the reviewed studies indicate that while production systems can affect specific social dimensions, geographical and institutional factors play a more fundamental role in shaping S-LCA outcomes. Economic development levels, governance quality, access to social services, and labor market conditions represent key determinants of social performance within rice production systems. Therefore, the interpretation and comparison of S-LCA results should always take into account the geographical and institutional contexts in which assessments are conducted.

In large-scale studies such as Mancini et al. (2023) and Vinci et al. (2023), dependence on global supply chains linked to countries with elevated social risks contributed to higher aggregated risk levels for several social indicators. These studies demonstrate that even when production takes place in developed countries, sourcing inputs from high-risk regions may substantially affect overall social performance. The structural characteristics of these geographical and system-related differences are summarized in Table 3.

Table 3. Comparison of Selected S-LCA Studies According to Geographical Context, Production System, and Analytical Scale

No.	Study	Country / Region	Analytical Scale	Production System	Type of Comparison	Main Finding Related to Geographical or System Differences
1	Phantha et al. (2021)	Thailand	Farm level	Conventional vs. Organic	System comparison	Rice farmers showed higher social performance under organic farming (0.93) than conventional farming (0.65), mainly due to food security and income satisfaction; worker (0.96) and local-community (1.00) scores were identical across both systems.

No.	Study	Country / Region	Analytical Scale	Production System	Type of Comparison	Main Finding Related to Geographical or System Differences
2	Kalvani et al. (2022)	Iran – Malaysia	Farm level	Conventional	Cross-country comparison	Differences in institutional structures and working conditions resulted in variations in social performance scores.
3	Sharaai et al. (2022)	Selangor, Malaysia	Farm level	Conventional	Single-country assessment	Social performance was influenced by production-cycle characteristics and regional conditions.
4	Wei et al. (2022)	China (31 provinces)	Regional level	Conventional	Inter-provincial comparison	More developed provinces exhibited higher levels of social performance.
5	Mancini et al. (2023)	European Union (global supply chains)	Global level	Supply chain	Dependency analysis	Dependence on high-risk countries increased aggregated social risks.
6	Vinci et al. (2023)	Multiple countries	Global level	Supply chain	Cross-country comparison	Considerable structural differences in social risk levels were observed among countries.
7	Prasara-A & Gheewala (2025)	Thailand	Value-chain level	Conventional	Stage comparison	No social hotspot was identified for rice at either the actual or adjusted performance level, although several social indicators showed moderate performance.

In summary, the reviewed literature indicates that geographical context, economic development level, institutional structure, and production system characteristics are among the most influential determinants of S-LCA outcomes in rice production. No uniform pattern of social performance was observed across countries and regions, emphasizing the importance of contextualized interpretation when assessing social sustainability in agricultural systems.

4.4. Overall Patterns of Social Performance and Risk Levels

A comparative analysis of the reviewed studies indicates that the selected literature can be broadly classified into two main categories according to the nature of their outputs:

Performance-based assessments and risk-based assessments- In performance-based studies, which were predominantly conducted at the farm level, results were reported as social performance scores or aggregated social indicators. These studies primarily focused on the direct comparison of social performance among production systems, countries, or stages of the value chain. Their central objective was to determine whether one production system exhibited better social performance than another. Within this framework, indicators such as farmers' income, occupational health and safety, working conditions, and livelihood security contributed most significantly to overall social performance scores (Phantha et al., 2021; Sharaai et al., 2022; Kalvani et al., 2022).

In contrast, risk-based studies, which mainly relied on secondary databases and large-scale modeling approaches such as PSILCA and Multi-Regional Input–Output (MRIO) models (Mancini et al., 2023; Vinci et al., 2023), reported their findings in terms of social risk levels or indicators of structural vulnerability. Rather than comparing the relative performance of production systems, these studies focused on identifying social hotspots and high-risk segments within supply chains. Indicators such as child labor, forced labor, fair wages, and occupational safety frequently exhibited the highest levels of social risk in specific countries or economic sectors.

Wei et al. (2022) adopted an intermediate approach by combining quantitative indicators with weighting procedures to construct a regional social performance index. In this framework, differences among provinces reflected inequalities in social development at the national level. Similarly, Prasara-A and Gheewala (2025) employed a

reference-scale approach to compare the social performance of four major economic crops across cultivation, transportation, collection, and consumption stages. For rice, no social hotspot was identified at either the actual or adjusted social performance level, although several indicators showed moderate performance and required continued monitoring. This finding is largely consistent with the results reported in farm-level performance-based studies.

A structured summary of the principal indicators, analytical approaches, and key quantitative findings reported in each selected study is presented in Table 4. Overall, the results indicate that the assessment approach adopted—performance-based versus risk-based—directly influences the interpretation of social sustainability outcomes. Farm-level studies tend to emphasize relative social improvement, whereas large-scale assessments primarily focus on structural social vulnerabilities and risk exposure within supply chains.

Table 4. Classification of Quantitative and Qualitative Findings of the Selected Studies According to Social Indicators and Analytical Approaches

No.	Study	Analytical Approach	Key Social Indicators	Main Quantitative Evidence	Dominant Result Pattern
1	Phantha et al. (2021)	Performance-based (Conventional vs. Organic)	Farmers, workers, local communities; food security, income satisfaction, health and safety, local employment	Rice farmers' social performance: Organic = 0.93, Conventional = 0.65; Workers = 0.96 in both systems; Local communities = 1.00 in both systems.	(i) Higher social performance of rice farmers under organic farming, mainly due to food security and income satisfaction; (ii) No difference between the two systems for workers and local communities.
2	Kalvani et al. (2022)	Performance-based (Comparative farm-level assessment)	Workers, local communities, farmers; health and safety, discrimination, wages, employment, land and water rights, technology access, income satisfaction	Weighted social scores (Iran vs. Malaysia): Workers = 29.64 vs. 62.00; Local communities = 68.50 vs. 64.00; Farmers = 15.60 vs. 66.00	(i) Significant differences in social performance between countries; (ii) Strong sensitivity to institutional support systems and mechanization levels
3	Sharaai et al. (2022)	Performance-based (Production-processing chain)	Mill workers, farmers, local communities; income, health and safety, technology access, living standards	Overall social performance scores (%): Local communities = 62; Workers = 59; Farmers = 53	(i) Lower social performance among farmers compared with other stakeholder groups; (ii) Income and health and safety identified as major concerns
4	Wei et al. (2022)	Hybrid (Regional index and weighting approach)	Farmers, consumers, society, rural areas; composite social index (SI)	Highest reported indicator weight = 0.122 (consumer health and safety); strong regional disparities across provinces	Social performance strongly associated with regional development levels and social infrastructure
5	Mancini et al. (2023)	Risk-based (Macro-scale assessment)	Child labor, forced labor, fair wages, workers' rights, corruption, literacy, health and safety	Selected risk scores for rice: Fair wages = 8.6; Responsible business conduct = 5.26; Workers' rights = 5.25; Child labor = 5.8	(i) Structural vulnerability transmitted through global supply chains; (ii) High social risks related to labor rights and fair wages
6	Vinci et al. (2023)	Risk-based (Cross-country comparison)	Child labor, forced labor, fair wages, working hours, workers' rights,	Child labor ranged from 0.4% (Sri Lanka) to 21% (Senegal); Iran = 3%;	(i) Social risks strongly dependent on national contexts; (ii) Child labor,

