



## Tourism in Gilan Province with a Multi-Criteria Decision-Making Approach using Topsis

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ARTICLE INFO	ABSTRACT
<p>Article History:            Received 4 June 2021            Received in revised form 14 August 2021            Accepted 16 September 2021            Available online 19 September 2021</p>	<p>Tea, as a globally consumed aromatic beverage, ranks second only to water in terms of consumption, reflecting its significant cultural, social, and economic roles. In Iran, tea occupies a central position in daily life, symbolizing hospitality and social cohesion. The Gilan Province represents the primary region for tea cultivation in the country, benefiting from optimal climatic conditions, fertile soils, and abundant rainfall, which collectively ensure the production of high-quality tea. Considering the cultural importance of tea, its widespread popularity, and the touristic attractiveness of Gilan, tea tourism emerges as a promising avenue to integrate agricultural heritage with recreational and cultural experiences. This study aims to evaluate and optimize potential tea tourism destinations within Gilan Province by analyzing the major tea-cultivating cities. The research employs the multi-criteria decision-making (MCDM) approach, specifically the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), to systematically rank cities based on relevant indicators. The analysis identifies cultivation area, number of hotels, presence of tea factories, and average annual tourist influx as the most critical factors influencing the suitability of locations for tea tourism. Results indicate that Rasht offers the most favorable conditions, combining infrastructural readiness, cultural richness, and extensive tea production, thereby positioning it as the optimal hub for promoting and developing tea tourism in the region.</p>
<p>Keywords:            Tea Tourism, Multi-Criteria Decision-Making (MCDM), Topsis, Iran, Gilan</p>	

### 1. INTRODUCTION

Research in this field indicates that tea leaves were first discovered in China around three thousand years before Christ. The plant was initially wild and grew in the northern regions of India, specifically in Assam and other areas named Nonikin and Laos. The earliest people to use these green leaves were the Chinese people in the Shan state and Burma, and it became popular around 270 years before Christ in Egypt [1]. Studies show that initially, Buddhist monks used tea for relaxation and having restful sleep, and the initial cultivation of tea took place in those temples. Now, this plant is cultivated in countries such as China, India, Iran, Japan, Brazil, and several European countries [2].

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In many countries, industrial tourism is flourishing as a means to generate income. Many businesses that grow alongside tourism development include airlines, transportation, hotels, and restaurants, asset companies, tour operators, travel agencies, car rental firms, hospitality, and retail establishments, playing a significant role in the overall economic development of a country. In countries where the cost of tea production is high, and productivity is low, they have less profit. Therefore, one way to increase profits is diversification in activities, and tourism is a very suitable option [3]. Ecotourism, which focuses on natural beauty, tribal culture, religious rituals, historical places, jungles, wildlife, and hill resorts, has gained momentum in countries such as Bangladesh since the 1960s.

Tea tourism is a form of tourism that is utilized in tea-growing regions worldwide [4]. A tea tourist is someone who, with an interest in history, traditions, and avid tea consumption, visits tea cultivation areas [5]. Tea tourism is a contemporary concept that has been under research and discussion since the early 21st century. It is an exciting tourism idea associated with tea gardens. Tea gardens, tea-picking processes, tea production, tribal cultural festivals, and stays in tea hill stations are part of this tea tourism experience. This kind of tour is a unique nature-connected experience. Currently, tea tourism is prevalent in countries such as China, Sri Lanka, Kenya, and India [6]. Zhang [7] indicates that tea tourism has developed to showcase tea cultivation areas with beautiful natural environments or special historical heritage. The culture of tea (local tea customs) is conveyed through various activities for promotion, learning, shopping, and other forms of recreational and tourism experiences. Tea tourists are mainly tea lovers aged between 31 and 40, and tea-drinking habits significantly influence people's attitudes toward tea tourism [8]. Therefore, for a province or country that wants to promote tea tourism, it must employ effective advertising methods and tools [9]. One of the marketing problems of tea is the insufficient participation of traditional and old distribution channels [10]. One of the significant advantages of tea tourism is that it prevents the uncontrolled migration of villagers to the city and retains rural labor in those villages [11].

