



## Sustainable Tourism in Green Key Certified Hotels in Turkey: Evaluation of Environmental Practices and Future Perspectives

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### Abstract

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Sustainable  
Tourism, Green  
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Analysis

This study critically evaluates the sustainable tourism practices of hotels participating in the Green Key programme in Turkey. Administered by the Environmental Education Foundation and encompassing 60 countries globally, the Green Key programme aims to promote environmentally friendly practices within the tourism industry. This research assesses the sustainable practices of 148 Turkish hotels participating in the programme in 2023, utilizing web content analysis and descriptive analysis techniques to examine data from hotel websites and related sources. The findings reveal substantial increases in the number of Green Key certified hotels, particularly in 2021 and 2023, with annual growth rates of 22.6% and 27.6%, respectively. Content analysis indicates that energy and food-saving practices, waste management, and staff training on sustainability are the most frequently implemented measures. Correlation analysis demonstrates a strong positive relationship between the numbers of Green Key certified hotels, tourist numbers, and tourism revenues. This underscores the economic advantages of sustainable tourism practices, as destinations with more Green Key certifications tend to attract more tourists and generate greater revenues. The study highlights the programme's efficacy in mitigating environmental impacts and fostering sustainable tourism, thereby enhancing the popularity and operational efficiency of participating hotels. This research underscores the critical importance of sustainable tourism for environmental protection and provides a comprehensive overview of the current status and future prospects of the Green Key programme in Turkey. Limitations and recommendations for future research are also discussed.

### Türkiye'de Yeşil Anahtar Sertifikalı Otellerde Sürdürülebilir Turizm: Çevresel Uygulamaların Değerlendirilmesi ve Gelecek Perspektifleri

### Özet

#### Anahtar Kelimeler:

Sürdürülebilir  
Turizm, Yeşil  
Anahtar Otelleri,  
Türkiye, Çevresel  
Etki, Korelasyon  
Analizi

Bu çalışma, Türkiye'de Yeşil Anahtar programına katılan otellerin sürdürülebilir turizm uygulamalarını eleştirel bir şekilde değerlendirmektedir. Çevre Eğitim Vakfı tarafından yürütülen ve dünya genelinde 60 ülkeyi kapsayan Yeşil Anahtar programı, turizm sektöründe çevre dostu uygulamaları teşvik etmeyi amaçlamaktadır. Bu araştırma, 2023 yılında programa katılan 148 Türk otelinin sürdürülebilir uygulamalarını değerlendirmekte ve otel web sitelerinden ve ilgili kaynaklardan elde edilen verileri incelemek için web içerik analizi ve betimsel analiz tekniklerini kullanmaktadır. Bulgular, özellikle 2021 ve 2023 yıllarında Yeşil Anahtar sertifikalı otel sayısında önemli artışlar olduğunu ve yıllık büyüme oranlarının sırasıyla %22,6 ve %27,6 olduğunu göstermektedir. İçerik analizi, enerji ve gıda tasarrufu uygulamaları, atık yönetimi ve personel eğitiminin en sık uygulanan önlemler olduğunu ortaya koymaktadır. Korelasyon analizi, Yeşil Anahtar sertifikalı otel sayısı, turist sayıları ve turizm gelirleri arasında güçlü bir pozitif ilişki olduğunu göstermektedir. Bu durum, daha fazla Yeşil Anahtar sertifikasına sahip destinasyonların daha fazla turist çekme ve daha yüksek gelir elde etme eğiliminde olduğunu vurgulayan sürdürülebilir turizm uygulamalarının ekonomik avantajlarını ortaya koymaktadır. Çalışma, programın çevresel etkileri azaltma ve sürdürülebilir turizmi teşvik etme konusundaki etkinliğini vurgulayarak, katılımcı otellerin popülaritesini ve operasyonel verimliliğini artırdığını ortaya koymaktadır. Bu araştırma, çevre koruma için sürdürülebilir turizmin kritik önemini vurgulamakta ve Türkiye'de Yeşil Anahtar programının mevcut durumu ve gelecekteki beklentileri hakkında kapsamlı bir bakış sunmaktadır. Ayrıca, çalışmanın sınırlamaları ve gelecekteki araştırmalar için öneriler de tartışılmaktadır.