No.	Study	Analytical Approach	Key Social Indicators	Main Quantitative Evidence	Dominant Result Pattern
			discrimination, migration	Forced labor in Iran = 16.2 cases per 1,000 people	forced labor, and working hours emerged as key risk factors
7	Prasara-A & Gheewala (2025)	Performance-based (Reference-scale/value-chain assessment)	Land and water rights, economic performance, health and safety, labor and machinery access, fair competition, women's empowerment, career satisfaction, and food security	No rice-related social hotspot was identified at either the actual level (PSact = 1) or the adjusted level (PSadj = 0).	(i) No rice-specific social hotspots were identified; (ii) several indicators nevertheless showed moderate or attention-requiring performance, highlighting the need for continued monitoring.

4.5. Stakeholder-Based Analysis of Social Life Cycle Assessment Results

A review of the selected studies from a stakeholder perspective indicates that workers were consistently identified as the most sensitive social group across all studies. In farm-level assessments, indicators such as working conditions, working hours, occupational health and safety, and fair wages contributed most substantially to variations in overall social performance scores. In particular, the comparative study conducted in Iran and Malaysia demonstrated that differences in several labor-related sub-indicators significantly influenced overall social performance outcomes (Kalvani et al., 2022). Similarly, Phantha et al. (2021) found no difference between conventional and organic rice farming in the overall social performance of workers (0.96 in both systems) or local communities (1.00 in both systems). The principal difference was observed among rice farmers, whose social performance was higher under organic farming (0.93) than under conventional farming (0.65), primarily because of better food security and income satisfaction.

In studies relying on secondary databases and large-scale modeling approaches, such as Mancini et al. (2023) and Vinci et al. (2023), indicators including child labor, forced labor, and fair wages exhibited elevated social risk levels in several countries. These studies emphasize that even when social performance appears satisfactory at the farm level, structural vulnerabilities embedded within supply chains may still adversely affect workers' social conditions. The strong emphasis placed on workers throughout the reviewed literature highlights that a substantial component of social sustainability in rice production systems depends on the quality of rural employment. Indicators such as occupational health and safety, fair wages, and employment security represent not only social assessment variables but also fundamental dimensions of social welfare and social justice within rural communities. Consequently, poor performance in these indicators may undermine livelihood sustainability and the overall quality of life of the agricultural workforce.

Farmers, as owners or operators of agricultural production systems, also played a central role in farm-based studies. Comparative investigations such as those conducted by Phantha et al. (2021) and Kalvani et al. (2022) demonstrated that income, economic security, and livelihood stability were among the most influential factors distinguishing production systems and countries. Likewise, Wei et al. (2022) reported that regional variations in social indicators were strongly associated with differences in economic development and farmers' income levels. The prominence of indicators such as income, economic security, and livelihood stability suggests that S-LCA in rice production is directly linked to one of the core objectives of rural development, namely livelihood sustainability. Overall, the reviewed studies indicate that improvements in the social performance of rice value chains are closely tied to the ability of production systems to ensure economic security and maintain the continuity of rural household livelihoods.

Local communities received greater attention in value-chain and regional-scale studies. In the work of Prasara-A and Gheewala (2025), the social performance of different stages of the value chain was assessed with particular emphasis on employment generation and regional development.

Similarly, Wei et al. (2022) examined indicators related to social development and regional infrastructure at the provincial level. In global-scale studies such as Mancini et al. (2023), local communities were considered through broader indicators of social development and social risk in input-supplying countries. In contrast, consumers were either excluded from the assessment or only marginally addressed in most studies. This limited representation suggests that the current S-LCA literature on rice production remains largely focused on production-oriented stakeholders, while downstream actors in the value chain receive considerably less attention. Although local communities have generally received less attention than workers and farmers, indicators related to local employment, regional development, social infrastructure, and social participation demonstrate that the social impacts of rice production extend beyond the farm level and may influence broader patterns of rural development. This relationship is particularly evident in regional and value-chain studies that explicitly attempt to connect agricultural activities with social development processes in rural areas.

A stakeholder-based summary of the main findings reported in the reviewed studies is presented in Table 5. As shown in the table, the scope and intensity of reported social impacts were generally greater and more explicitly documented for workers and farmers than for other stakeholder groups, whereas local communities and especially consumers received comparatively limited attention.

Overall, the stakeholder-based analysis reveals that workers and farmers constitute the primary focus of existing S-LCA studies in rice production systems, while local communities and consumers remain underrepresented. This imbalance may reduce the comprehensiveness of social life cycle assessments and contribute to the neglect of important dimensions of social sustainability in rural areas. Consequently, it represents one of the major gaps in the current literature. More broadly, the reviewed studies indicate that S-LCA applications in rice production have primarily focused on three fundamental dimensions of social sustainability: employment quality, livelihood security, and community well-being. Workers are represented through indicators such as occupational health and safety, fair wages, and labor rights; farmers through income, economic security, and livelihood sustainability; and local communities through employment opportunities, social participation, and regional development. Therefore, S-LCA should be viewed not merely as a tool for measuring the social performance of production systems, but also as a framework capable of identifying strengths and weaknesses in rural social development. Nevertheless, the limited attention paid to local communities and consumers indicates that the existing literature has not yet achieved a comprehensive assessment of the multiple dimensions of social sustainability and sustainable rural development.

Table 5. Stakeholder-Oriented Summary of the Main Findings Reported in the Selected S-LCA Studies

No.	Study	Workers	Farmers	Local Communities	Consumers
1	Phantha et al. (2021)	Workers showed identical overall social performance in conventional and organic rice farming (0.96 in both systems), with no differences in minimum wage, equal opportunity, health and safety, freedom of collective bargaining, or forced labor.	Rice farmers showed higher social performance under organic farming (0.93) than under conventional farming (0.65), primarily due to better food security and income satisfaction.	Local communities showed identical social performance in both conventional and organic systems (1.00), with no differences in community strength, community engagement, or local employment.	Not assessed.
2	Kalvani et al. (2022)	Workers in Malaysia exhibited better performance than those in Iran regarding	Income levels and livelihood stability differed significantly between the two countries and played a major role in	Social performance was indirectly influenced by national levels of social	Not assessed.