Gilan is a province in northern Iran where a significant volume of the country's tea is consumed and produced. The five major cities of tea production in this province include Rasht, Langaroud, Lahijan, Rudsar, and Fuman. In most regions worldwide, agriculture is not the main source of income for villagers, and they have employed different strategies to generate income. On the one hand, tourism is one of the industries that generate substantial income and foreign currencies [12]. Since tea tourism is one of the modern types of tourism that has emerged in tea-producing countries and gained popularity among tea enthusiasts [13], one of the strategies that can be used in Gilan province is tea tourism. In this type of tourism, tourists visit tea cultivation lands, tea museums, tea festivals, and tea factories. Ultimately, they go to places to drink tea, where they can brew and enjoy their favorite tea. This article aims to find the best place for tea tourism in the Gilan province and, for this purpose, the Topsis method has been used.

## **2. RESEARCH METHODOLOGY**

Just as Ming Su and his colleagues [11] considered indicators such as the area under cultivation, the number of hotels, the number of factories, and the number of tourists in their research, we also evaluate these criteria in the 5 cities of Gilan (Rasht, Lahijan, Fuman, Langaroud, and Rudsar) that are essential for the country's tea supply. The weight of each criterion according to them is 0.25, 0.20, 0.25, and 0.30, respectively. Based on a survey conducted with five active experts in the field of tourism and tea, these weights were confirmed and considered valid in the climatic conditions of Gilan. Then, to rank the cities based on the determined indices, the Topsis method is used.

This method was introduced by Hwang and Yoon [14] in 1981. It is one of the best multiple criteria decision-making models and has been widely used in various fields. In this method,  $m$  options are evaluated by  $n$  indices, and each problem can be considered as a geometric system consisting of  $m$  points in an  $n$ -dimensional space. The solution steps of this method are as follows:

Step 1: Formation of the Decision Matrix

$$D = \begin{matrix} & \begin{pmatrix} x_1 & & x_j & & x_n \end{pmatrix} \\ \begin{pmatrix} A_1 \\ \vdots \\ A_i \\ \vdots \\ A_m \end{pmatrix} & \begin{pmatrix} x_{11} & \dots & x_{1j} & \dots & x_{1n} \\ \vdots & & \vdots & & \vdots \\ x_{i1} & \dots & x_{ij} & \dots & x_{in} \\ \vdots & & \vdots & & \vdots \\ x_{m1} & \dots & x_{mj} & \dots & x_{mn} \end{pmatrix} \end{matrix} \quad (1)$$

Step 2: Normalize the Decision Matrix D using the following formul

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{k=1}^m x_{kj}^2}}, \quad i = 1, \dots, m; \quad j = 1, \dots, n \quad (2)$$

Step 3: Calculate the Weighted Decision Matrix  $V = (V_{ij})_{m \times n}$ , where  $w_j$  is the weight of the j-th criterion, and we have:

$$\sum_{j=1}^n w_j = 1 \quad (3)$$

$$v_{ij} = w_j r_{ij}, \quad i = 1, \dots, m; \quad j = 1, \dots, n$$

Step 4: Identify the Ideal and Negative-Ideal solutions:

$$A^* = \{v_1^*, \dots, v_m^*\} = \left\{ \left( \max_j v_{ij} \mid j \in \Omega_b \right), \left( \min_j v_{ij} \mid j \in \Omega_c \right) \right\} \quad (4)$$

$$A^- = \{v_1^-, \dots, v_m^-\} = \left\{ \left( \min_j v_{ij} \mid j \in \Omega_b \right), \left( \max_j v_{ij} \mid j \in \Omega_c \right) \right\} \quad (5)$$

$\Omega_b$  = The set of criteria with a profit nature

$\Omega_c$  = The set of criteria with a cost nature

Step 5: Calculating the distance of each option from the ideal and anti-ideal options:

$$S_i^* = \sqrt{\sum_{j=1}^n (v_{ij} - A_j^*)^2}, \quad i = 1, \dots, m \quad (6)$$

$$S_i^- = \sqrt{\sum_{j=1}^n (v_{ij} - A_j^-)^2}, \quad i = 1, \dots, m \quad (7)$$

Step 6: Calculating the final criterion for ranking each option:

$$C_i = \frac{S_i^-}{S_i^* + S_i^-}, \quad i = 1, \dots, m \quad (8)$$

Step 7: Ranking options based on the final criterion for ranking:

### 3. FINDINGS

The information related to the performance of cities in various indicators has been extracted based on the documents and statistics from the National Tea Organization in the year 2018 and the statistics from the Management and Planning Organization of Gilan Province in the year 2018. Accordingly, the cultivated area of tea in 5 selected cities is presented in Table 1. This criterion falls under the category of benefits. Additionally, the number of hotels and accommodations in the selected cities is shown in Table 2. This criterion also belongs to the category of benefits.