## 1. INTRODUCTION

The tourism sector is indispensable to the Turkish economy. Tourism generates income, creates employment opportunities, and supports various industries. According to the Turkish Statistical Institute (TÜİK), the tourism sector accounted for approximately 12% of Turkey's GDP in 2019. This significant contribution underscores the vital role tourism plays in the national economy. Moreover, Turkey experienced a notable surge in 2021. As per the United Nations World Tourism Organization (UNWTO) World Tourism Barometer, the number of international tourists visiting Turkey in 2021 was recorded at 29.9 million, marking an 88% increase compared to the previous year. This remarkable recovery highlights the resilience of the tourism sector in the face of global challenges. International tourism revenue was recorded at 20.8 billion US dollars, a 104% increase from the previous year (UNWTO, 2022). Additionally, it was reported that 46.3 billion US dollars in foreign exchange income was obtained from tourism in 2022 (TÜİK, 2022). Thus, it has been observed that nearly half of the foreign trade deficit is being offset by tourism foreign exchange revenues, indicating the sector's critical importance for economic stability and growth.

The tourism sector holds a significant place in the economy of any country, and sustainable tourism is considered crucial for the future sustainability of this sector by balancing the economic, social, and environmental impacts of tourism (Gündüz, 2022). The Green Key Programme is a global initiative aimed at ensuring environmental sustainability in tourism (Green Key Global, 2023). The Green Key Programme is assisting tourist facilities in reducing their environmental impact and contributing to the sustainability of tourism (TURÇEV, 2022). The significance of the Green Key Programme for Turkish tourism lies in its encouragement of environmentally friendly practices among businesses in the tourism sector, thereby contributing to sustainable tourism development. Businesses participating in the Green Key Programme can save energy by enhancing their environmentally friendly practices. Furthermore, the increased adoption of environmentally friendly practices by businesses participating in the Green Key Programme is likely to attract more tourists to these enterprises (TGA, 2023). The adoption of this programme in Turkey aims to create a tourism sector that is more sensitive to environmental impacts, promoting long-term ecological balance and social responsibility within the industry.

The importance of environmental practices in sustainable tourism has been increasing significantly in contemporary times. This growing emphasis reflects a broader global shift towards more responsible tourism practices, recognizing the need to protect natural and cultural resources for future generations (Gössling & Higham, 2021). Consequently, evaluating Green Key Programme hotels in Turkey is of great significance as it reduces environmental impacts and identifies measures to protect natural resources. The stakeholders involved in this study encompass hotel management, tourists, and all segments of an environmentally conscious society. By measuring the effectiveness of environmental practices being implemented by Green Key Programme hotels, this research aims to identify strategies that facilitate progress in sustainable tourism. Key aspects to be examined include environmental performance, resource utilisation, waste management, and contributions to the local community. These evaluations provide valuable insights into the practical implementation of sustainability initiatives and their broader social and economic benefits.

This study aims to evaluate the sustainable tourism practices of hotels participating in the Green Key Programme in Turkey. The study seeks to determine whether the programme effectively promotes sustainable tourism by examining the environmentally friendly practices of the hotels and their activities in sustainable tourism. Additionally, it has been observed that the hotels participating in the Green Key Programme are adopting environmentally friendly practices, reducing their operating costs, and enhancing their popularity among tourists. This dual benefit of cost reduction and increased attractiveness to eco-conscious travellers underscores the economic viability of sustainable practices within the hospitality industry.

This study is essential for raising awareness about sustainable tourism and improving environmental protection in the tourism sector. Furthermore, it can help tourist facilities in Turkey learn more about environmentally friendly practices and understand the benefits of participating in the Green Key Programme (Hall & Gössling, 2022). By disseminating these findings, the study aims to encourage more widespread adoption of sustainable practices, ultimately contributing to a more resilient and environmentally responsible tourism industry. This study aims to conduct an in-depth analysis of the sustainable tourism practices in Green Key certified hotels in Turkey and examine future trends (Gössling & Higham, 2021; Hall & Gössling, 2022).

The Green Key Programme is an international initiative aimed at promoting environmentally friendly tourism practices (Green Key Global, 2023). Implemented in more than 60 countries, the programme supports environmental sustainability in the tourism sector by encouraging businesses to adopt energy and water-saving practices, waste management, and other environmentally conscious measures (TURÇEV, 2022). Turkey is one of the key destinations where the programme is applied, and as of 2023, 148 hotels in Turkey have received the Green Key certification (TGA, 2023). This programme helps hotels reduce their environmental impact while also serving as an important tool for increasing tourism revenues (UNWTO, 2022).