No.	Study	Workers	Farmers	Local Communities	Consumers
		employment security and wage-related indicators, highlighting the influence of institutional factors.	determining overall social performance.	development and institutional quality.	
3	Sharaai et al. (2022)	Social performance differences were limited and highly dependent on the indicator considered; some indicators improved while others showed little variation.	Moderate and inconclusive socio-economic changes were reported.	The role of local communities was not strongly emphasized.	Not assessed.
4	Wei et al. (2022)	Social inequalities among provinces were evident, with more developed provinces achieving higher social performance scores.	Income and regional economic development were positively associated with improved social indicators.	Social infrastructure and regional development were identified as key drivers of social performance improvement.	Not assessed directly, although consumer-related indicators were incorporated within the composite assessment framework.
5	Mancini et al. (2023)	High levels of child labor and forced labor risks were reported in some supplier countries, generating structural risks throughout global supply chains.	Farmers in high-risk countries were exposed to institutional and governance-related vulnerabilities.	Social risks were higher in countries characterized by weaker governance structures.	Not assessed.
6	Vinci et al. (2023)	Structural risks associated with child labor, forced labor, and fair wages were highlighted, with trade dependencies playing a decisive role.	Indirectly affected through global trade and supply-chain structures.	Elevated social risks were reported in several input-supplying countries.	Not assessed.
7	Prasara-A & Gheewala (2025)	Workers were assessed across agriculture and transportation stages using indicators related to wages, working hours, working conditions, equality, occupational health and safety, and career satisfaction.	Farm owners were assessed in terms of land and water rights, economic development, governmental support, knowledge transfer, health and safety, women's empowerment, fair competition, and access to labor and machinery. For rice, several indicators were moderate, including net profit and access to machinery, but no social hotspot was identified.	Local communities were included across several life-cycle stages, particularly in relation to health and safety and the social effects of agricultural production, transportation, and collection.	Assessed through the local-community stakeholder group at the consumption stage, including food-security indicators related to access to locally available agricultural products at fair prices and acceptable quality.

Table 5 demonstrates that workers and farmers received the greatest attention across the reviewed studies, whereas local communities and particularly consumers were considerably underrepresented. This imbalance suggests that current S-LCA applications in rice production systems remain primarily focused on production-oriented stakeholders, highlighting an important gap in the literature regarding the broader dimensions of social sustainability and sustainable rural development.

4.6. Comparative Discussion of Findings

The findings of this systematic review indicate that the S-LCA literature on rice production, despite its recent expansion, still faces a significant conceptual and methodological duality. This

duality directly affects both the interpretation of results and their applicability to policy-making. On the one hand, performance-based studies, predominantly conducted at the farm or value-chain stage level, seek to evaluate the social performance of production systems through scoring methods or aggregated indicators and essentially address the question: *Which system performs better socially?* On the other hand, risk-based studies, relying on databases and large-scale modeling approaches, represent structural vulnerabilities through social risk indicators and primarily address the question: *Where are the major social risks located and why do they occur?*

Although these two approaches are often regarded as complementary, they may generate apparently contradictory interpretations if presented without adequate conceptual framing. This is particularly relevant for readers who expect S-LCA studies to provide a single, directly comparable assessment of social sustainability.

The reviewed studies demonstrate that differences among countries and production systems do not merely alter indicator values; they also influence the interpretation of social performance outcomes. For example, the comparative assessment of rice production systems in Iran and Malaysia revealed that institutional structures, labor arrangements, mechanization levels, and social support mechanisms substantially affected the relative importance of indicators such as employment security and working conditions, ultimately influencing overall social performance scores. These findings suggest that improvements in social sustainability cannot be achieved solely through technical interventions aimed at increasing productivity or reducing input use. Rather, they also depend on institutional reforms, including social insurance schemes, occupational safety standards, labor regulations, and support mechanisms for producers.

From this perspective, institutions may be viewed as an integral component of agricultural production systems. Just as inputs such as fertilizers, water, and machinery influence production outcomes, governance structures, labor regulations, and social welfare systems shape social sustainability outcomes.

The reviewed literature further suggests that policymakers should not assume that a particular production label, such as "organic" or "conventional," automatically guarantees improvements across all dimensions of social sustainability. Several indicators appear to be more strongly influenced by market conditions, access to services, and institutional support systems than by production methods themselves. Consequently, social improvement strategies should be designed around specific social indicators rather than being solely production-system oriented.

Regional-level assessments also indicate that social performance is strongly associated with levels of economic development and social infrastructure. This finding highlights the importance of intra-country heterogeneity. Even within a common national governance framework, regional disparities may significantly influence S-LCA outcomes. Therefore, uniform policy interventions may be insufficient, and region-specific strategies may be required to address social sustainability challenges effectively.

One of the most important interpretative challenges identified in the literature is the apparent discrepancy between performance-based and risk-based findings. Farm-level assessments may report acceptable social performance, whereas risk-based analyses may simultaneously identify substantial social risks within the same commodity supply chain. Rather than representing a contradiction, this reflects differences in analytical scale and assessment objectives. Performance-based approaches evaluate actual conditions within specific production systems, while risk-based approaches identify structural vulnerabilities embedded within broader supply chains and institutional contexts.

Accordingly, high social risk scores should not be interpreted as evidence that negative social outcomes are necessarily occurring in a particular production system. Instead, they indicate increased vulnerability and the potential occurrence of undesirable social impacts. Indicators such as child labor, forced labor, and excessive working hours therefore function primarily as warning signals that guide decision-makers toward critical intervention points within supply chains.

These findings suggest that future research and policy development would benefit from a more integrated framework that combines the strengths of both approaches. Performance-based studies are particularly useful for identifying local interventions, such as improvements in

occupational safety, worker training, and labor standards, whereas risk-based studies are more suitable for designing supply-chain policies related to responsible sourcing, traceability systems, and supplier evaluation. Consequently, the two approaches should be regarded as complementary rather than competing perspectives.

Another important finding is that workers emerged as the most sensitive stakeholder group across all reviewed studies. This predominance can be explained by two factors. First, many of the standard S-LCA indicators are inherently worker-oriented, including working conditions, occupational health and safety, wages, and working hours. Second, labor-intensive stages of rice production often constitute the primary sources of social vulnerability within the value chain.