**Table 1.** Cultivated Area of Tea in 5 Selected Cities of Gilan Province (Based on the Statistics of the National Tea Organization in the year 2017)

	<b>Cultivated area (square meters)</b>		
	rain	Irrigation	total
Rasht	7,579,271	-	<b>7,579,271</b>
Langrod	52,929,659	-	<b>52,929,659</b>
Fuman	14,598,918	3,241,289	<b>17,840,207</b>
Lahijan	44,216,323	-	<b>44,216,323</b>
Rodsar	52,880,627	-	<b>52,880,627</b>

**Table 2.** Number of Hotels and Other Accommodations in 5 Selected Cities of Gilan Province (Based on the Statistics of the Management and Planning Organization of Gilan Province in the year 2017)

	hotel	hospitable	Residential complex	Apartment hotel	total
Rasht	10	10	10	2	<b>32</b>
Langrod	5	1	10	0	<b>16</b>
Fuman	8	3	4	3	<b>18</b>
Lahijan	5	4	2	2	<b>13</b>
Rodsar	11	3	10	4	<b>28</b>

In Table 3, the number of tea factories in five selected cities of Gilan province is provided, and Table 4 displays the annual tourist arrivals in the respective cities.

**Table 3.** Number of Active Tea Factories in 5 Selected Cities of Gilan Province (Based on the Statistics of the National Tea Organization in the year 1397)

	Rasht	Langrud	Fuman	Lahijan	Rodsar
Number of active tea factories	6	30	8	28	<b>30</b>

**Table 4.** Number of trips to 5 selected cities in Gilan province (Based on the statistics of the Statistical Center of Iran in the spring season of 2018)

	Rasht	Langrod	Fuman	Lahijan	Rodsar
Number of trips made	2883793	450445	768839	1037918	<b>740494</b>

**Table 5.** Decision-making matrix

Cultivated area	Number of hotels	Number of factories	Number of tourists
0.25	0.2	0.25	<b>0.3</b>
7579271	32	6	<b>2883793</b>
52929659	16	30	<b>450445</b>
17840207	18	8	<b>768839</b>
44216323	13	28	<b>1037918</b>
52880627	28	30	<b>640494</b>

Using formulas 1 to 5, the ideal and anti-ideal options have been calculated, and the results are presented in Table 5. The option that has the maximum distance from the anti-ideal and the minimum distance from the ideal receives a higher final score.

**Table 6.** Ideal and Anti-Ideal Options

	<b>Cultivated area</b>	<b>Number of hotels</b>	<b>Number of factories</b>	<b>Number of tourists</b>
ideal	0.1486065	0.1265652	0.1447671	<b>0.2657527</b>
Anti-ideal	0.0212797	0.0514171	0.0289534	<b>0.0415102</b>

**Table 7.** Final Ranking

<b>month</b>	<b>Final Distinction</b>	<b>Rank</b>
Rasht	0.578778	<b>1</b>
Roadser	0.4685597	<b>2</b>
Lahijan	0.4559851	<b>3</b>
Langrud	0.4254386	<b>4</b>
Fomen	0.1577233	<b>5</b>

#### 4. CONCLUSION

After the ranking by the TOPSIS method, the city of Rasht was selected as the first city in terms of tea tourism. Therefore, a shopping, visiting, and tea-drinking center should be opened in this city with the participation of municipal government agencies to attract tea tourists and increase tea production in the province. In these centers, facilities for brewing tea according to tourists' preferences should be provided. Additionally, related institutions should coordinate in creating such a center and be able to offer an attractive and exciting tour for tea tourists from tea cultivation areas. There should also be a tour to introduce the history of tea in Iran to tourists, familiarizing them with the customs and traditions related to tea in the country. Tea tourism contributes to improving the living standards of local residents and farmers by increasing tea production and local product sales. Another significant advantage of this type of tourism is preventing the direct migration of villagers to cities and maintaining rural labor. In Iran, one of the limitations in tea tourism is the lack of internet access in all areas, especially in tea cultivation regions, for tourists. Another existing limitation is the way of communication with tourists. To the extent possible, individuals in more contact with tourists should make an effort to learn English. In conclusion, all these stages can be achieved through the collaboration of governmental and private organizations with good coordination between these two sectors.

#### Transparency Statement

The data supporting this study are available upon reasonable request to the corresponding author, subject to ethical and confidentiality considerations.

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#### Declaration of Interest

The authors declare that they have no competing interests.

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