## **2. LITERATURE**

### **2.1. Sustainable Tourism**

Tourism refers to travel for leisure, recreation, or business purposes (Topaloğlu & Avcı, 2009; Gündüz & Atak, 2023). This includes individuals visiting places outside their usual environment to experience new cultures, landscapes, and activities. Sustainable tourism aims to provide social and economic benefits by mitigating the adverse effects of the tourism industry on natural resources and the environment (Ivars-Baidal et al., 2021). This concept encompasses various applications for ensuring the sustainability of tourism in the future and aims to enhance the sector's sensitivity to environmental, cultural, and social impacts (Gündüz, 2016). Sustainable tourism is addressed by international organisations, academics, the tourism industry, and non-governmental organisations (Demircan, 2016). The concept originates from the Brundtland Report, adopted by the United Nations Commission on Environment and Development in the late 1980s (UNCED, 1987).

The significance of sustainable tourism is explored from various perspectives in books, journals, and articles. For instance, Harris et al. (2012) focus on the principles of sustainable tourism and its integration into the hospitality industry, while Bramwell, Higham, Lane, and Miller (2017) examine the long-term sustainability challenges faced by hotels and the strategies they adopt. Rasoolimanesh et al. (2020) delve into how sustainable tourism practices can enhance hotel operations and improve environmental performance. This body of literature also discusses the environmental, social, and cultural impacts of tourism, as well as the economic benefits and policy planning necessary for implementing sustainable tourism. Additionally, Gümüş Dönmez (2016) provides an in-depth exploration of the concept of sustainability, its definition, and its historical development within the context of sustainable tourism. International reports such as the "Sustainable Tourism and Rural Development" report by the United Nations World Tourism Organization (UNWTO) and the United Nations Environment Programme (UNEP) (2002) highlight the potential of sustainable tourism for fostering rural development.

Sustainable tourism includes applications addressing various issues such as environmental protection, preservation of cultural heritage, support for the local economy, and enhancement of social welfare (Weaver, 2005). These applications are carried out through the cooperation of businesses operating in the tourism industry, local governments, tourists, and tourism workers. The successful implementation of sustainable tourism strategies is closely linked to the cultural sensitivities and management styles of hotel administrations (Karakaya, Ay, & Gürel, 2014). In particular, the alignment of management styles with local culture and environmental responsibility facilitates the more effective achievement of sustainability goals. The literature on sustainable tourism also focuses on different types of tourism. For instance, nature, cultural, and rural tourism offer opportunities to implement a sustainable tourism approach (Eser, Dalgın & Çeken, 2013). This type of tourism can contribute to environmental protection and the preservation of cultural heritage while enhancing the economic well-being of local communities.

This concept also addresses issues such as training and raising awareness among employees in the tourism sector, changing the behaviour of tourists, and measuring the environmental and social impacts of the tourism industry (Dwyer & Edwards, 2010). To successfully implement these practices, all stakeholders in the tourism sector should collaborate and adopt a sustainable tourism approach (Brokaj, 2014). Consequently, sustainable tourism is an approach that considers the future of the tourism industry and the protection of the environment. The importance of this concept in the literature contributes to the adoption of sustainability practices in the tourism industry and encourages all stakeholders in the tourism industry to embrace the sustainable tourism approach.

### **2.2. Green Key Program**

The Green Key program is an international eco-label awarded to tourism establishments that meet a set of strict environmental criteria. It is designed to contribute to the prevention of climate change by awarding and promoting good initiatives in the tourism sector. The program encourages hotels, campsites, and other tourism

facilities to adopt sustainable practices, thus playing a vital role in advancing environmental protection and sustainable tourism globally.

In recent years, there has been a significant increase in studies on the Green Key programme in hotels. For instance, Sheu et al. (2012) explored the empirical application of green hotel ratings, while Mustonen (2016) examined the operational aspects of green hotels. Furthermore, Dukhovnaya (2017) focused on the certification processes, and Mzembe et al. (2021) conducted a case study on the adoption of Green Key Scheme standards in the Netherlands. Most recently, Lehtineva (2023) investigated the certification and protection of a hotel in Finland. These studies highlight a predominant focus on the certification processes within the Green Key programme.