While this focus facilitates the design of practical interventions, it may also lead to an overly narrow interpretation of social sustainability in which broader dimensions of rural social development remain insufficiently addressed. Similar concerns apply to farmers, whose social performance is frequently assessed through indicators such as income, economic security, and livelihood stability. Although these indicators are highly relevant, they often occupy the boundary between social and economic sustainability. Therefore, future S-LCA studies should expand beyond income-related measures and incorporate indicators such as access to healthcare, social insurance coverage, agricultural extension services, bargaining power, employment security, and equitable access to productive resources.

The review further reveals that local communities receive greater attention in regional and value-chain studies than in farm-level assessments. This suggests that community-level impacts are often more visible at broader analytical scales. Consequently, the effective assessment of local communities requires context-specific indicators addressing social participation, migration, social conflicts, cultural change, and community resilience, dimensions that remain underrepresented in the current rice S-LCA literature.

In contrast, consumers have been largely excluded from existing assessments. Given the strategic role of rice in food systems, this omission represents a significant limitation. Issues such as food accessibility, affordability, food security, traceability, and consumer trust remain insufficiently explored. As a result, current S-LCA applications in rice production remain predominantly production-oriented.

A further methodological challenge concerns the lack of consistency in functional units and system boundaries. Variations in the definition and reporting of functional units—including land-based reference units, economic units, and system-level units—as well as the absence of an explicitly defined unit in some studies, directly affect the interpretation and comparability of social indicators. Greater transparency and standardization in reporting functional units and system boundaries would therefore improve comparability across studies.

Overall, the reviewed literature demonstrates that S-LCA possesses considerable potential for identifying and explaining social impacts within rice production systems. However, while existing studies have been largely successful in diagnosing social issues, they have been less effective in translating their findings into operational frameworks capable of supporting sustainable rural development policies. Consequently, bridging the gap between social assessment and development-oriented policy-making remains one of the most important challenges for future research.

5. Discussion and Conclusion

This systematic review demonstrated that although Social Life Cycle Assessment (S-LCA) research in rice production has expanded considerably in recent years, important challenges remain regarding the comprehensive representation of social sustainability dimensions, particularly social justice, social welfare, livelihood security, social participation, and balanced stakeholder coverage. The comparative analysis revealed that geographical context, economic development level, institutional structures, and production system characteristics play decisive roles in shaping and interpreting S-LCA outcomes. Furthermore, the two dominant assessment approaches—performance-based and risk-based—although apparently generating different results, operate at different analytical levels and should therefore be regarded as complementary rather than contradictory perspectives.

The findings clearly indicate that addressing the social dimensions of rice production is not merely an optional addition to sustainability assessment

but a fundamental requirement for achieving sustainable rural development. Performance-oriented indicators such as farmers' income, occupational health and safety, and livelihood stability are directly associated with improvements in rural quality of life. At the same time, the reviewed studies suggest that social sustainability challenges may extend beyond farm boundaries and emerge through broader institutional and supply-chain structures. Therefore, achieving socially sustainable rice production requires simultaneous attention to local production conditions and wider socio-economic contexts affecting rural livelihoods.

Consequently, rural development policies in rice-producing regions should simultaneously address both farm-level and supply-chain dimensions. Farm-level interventions may include occupational safety standards, fair labor contracts, worker training programs, and social insurance schemes, whereas supply-chain interventions should focus on traceability systems, responsible sourcing practices, supplier evaluation, and the mitigation of structural social risks. Only through such an integrated approach can S-LCA evolve from a diagnostic assessment tool into a practical roadmap for promoting social justice, social cohesion, and resilience within rural communities.

The stakeholder analysis further revealed that workers and farmers have received the greatest attention in the existing literature, whereas local communities and consumers remain substantially underrepresented. This imbalance may reduce the comprehensiveness of social assessments and highlights the need for broader stakeholder coverage in future research. In addition, methodological heterogeneity regarding functional units, system boundaries, and indicator quantification continues to limit the comparability of findings across studies.

Another important conclusion emerging from this review is that many existing S-LCA studies, despite their emphasis on social indicators, have not established a sufficiently explicit connection between assessment outcomes and the broader objectives of social sustainability and rural development. Indicators such as income, occupational health and safety, employment, food security, and social participation frequently appear in the literature; however, they are often analyzed individually rather than being interpreted within broader frameworks of social justice, livelihood security, social welfare, and community empowerment. Strengthening the contribution of S-LCA to policy-making therefore requires a more explicit integration of assessment outcomes with the objectives of sustainable rural development.

Based on the findings of this review, several directions for future research and methodological advancement can be proposed. First, S-LCA frameworks should move beyond methodological standardization alone and facilitate the systematic assessment of key dimensions of social sustainability, including social justice, livelihood security, social welfare, and community participation. Such integration would enhance the applicability of S-LCA within rural development planning and policy-making processes.

Second, the development and localization of social indicators should account for the cultural, institutional, and livelihood characteristics of rice-producing regions. Indicators such as livelihood security, access to resources, community participation, and rural resilience could complement conventional S-LCA indicators and provide a more realistic representation of social development conditions in rural areas.

Third, greater integration between performance-based and risk-based approaches is recommended. Such integration would enable simultaneous assessment of current social conditions and future vulnerabilities, thereby providing policymakers with a more comprehensive understanding of both existing challenges and emerging threats to long-term social sustainability.

Fourth, future studies should move beyond the exclusive use of aggregated social scores and incorporate measurable indicators directly linked to rural quality of life, employment security, social insurance coverage, access to social services, and local participation. This shift would significantly enhance the practical relevance of S-LCA findings for rural development planning and policy formulation.

In conclusion, the future development of S-LCA in rice production depends not only on methodological refinement but also on its capacity to function as a tool for monitoring and guiding social sustainability in rural areas. The success of future studies should therefore be evaluated not solely on methodological rigor, but also on their ability to contribute meaningfully to social justice,

livelihood security, social welfare, and the empowerment of rural communities.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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Review Article

مرور نظام‌مند ارزیابی چرخه حیات اجتماعی تولید برنج و پیامدهای آن برای توسعه پایدار روستایی

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چکیده

مبسوط

۱. مقدمه

توسعه پایدار به عنوان پارادایمی تأثیرگذار برای بهبود رفاه انسانی و حفاظت از منابع طبیعی، بر تعادل ابعاد اقتصادی، زیست‌محیطی و اجتماعی تأکید دارد. توسعه پایدار روستایی با تکیه بر پایداری اجتماعی، به دنبال توزیع عادلانه منابع، انسجام اجتماعی، امنیت معیشت و رفاه کارگران است. تولید برنج با تأمین غذای بیش از ۳/۵ میلیارد نفر، نقشی اساسی در امنیت غذایی و معیشت روستایی دارد. با وجود این اهمیت، پژوهش‌های پیشین عمدتاً بر ابعاد زیست‌محیطی و اقتصادی متمرکز بوده و ابعاد اجتماعی مانند نابرابری دستمزد، شرایط کاری نامناسب و مخاطرات سلامت شغلی کمتر توجه شده‌اند. ارزیابی چرخه حیات اجتماعی (S-LCA) چارچوبی مناسب برای شناسایی و ارزیابی پیامدهای اجتماعی در گروه‌های مختلف ذی‌نفعان فراهم می‌کند و از سیاست‌گذاری مبتنی بر شواهد به سوی توسعه پایدار روستایی حمایت می‌نماید. هدف این مطالعه، مرور نظام‌مند کاربرد S-LCA در تولید برنج، شناسایی شاخص‌های اجتماعی، بررسی نمایندگی ذی‌نفعان، تحلیل ناهمگونی روش‌شناختی و برجسته‌سازی شکاف‌های پژوهشی است.

۲. مبانی نظری تحقیق

پایداری اجتماعی در توسعه روستایی به ظرفیت جوامع برای حفظ انسجام اجتماعی، بهبود کیفیت زندگی، دسترسی عادلانه به فرصت‌ها و مشارکت در تصمیم‌گیری اشاره دارد. ارزیابی چرخه حیات اجتماعی از تلفیق سه سنت فکری نشأت گرفته است: پارادایم توسعه پایدار، رویکرد توسعه انسانی و ادبیات عدالت اجتماعی. برخلاف ارزیابی زیست‌محیطی، S-LCA به مردم، روابط اجتماعی و ساختارهای نهادی می‌پردازد. گروه‌های کلیدی ذی‌نفع شامل کارگران، مصرف‌کنندگان، جوامع محلی و کنشگران زنجیره ارزش هستند. دو رویکرد اصلی در S-LCA وجود دارد: رویکرد مبتنی بر عملکرد که شرایط واقعی اجتماعی را با داده‌های میدانی ارزیابی می‌کند و رویکرد مبتنی بر ریسک که احتمال وقوع پیامدهای نامطلوب را با استفاده از داده‌های ثانویه برآورد می‌نماید. چارچوب تحلیلی این مطالعه، مسیری ترتیبی از ارزیابی S-LCA، شناسایی ذی‌نفعان و رویکرد روش‌شناختی، شناسایی ابعاد اجتماعی و نقاط بحرانی، پیامدهای سیاستی، پیامدهای پایداری اجتماعی و توسعه پایدار روستایی را ترسیم می‌کند.

۳. روش تحقیق

این مطالعه با رویکرد مرور نظام‌مند و بر اساس رهنمودهای PRISMA انجام شد. جستجو در پایگاه‌های Scopus و Web of Science با عبارات مرتبط با تولید برنج و ارزیابی چرخه حیات اجتماعی برای دوره ده‌ساله (۲۰۱۶-۲۰۲۶) صورت گرفت. معیارهای ورود شامل مقالات مجلات معتبر، مطالعات مستقیم در ارتباط با کاربرد S-LCA در تولید برنج، ارائه اطلاعات روش‌شناختی کافی و نگارش به زبان انگلیسی بود. پس از غربالگری عنوان، چکیده و متن کامل، هفت مطالعه برای مرور نهایی انتخاب شدند. استخراج داده‌ها شامل متغیرهای نویسندگان، سال انتشار، محدوده جغرافیایی، گروه‌های ذی‌نفع، شاخص‌های اجتماعی، واحد کارکردی، مرز سیستم و رویکردهای روش‌شناختی بود. کیفیت مطالعات بر اساس سه معیار سازگاری روش‌شناختی، کیفیت داده‌های اجتماعی و نمایندگی ذی‌نفعان ارزیابی شد.

۴. یافته‌های تحقیق

مرور مطالعات نشان داد که علی‌رغم کاربرد چارچوب S-LCA در همه پژوهش‌ها، ناهمگونی قابل‌توجهی در عملیاتی‌سازی آن وجود دارد. از نظر رویکرد ارزیابی، چهار مطالعه به رهنمودهای

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UNEP/SETAC اشاره داشتند و دو مطالعه عمدتاً از رویکرد مبتنی بر ریسک استفاده کردند. تنوع در تعریف واحد کارکردی (از هکتار تا واحد اقتصادی و سطح سیستم) و مرز سیستم (سه مطالعه در مرحله مزرعه، دو مطالعه در زنجیره ارزش و دو مطالعه در چرخه حیات کامل) مشاهده شد. کارگران حساسترین گروه ذی‌نفع بودند و شاخص‌های سلامت و ایمنی شغلی، دستمزد منصفانه و حقوق کار بیشترین فراوانی را داشتند. جوامع محلی در پنج مطالعه و مصرف‌کنندگان کمترین توجه را دریافت کردند.

سیستم‌های تولید ارگانیک عملکرد اجتماعی بهتری نسبت به سیستم‌های متداول نشان دادند، اما نگرانی‌هایی مانند کار کودکان و استثمار نیروی کار همچنان وجود داشت. تفاوت‌های جغرافیایی و نهادی نقش تعیین‌کننده‌ای در عملکرد اجتماعی ایفا کردند؛ مطالعه تطبیقی ایران و مالزی نشان داد که تفاوت در ساختارهای نهادی و سطوح مکانیزاسیون، امتیازات عملکرد اجتماعی را به طور قابل‌توجهی تحت تأثیر قرار می‌دهد. ارزیابی کیفیت نشان داد که از نظر سازگاری روش‌شناختی، مطالعات دارای تعریف صریح واحد مرجع و مرز سیستم قوی‌تر بودند و کیفیت داده‌های اجتماعی در مطالعات مبتنی بر داده‌های میدانی بالاترین بود.

۵. بحث و نتیجه‌گیری

مرور نظام‌مند نشان داد که پژوهش‌های S-LCA در تولید برنج با چالش‌هایی در نمایش جامع پایداری اجتماعی، به ویژه عدالت اجتماعی، رفاه، امنیت معیشت و مشارکت اجتماعی، و همچنین پوشش متوازن ذی‌نفعان مواجه هستند. دو رویکرد مبتنی بر عملکرد و مبتنی بر ریسک اگرچه نتایج متفاوتی تولید می‌کنند، در سطوح تحلیلی متفاوتی عمل کرده و مکمل یکدیگرند. پرداختن به ابعاد اجتماعی تولید برنج نه یک افزودن اختیاری، بلکه شرط اساسی تحقق توسعه پایدار روستایی است. شاخص‌هایی مانند درآمد کشاورزان، سلامت و ایمنی شغلی و ثبات معیشت با کیفیت زندگی روستایی مرتبط هستند و چالش‌های پایداری اجتماعی ممکن است فراتر از مزرعه و در ساختارهای زنجیره تأمین ظهور کنند.