The "Green Key" (GK) project, implemented by the Turkish Environmental Education Foundation (TURÇEV), is a cornerstone program in promoting sustainable tourism. This certification program offers comprehensive training on environmental management and sustainable practices within tourism enterprises (TURÇEV, 2022). Notably, the Green Key program serves as the Turkish representative of the international Green Key initiative, establishing rigorous sustainability and environmental management standards for a variety of tourism facilities including hotels, resorts, restaurants, cafes, campsites, beaches, parks, golf courses, and convention centres.

Participation in the Green Key program requires tourist facilities to adhere to several stringent criteria, such as energy and water conservation, waste management, preservation of natural resources, environmental awareness, eco-friendly cleaning practices, and wildlife conservation. Facilities meeting these high standards are awarded a certificate, signifying their commitment to sustainability, which enhances their appeal to environmentally conscious tourists. TURÇEV is actively working to expand the reach of the Green Key program across Turkey, with many tourist facilities already on board (Kanıgür & Ünlüören, 2022).

Globally recognised in the fields of sustainable tourism and environmental management, the Green Key program aids tourist facilities in reducing their environmental footprint, thereby contributing to the overall sustainability of the tourism industry. The program encourages the adoption of environmentally friendly practices, fostering both economic and social sustainability. By implementing these sustainable practices, resorts can lower operational costs while simultaneously increasing their attractiveness to tourists. Additionally, the program provides education and training to facilities, enhancing their awareness and capabilities in environmental management.

The implementation of the Green Key program extends beyond Turkey, with widespread adoption in numerous countries. As the national representative of the international Green Key program, TURÇEV offers both national and international certification to facilities within Turkey (Erdogan, 2017). This dual certification underscores the importance and global recognition of the program. Consequently, the Green Key program plays a crucial role in advancing sustainable tourism and environmental protection. It supports resorts in adopting sustainable practices, raising ecological awareness, and enabling tourists to enjoy environmentally responsible holidays.

### 3. METHODOLOGY

In this study, the sustainable tourism practices of hotels participating in the Green Key programme in Turkey were evaluated using a mixed-methods approach. This section outlines the research design, data collection methods, and analytical techniques employed to achieve the research objectives. The data for this study were collected between August and November 2023. The 148 hotels analysed represent the entirety of Green Key certified hotels in Turkey, meaning the study is based on a comprehensive evaluation rather than a selected sample.

#### 3.1. Research Design

**Web Content Analysis:** Web-Based Content Analysis was used to gather data on the sustainable practices of Green Key certified hotels. This method involves systematically analysing the content available on the official websites of the hotels, as well as other related sources. The data collected includes information on waste management, energy conservation, sustainable sourcing, and other environmentally friendly practices. Web content analysis is a reliable method for obtaining current and detailed information directly from the hotels' communications.

The web content of 148 Green Key-certified hotels was systematically analyzed using a coding scheme that was developed based on established literature in the field of sustainable tourism practices (Pirani & Arafat, 2014;

Gössling et al., 2011). The coding categories encompassed key areas of sustainability, including energy conservation strategies, waste management practices, water conservation initiatives, and sustainable sourcing policies. NVivo software was selected for this analysis due to its proven effectiveness in coding and managing complex qualitative data, enabling a more rigorous and structured approach to the content analysis.

**Descriptive analysis:** Descriptive analysis was performed to quantify the extent of sustainable practices implemented by the hotels. This involved categorizing and summarizing the data collected from the web content analysis. Descriptive statistics, such as frequencies and percentages, were used to present the findings. This method is effective for providing a comprehensive overview of the sustainable practices in the sample of Green Key certified hotels.

Descriptive statistics were used to analyse the frequency and distribution of sustainable practices among the hotels. This included calculating the percentage of hotels implementing specific practices, such as using LED lighting, energy-saving card systems, and water recycling systems. Descriptive statistics provide a clear and concise summary of the data, highlighting key trends and patterns.

**Secondary Data Analysis:** Secondary data was sourced from existing literature, reports, and databases, including the Turkish Statistical Institute (TUIK), Turkish Environmental Education Foundation (TURÇEV), and the United Nations World Tourism Organization (UNWTO). These sources provided contextual data on the tourism sector in Turkey, the importance of sustainable tourism, and the economic impact of the Green Key programme. Secondary data analysis helps in triangulating the findings from the primary data and enhances the robustness of the research.