بر اساس یافته‌ها، چارچوب‌های S-LCA باید فراتر از استانداردسازی روش‌شناختی حرکت کرده و ارزیابی نظام‌مند ابعاد کلیدی پایداری اجتماعی را تسهیل کنند. توسعه و بومی‌سازی شاخص‌ها باید با در نظر گرفتن ویژگی‌های فرهنگی و نهادی مناطق تولیدکننده برنج انجام شود. ادغام رویکردهای مبتنی بر عملکرد و ریسک و استفاده از شاخص‌های قابل اندازه‌گیری مستقیم مرتبط با کیفیت زندگی روستایی توصیه می‌شود. در مجموع، توسعه آینده S-LCA در تولید برنج نه تنها به اصلاحات روش‌شناختی، بلکه به ظرفیت آن به عنوان ابزاری برای پایش و هدایت پایداری اجتماعی در مناطق روستایی وابسته است.

کلیدواژه‌ها: تولید برنج؛ ارزیابی چرخه حیات اجتماعی؛ پایداری اجتماعی؛ توسعه پایدار روستایی؛ معیشت روستایی؛ کشاورزی پایدار.

تشکر و قدردانی

مطالعه حاضر برگرفته از از رساله دکتری الناز عاشری گفشه، گروه جغرافیا و برنامه‌ریزی روستایی، دانشکده علوم انسانی و اجتماعی، دانشگاه گیلان، رشت، ایران، است.

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فهرست مندرجات

عنوان	صفحه
■ ارزیابی عوامل بازدارنده فعالیت شرکت‌های تعاونی عشایری در استان فارس: شناسایی راهکارهای توسعه روستایی- عشایری منطقه مدینه خسروجردی- مهدی نوری‌پور- آیت‌اله کرمی- سعید صالحی- مریم آفریدونی	(۲۰-۱)
■ آینده‌نگاری بازآفرینی اجتماع‌محور در بافت‌های تاریخی شهری با خاستگاه روستایی: مطالعه موردی محله سفلی اصفهان علی مومنی- جمیله توکلی‌نیا- محسن کلانتری- امیر رضا خاوریان گرمسیر	(۳۸-۲۱)
■ تحلیل رابطه میان دلبستگی به مکان و افزایش خانه‌های دوم در مقاصد گردشگری روستایی (مورد مطالعه: استان مازندران، ایران) مهدی رمضان‌زاده لسبوئی- مهری دنیوی	(۵۵-۳۹)
■ تبیین چارچوب حکمرانی مشارکتی در توسعه پایدار گردشگری روستایی: مطالعه‌ای کیفی در غرب استان مازندران فرهاد جوان- شهرام امیر انتخابی	(۷۹-۵۷)
■ مسیرهای برنامه‌ریزی برای گذار به توسعه شهری با انرژی صفر در اقلیم‌های گرم و خشک: مطالعه‌ای شبیه‌سازی‌محور در شهر سمنان، ایران الناز مقصودی- سعید کامیابی	(۱۰۱-۸۱)
■ مرور نظام‌مند ارزیابی چرخه حیات اجتماعی تولید برنج و پیامدهای آن برای توسعه پایدار روستایی الناز عاشری-گفشه- مجید یاسوری- علی حاجی نژاد- اشکان نبوی پله سرایی	(۱۲۸-۱۰۳)

داوران این شماره به ترتیب حروف الفبا

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دکتر زهرا یکتامهر (استادیار جغرافیا و برنامه‌ریزی شهری دانشگاه آزاد اسلامی مشهد)

۹. ۳. انواع نقل قول‌ها (مستقیم و غیر مستقیم)، نقل به مضمون و مطالب به دست آمده از منابع و مآخذ، با حروف نازک و استفاده از نشانه‌گذاری‌های مرسوم، مشخص شود و نام صاحبان آثار، تاریخ و شماره صفحات منابع و مآخذ، بلافاصله در میان پرانتز نوشته شود.

۱۰. مقالات برگرفته از رساله و پایان‌نامه دانشجویان با نام استاد راهنما، مشاوران و دانشجو به صورت توأمان و با مسؤولیت استاد راهنما منتشر می‌شود.

۱۱ . چنانچه مخارج تحقیق یا تهیه مقاله توسط مؤسسه‌ای تأمین مالی شده باشد، باید در بخش تشکر و قدردانی مشخص گردد.

۱۲ . شیوه ارزیابی مقالات: مقالات ارسالی که شرایط پذیرش را احراز کنند، برای داوران خبره در آن موضوع ارسال می‌شوند. داوران محترم، جدای از ارزشیابی کیفی مقالات، راهبردهای سازنده‌ای پیشنهاد می‌کنند. پیشنهادهای داوران محترم به طور کامل، اما بدون نام و نشان داور، برای نویسنده مقاله ارسال خواهد شد.

۱۳ . مجله حق رد یا قبول و نیز ویراستاری مقالات را برای خود محفوظ می‌دارد و مقالات مسترد نمی‌گردد. اصل مقالات رد یا انصراف داده شده پس از سه ماه از مجموعه آرشیو مجله خارج خواهد شد و مجله پژوهش و برنامه‌ریزی روستایی هیچ مسئولیتی در این ارتباط نخواهد داشت.

۱۴ . مسؤولیت ارائه صحیح مطالب مقاله بر عهده‌ی نویسندگان مقاله است. از این‌رو، نسخه‌ای از مقاله آماده چاپ برای انجام آخرین تصحیحات احتمالی به نشانی الکترونیکی نویسنده ارسال خواهد شد. چنانچه ظرف مدت یک هفته پاسخی از سوی نویسندگان واصل نگردید به معنای موافقت آنها با اصلاحات انجام شده تلقی و نسبت به چاپ آن اقدام می‌شود.

۱۵. دریافت مقاله صرفاً از طریق سامانه مجله (http://jrrp.um.ac.ir) خواهد بود و مجله از پذیرش مقالات دستی یا پستی معذور خواهد بود.

۱۶. نویسندگان گرامی، مقالاتی که مطابق فرمت مجله تهیه نشده باشند به نویسنده بازگردانده شده و در فرآیند ارزیابی قرار نخواهد گرفت.

۱۷. فایل های ضروری برای ارسال از طریق سامانه عبارتند از:

الف) فایل مشخصات نویسندگان: در محیط word شامل اسامی و مشخصات نویسندگان به فارسی و انگلیسی.

ب) فایل اصلی مقاله بدون مشخصات: در محیط word شامل متن اصلی مقاله بدون اسامی و مشخصات نویسندگان.