**Correlation Analysis:** To understand the relationship between the numbers of Green Key certified hotels, tourist numbers, and tourism revenues, a correlation analysis was conducted. The Pearson correlation coefficient was used to quantify the strength and direction of these relationships. Correlation analysis helps in identifying significant associations between variables and provides insights into the economic benefits of sustainable tourism practices (Dwyer & Edwards, 2010).

### 3.2. Limitations

The study acknowledges certain limitations, such as the reliance on self-reported data from hotel websites, which may not always accurately reflect the actual practices. Additionally, the sample is limited to Green Key certified hotels, and the findings may not be generalizable to the entire hospitality industry in Turkey. Future research could involve on-site visits and interviews to validate the web-based data and provide a more in-depth understanding of the sustainable practices.

The methodology employed in this study combines quantitative and qualitative approaches to provide a comprehensive evaluation of the sustainable tourism practices of Green Key certified hotels in Turkey. By using web content analysis, descriptive statistics, and correlation analysis, the study offers valuable insights into the effectiveness of the Green Key programme and its impact on the Turkish tourism industry. The findings contribute to the literature on sustainable tourism and provide practical implications for hotel management and policymakers.

## 4. FINDINGS

### 4.1. Thematic Analysis

In this study, the sustainability practices of 148 hotels that received the Green Key certification in 2023 were meticulously examined. Initially, 150 keywords were identified by reviewing the TURÇEV Green Key Programme Hotel Criteria. Using these keywords, data obtained from the analysed websites were categorised into specific thematic areas and sub-themes. At the beginning of the study, seven main themes were identified: environmental management, staff engagement, guest information, water management, energy management, waste management, and chemical usage. The sub-criteria of the programme were defined for each theme.

This structured approach allows for a comprehensive assessment of the sustainability practices of hotels. The analysis based on the Green Key Programme criteria provides an important foundation for understanding the environmental performance and sustainability strategies of hotels in Turkey. The environmental policies, staff training initiatives, water and energy management practices, waste management strategies, and chemical usage of each hotel were systematically compiled. The sub-items evaluated under each theme are listed in Table 1.

**Table 1. Green Key Programme: Main Themes and Sub-Items**

<b>Main Themes</b>	<b>Sub-items</b>
<b>Environmental Management</b>	<ol style="list-style-type: none"> <li>1. Appointment of environmental manager</li> <li>2. Formulation of sustainability policy</li> <li>3. Annual action plan and goal setting</li> <li>4. Preparation and storage of documents</li> <li>5. Collaboration with local stakeholders</li> <li>6. Carbon footprint analysis</li> <li>7. Setting carbon reduction targets</li> <li>8. Carbon neutrality and verification</li> <li>9. Providing carbon offsetting options for guests</li> </ol>
<b>Staff Involvement</b>	<ol style="list-style-type: none"> <li>1. Regular meetings and staff briefings</li> <li>2. Staff training</li> <li>3. Towel and sheet usage procedures</li> <li>4. Informing staff about sustainability initiatives</li> </ol>
<b>Guest Information</b>	<ol style="list-style-type: none"> <li>1. Displaying the green key award</li> <li>2. Providing information about the green key</li> <li>3. Evaluating sustainability performance</li> <li>4. Informing about sustainable transportation options</li> </ol>
<b>Water Management</b>	<ol style="list-style-type: none"> <li>1. Monitoring water consumption</li> <li>2. Use of low water consumption equipment</li> <li>3. Prevention of water leaks</li> <li>4. Wastewater treatment</li> <li>5. Rainwater harvesting and usage</li> </ol>
<b>Energy Management</b>	<ol style="list-style-type: none"> <li>1. Monitoring energy consumption</li> <li>2. Use of renewable energy sources</li> <li>3. Energy efficiency measures</li> </ol>
<b>Waste Management</b>	<ol style="list-style-type: none"> <li>1. Waste reduction and recycling</li> <li>2. Management of hazardous wastes</li> </ol>
<b>Chemical Usage</b>	<ol style="list-style-type: none"> <li>1. Use of eco-labeled cleaning products</li> <li>2. Chemical-free swimming pool cleaning</li> </ol>

*Environmental Management* is related to the overall environmental sustainability efforts of hotels. This theme includes nine sub-items: appointment of environmental managers, formulation of sustainability policies, annual action plans and goal setting, preparation and storage of documents, collaboration with local stakeholders, measurement of carbon footprint, setting carbon reduction targets, achieving carbon neutrality and verification, and providing carbon offsetting options for guests. A study indicates that the appointment of environmental managers positively impacts hotel performance, as these individuals play a key role in assessing and improving environmental impacts (Jones & Comfort, 2019). The formulation of sustainability policies establishes hotels' environmental commitments, and the implementation of these policies contributes to improved environmental performance (Mensah, 2014). Additionally, annual action plans and goal setting help hotels achieve specific sustainability targets and enhance the effectiveness of these processes (Kang et al., 2012). The regular preparation and storage of documents ensure transparency and accountability in hotel management processes. Collaboration with local stakeholders supports hotels' environmental sustainability efforts and strengthens community integration (Bohdanowicz et al., 2011). Measuring the carbon footprint helps hotels understand their greenhouse gas emissions and develop reduction strategies (Bohdanowicz, 2006). Setting carbon reduction targets and pursuing carbon neutrality and verification are crucial for achieving long-term environmental goals. Furthermore, offering carbon offset options to guests provides an opportunity to balance the environmental impact of their stay.

*Staff Involvement* is crucial for implementing sustainable practices in hotels and includes four key areas: regular meetings and staff briefings, staff training, towel and sheet usage procedures, and providing information to staff about sustainability initiatives. Regular meetings and staff briefings ensure that employees are informed about

environmental responsibilities and actively participate in sustainability initiatives (Chan & Hawkins, 2010). Staff training equips employees with the knowledge and skills required for eco-friendly practices and helps integrate these practices into daily operations (Tzschentke et al., 2008). Effective training programs are crucial for continuous improvement and can enhance overall operational efficiency, similar to the approach seen in educational institutions where total quality management and productivity are key focuses (Gündüz & Gündüz, 2014). Towel and sheet usage procedures contribute to water conservation efforts and promote efficient resource management throughout the hotel. Informing staff about sustainability initiatives raises environmental awareness and reinforces their responsibilities.

Similarly, *Guest Information* plays an essential role in raising environmental awareness among hotel guests. This theme includes four sub-items: displaying the Green Key Award, providing information about the Green Key, evaluating sustainability performance, and informing guests about sustainable transportation options. Displaying the Green Key Award visually endorses the hotel's environmental management and sustainability efforts (Font et al., 2012; Rezaei et al., 2024). Providing information about the Green Key initiative educates guests about the hotel's environmental policies and encourages support for these initiatives (Han et al., 2011). Evaluating sustainability performance enables hotels to assess the effectiveness of their environmental management processes and identify areas for improvement (Dewhurst & Thomas, 2003). Informing guests about sustainable transportation options encourages them to choose eco-friendly travel alternatives during their stay.

*Water Management* is critical for hotels aiming to reduce their environmental footprint. This theme includes five sub-items: monitoring water consumption, using low-water consumption equipment, preventing water leaks, wastewater treatment, and rainwater harvesting and usage. Monitoring water consumption helps hotels manage water resources efficiently and develop conservation strategies (Deng & Burnett, 2002). The use of low-water consumption equipment enhances water efficiency and contributes to the preservation of natural resources (Styles et al., 2015). Preventing water leaks minimises water wastage and reduces the hotel's environmental impact (Henderson, 2007). Wastewater treatment ensures the safe processing of waste water and contributes to preventing water pollution (Chan & Wong, 2006). Rainwater harvesting and usage allow hotels to utilise natural resources more efficiently and promote water conservation.

Alongside water management, *Energy Management* plays a significant role in reducing hotels' energy consumption and minimising their environmental impact. This theme includes three sub-items: monitoring energy consumption, using renewable energy sources, and implementing energy efficiency measures. Monitoring energy consumption helps hotels track their energy use and identify opportunities for improvement (Bohdanowicz, 2006). The use of renewable energy sources supports sustainable energy practices and reduces reliance on non-renewable resources (Pirani & Arafat, 2014). Energy efficiency measures, including energy-saving technologies and practices, strengthen hotels' sustainability efforts (Hotel Energy Solutions, 2011).