ج) فایل چکیده مبسوط (مکمل) مقاله: شامل چکیده مبسوط فارسی در قالب یک فایل در محیط Word.

۱۸. شرایط جزئی تر و دقیق تر نیز در فایل راهنمای نگارش و ارسال مقاله توسط نویسندگان ارائه شده است.

۱۹. مقاله پس از ارزیابی علمی به زبان انگلیسی برگردانده شده و نویسنده(گان) موظف به ترجمه آن در مراکز ویراستاری معتبر خواهند بود و تا قبل از انجام ترجمه، امکان ارسال گواهی پذیرش مقدور نمی‌باشد. لذا پیشنهاد می‌شود فارسی زبانان مقاله خود را به زبان فارسی تهیه و ارسال نموده و پس از طی فرایند ارزیابی علمی و پذیرش نسبت به ترجمه آن اقدام شود.

آدرس پستی: مشهد- میدان آزادی- پردیس دانشگاه فردوسی مشهد- دانشکده ادبیات و علوم انسانی- دفتر مجلهٔ پژوهش و برنامه‌ریزی روستایی.

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وب سایت: http://jrrp.um.ac.ir/

فرم اشتراک (یک ساله/ دوشماره) **مجلهٔ پژوهش و برنامه‌ریزی روستایی**

این جانب ..... شغل ..... با ارسال فیش بانکی به مبلغ ..... ریال به حساب جاری شماره **۴۲۵۲۹۹۶۳۸** بانک تجارت شعبه دانشگاه مشهد کد **۴۲۵۰** به نام عواید اختصاصی دانشکده ادبیات و علوم انسانی، متقاضی اشتراک فصلنامه از شماره .....هستم. چنانچه صاحبان مقالات منتشر شده متقاضی دریافت مجلّه و تیراژه‌ی آن از طریق پست پیشتاز باشند، باید هزینه‌ی آن را به شماره حساب مذکور واریز و اصل فیش پرداختی را به نشانی دفتر مجلّه ارسال کنند.

نشانی: ..... کدپستی: .....

شرایط پذیرش مقاله

برای سرعت بخشیدن به امر داوری و چاپ مقالات، از همهٔ پژوهشگرانی که مایل به چاپ مقالات علمی خود در این نشریه هستند، درخواست می‌شود به نکات زیر توجه کافی داشته باشند:

۱ . مقالهٔ ارسال شده نباید قبلاً در هیچ نشریهٔ داخلی یا خارجی چاپ شده باشد. هیئت تحریریه انتظار دارد نویسندگان محترم تا هنگامی که جواب پذیرش از نشریه نرسیده است، مقالهٔ خود را به مجلهٔ دیگری برای چاپ ارسال نفرمایند.

۲ . مقالات انگلیسی با قلم نازک Times New Roman11 با نرم افزار Word تهیه شود. مقالات، روی کاغذ A4 (با حاشیه از بالا ۳ و پایین ۲ و راست ۲ و چپ ۲ سانتی‌متر) تایپ شود. متن به صورت دو ستونی با رعایت فاصله ۱ سانتی‌متر بین دو ستون و فواصل بین خطوط به صورت single باشد. ۳ . حجم مقاله نباید ازحدود ۹۵۰۰ کلمه و یا حداکثر ۱۵ صفحهٔ چاپی به قطع نشریه بیشتر باشد (با در نظر گرفتن محل جداول، اشکال، خلاصه فارسی و فهرست منابع).

۴ . عنوان مقاله با در نظرگرفتن فواصل بین کلمات نباید از ۶۰ حرف تجاوز کند و با قلم Times New Roman14 سیاه تایپ شود.

۵ . نام نویسندهٔ مقاله با قلم سیاه Times New Roman10 عنوان علمی یا شغلی او با قلم Times New Roman10 در زیر عنوان مقاله ذکر شود. ضمناً آدرس الکترونیکی و شماره تلفن نویسندهٔ مسؤول در پاورقی آورده شود.

۶ . چکیدهٔ مقاله ساختاریافته با قلم نازک Times New Roman 11 به صورت تک ستونی باشد.

۷ . شکل‌ها و نمودارهای مقاله حتماً اصل و دارای کیفیت مطلوب باشد. فایل اصلی اشکال (تحت Word ،PDF ،Excel) و با دقت ۳۰۰ dpi ارائه شود. اندازهٔ قلم‌ها خصوصاً در مورد منحنی‌ها (legend) به گونه‌ای انتخاب شوند که پس از کوچک‌شدن مقیاس شکل برای چاپ نیز خوانا باشند.

۸ . ساختار مقاله شامل عناصر زیر است:

۸. ۱ صفحهٔ عنوان: در صفحهٔ شناسنامه باید عنوان مقاله، نام و نام خانوادگی نویسنده (نویسندگان)، درجهٔ علمی، نشانی دقیق (کد پستی، تلفن، دورنگار و پست الکترونیکی)، محل انجام پژوهش، مسؤول مقاله و تاریخ ارسال) درج شود. عهده‌دار مکاتبات باید با علامت ستاره مشخص شود.

۸. ۲ چکیده: شامل چکیده‌های فارسی ساختار یافته (شامل هدف؛ روش؛ یافته‌ها؛ محدودیت‌ها؛ راهکارهای عملی؛ اصالت و ارزش و واژگان کلیدی (۳ تا ۶ کلمه)) است. تا حد امکان چکیدهٔ مقاله از ۳۰۰ کلمه تجاوز نکند . علاوه بر چکیده ساختار یافته، لازم است چکیدهٔ مبسوط فارسی بین ۷۵۰ تا ۱۰۰۰ کلمه نیز حاوی مقدمه، مبانی نظری، روش، نتایج و بحث، نتیجه‌گیری و کلیدواژه‌های مقاله تهیه شود، به طوری که حاوی اطلاعاتی از کل مقاله باشد و بتوان جداگانه آن را چاپ کرد. با توجه به این که مقاله بعدا به صورت کامل به انگلیسی برگردانده خواهد شد، نیازی به ترجمه چکیده مبسوط به انگلیسی نیست.

۸. ۳ مقدمه: شامل ۱- طرح مسئله؛ ۲- اهمیت و ضرورت؛ ۳- اهداف و سوالات اصلی تحقیق.

۸. ۴ ادبیات نظری تحقیق: شامل ۱- تعاریف و مفاهیم؛ ۲- دیدگاه‌ها و مبانی نظری؛ ۳- پیشینه نظری تحقیق و ... .

۸. ۵ روش‌شناسی تحقیق: در برگیرندهٔ ۱- محدوده و قلمرو پژوهش؛ ۲- روش تحقیق و مراحل آن (روش تحقیق، جامعهٔ آماری، روش نمونه‌گیری، حجم نمونه و روش تعیین آن، ابزار گردآوری داده‌ها و اعتبارسنجی آن‌ها)؛ ۳- سؤال‌ها و فرضیه‌ها؛ ۴- معرفی متغیرها و شاخص‌ها؛ ۵- کاربرد روش‌ها و فنون.

۸. ۶ یافته‌های تحقیق: ارائهٔ نتایج دقیق یافته‌های مهم با رعایت اصول علمی و با استفاده از جداول و نمودارهای لازم.

۸. ۷ بحث و نتیجه‌گیری: شامل آثار و اهمیت یافته‌های پژوهش و یافته‌های پژوهش‌های مشابه دیگر با تأکید بر مغایرت‌ها و علل آن، توضیح قابلیت تعمیم‌پذیری و کاربرد علمی یافته‌ها و ارائهٔ رهنمودهای لازم برای ادامهٔ پژوهش در ارتباط با موضوع، نتیجه‌گیری و توصیه‌ها و پیشنهادهای احتمالی.

۸. ۸ تشکر و قدردانی: قبل از منابع مورد استفاده ارائه شود و از ذکر عناوین دکتر و مهندس خودداری شود.

۹. نحوهٔ ارجاعات: منابع و مآخذ باید به صورت درون‌متنی و همچنین در پایان مقاله ذکر شود.

۹. ۱ ارجاعات در متن مقاله باید به شیوهٔ داخل پرانتز (APA) نسخه ۶ باشد؛ به گونه‌ای که ابتدا نام مؤلف یا مؤلفان، سال انتشار و صفحه ذکر شود. شایان ذکر است که ارجاع به کارهای چاپ شده فقط به زبان فارسی بوده و در اسامی لاتین معادل آن در زیر نویس همان صفحه ارائه شود. به عنوان نمونه: (شکوئی، ۱۳۸۷، ص. ۵۰) یا (وودز، ۲۰۰۵، ص. ۲۷).

۹. ۲ در پایان مقاله، منابع مورد استفاده در متن مقاله، به ترتیب الفبایی نام خانوادگی نویسنده بر اساس الگوی فهرست نویسی APA تنظیم گردد.

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بسم الله الرحمن الرحيم

دانشکده ادبیات و علوم انسانی

مجلّهٔ پژوهش و برنامه‌ریزی روستایی

سال پانزدهم، شمارهٔ ۳، تابستان ۱۴۰۵، شمارهٔ پیاپی ۵۴

صاحب امتیاز: دانشگاه فردوسی مشهد

مدیر مسئول: دکتر حمید شایان

سردبیر: دکتر علی‌اکبر عنابستانی

هیئت تحریریه (به ترتیب حروف الفبا) :

کریستوفر برایانت	استاد برنامه‌ریزی روستایی و توسعه (دانشگاه مونترال کانادا)
خدیجه بوزرجمهری	دانشیار جغرافیا و برنامه‌ریزی روستایی (دانشگاه فردوسی مشهد)
سعید پیراسته	دانشیار جغرافیا و مدیریت محیطی (دانشگاه واترلو کانادا)
جعفر جوان	استاد جغرافیای روستایی (دانشگاه فردوسی مشهد)
محمدرضا رضوانی	استاد جغرافیا و برنامه‌ریزی روستایی (دانشگاه تهران)
عبدالرضا رکن‌الدین افتخاری	استاد جغرافیا و برنامه‌ریزی روستایی (دانشگاه تربیت مدرس)
عباس سعیدی	استاد جغرافیای روستایی (دانشگاه شهید بهشتی)
حمید شایان	استاد جغرافیای روستایی (دانشگاه فردوسی مشهد)
خدیجه شکرالله	دانشیار جغرافیا (کالج مسیحی فورمن/پاکستان)
سید اسکندر صیدایی	دانشیار جغرافیا و برنامه‌ریزی روستایی (دانشگاه اصفهان)
علی عسگری	استاد مدیریت بحران (دانشگاه یورک کانادا)
علی‌اکبر عنابستانی	استاد جغرافیای انسانی و آمایش (دانشگاه شهید بهشتی)
آنا فرمینو	استاد جغرافیا و برنامه‌ریزی منطقه‌ای (دانشگاه لیسبون جدید پرتغال)
ماریجا ماسکین	استاد موسسه معماری و شهرسازی و برنامه‌ریزی فضایی صربستان
مجتبی قدیری معصوم	استاد جغرافیای روستایی (دانشگاه تهران)
دو-چول کیم	استاد مدیریت محیط زیست روستایی (دانشگاه اوکایاما ژاپن)
سیدحسن مطیعی لنگرودی	استاد جغرافیای روستایی (دانشگاه تهران)

مقالات نمودار آرای نویسندگان است و به ترتیب وصول و تصویب درج می‌شود.

دستیار سردبیر: زهرا یکتامهر

ویراستار انگلیسی: مهرناز عنابستانی

مدیر اجرایی: زهرا بنی‌اسد

حروف‌نگاری و صفحه‌آرایی : معصومه ایرانپاک

شمارگان: ۵۰ نسخه

نشانی: مشهد، دانشگاه فردوسی مشهد، دانشکدهٔ ادبیّات و علوم انسانی دکتر علی شریعتی، کد پستی ۹۱۷۷۹۴۸۸۸۳ ، نمابر: ۳۸۷۹۶۸۴۰ (۰۵۱)

بها: داخل کشور: ۲۰۰۰۰۰ ریال (تک‌شماره) خارج کشور: ۲۵ دلار (آمریکا- سالانه)، ۲۰ دلار (سایر کشورها- سالانه)

درگاه الکترونیکی: http://jrrp.um.ac.ir/ E-mail:Rplanning@um.ac.ir

*** این مجله در جلسهٔ کمیسیون بررسی نشریات علمی کشور مورخ ۱۳۹۲/۲/۲۵ رتبهٔ علمی- پژوهشی دریافت و طی نامهٔ شمارهٔ ۳/۱۸/۳۵۷۲۸ در تاریخ ۱۳۹۲/۳/۱۳ ابلاغ گردیده است.**

این مجلّه در پایگاه های زیر نمایه می‌شود:

- **پایگاه استنادی علوم جهان اسلام (ISC)**
- **پایگاه اطلاعات علمی جهاد دانشگاهی (SID)**
- **پایگاه بانک اطلاعات نشریات کشور (Magiran)**
- **فهرست دسترسی آزاد مجلات (Doaj)**
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دانشگاه فردوسی مشهد

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مجله پژوهش و برنامه ریزی روستایی

سال پانزدهم، شماره ۳ تابستان ۱۴۰۵، شماره پیاپی ۵۴

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