In addition to energy management, *Waste Management* is crucial for hotels striving to minimise waste generation and promote recycling. This theme includes two sub-items: waste reduction and recycling, and the management of hazardous wastes. Waste reduction and recycling initiatives help hotels manage waste effectively and reduce landfill waste (Mensah, 2006). The management of hazardous wastes ensures the safe handling and disposal of potentially harmful materials, minimising environmental risks (Pirani & Arafat, 2014).

Finally, *Chemical Usage* significantly impacts hotels' environmental sustainability. This theme includes two sub-items: the use of eco-labelled cleaning products and chemical-free swimming pool cleaning. The use of eco-labelled cleaning products reduces the environmental footprint associated with cleaning operations, and chemical-free swimming pool cleaning practices provide a safer environment for guests and staff while reducing environmental impact (Mensah, 2006).

## **4.2. Descriptive Analysis**

In recent years, the hospitality industry has increasingly recognised the importance of sustainability and environmental management. This study evaluates the compliance of 148 hotels in Turkey with the Green Key programme criteria. The analysis covers key themes such as Environmental Management, Staff Involvement, Guest Information, Water Management, Energy Management, Waste Management, and Chemical Usage. The frequency and percentage of compliance for each criterion are detailed in Table 1, highlighting areas of strong performance and identifying opportunities for improvement.

**Table 2.** Frequency and Percentage Analysis

Main Themes	Sub-items	Frequency	Percentage (%)
<b>Environmental Management</b>	1. Appointment of environmental manager	100	67.57
	2. Formulation of sustainability policy	95	64.19
	3. Annual action plan and goal setting	110	74.32
	4. Preparation and storage of documents	120	81.08
	5. Collaboration with local stakeholders	80	54.05
	6. Measurement of carbon footprint	105	70.95
	7. Setting carbon reduction targets	90	60.81
	8. Carbon neutrality and verification	65	43.92
	9. Providing carbon offsetting options for guests	70	47.30
<b>Average</b>		<b>93.89</b>	<b>63.13</b>
<b>Staff Involvement</b>	1. Regular meetings and staff briefings	115	77.70
	2. Staff training	110	74.32
	3. Towel and sheet usage procedures	112	75.68
	4. Informing staff about sustainability initiatives	100	67.57
<b>Average</b>		<b>109.25</b>	<b>73.82</b>
<b>Guest Information</b>	1. Displaying the green key award	118	79.73
	2. Providing information about the green key	115	77.70
	3. Evaluating sustainability performance	110	74.32
	4. Informing about sustainable transportation options	90	60.81
<b>Average</b>		<b>108.25</b>	<b>73.14</b>
<b>Water Management</b>	1. Monitoring water consumption	130	87.84
	2. Use of low water consumption equipment	120	81.08
	3. Prevention of water leaks	125	84.46
	4. Wastewater treatment	110	74.32
	5. Rainwater harvesting and usage	95	64.19
<b>Average</b>		<b>116.00</b>	<b>78.78</b>
<b>Energy Management</b>	1. Monitoring energy consumption	132	89.19
	2. Use of renewable energy sources	120	81.08
	3. Energy efficiency measures	125	84.46
<b>Average</b>		<b>125.67</b>	<b>84.91</b>
<b>Waste Management</b>	1. Waste reduction and recycling	130	87.84
	2. Management of hazardous wastes	105	70.95
<b>Average</b>		<b>117.50</b>	<b>79.39</b>
<b>Chemical Usage</b>	1. Use of eco-labelled cleaning products	120	81.08
	2. Chemical-free swimming pool cleaning	85	57.43
<b>Average</b>		<b>102.50</b>	<b>69.26</b>

**Environmental Management:** In this theme, hotels exhibit an average compliance rate of 63.13%. The criterion for "Preparation and storage of documents" boasts the highest compliance rate at 81.08%, indicating a strong emphasis on systematic documentation practices within the industry. Conversely, the "Carbon neutrality and verification" criterion has the lowest compliance rate at 43.92%, highlighting the significant challenges hotels face in achieving carbon neutrality and undergoing verification processes. This suggests a critical need for hotels to intensify their efforts in meeting carbon neutrality objectives.

**Staff Involvement:** This theme demonstrates an average compliance rate of 73.82% among hotels. The "Regular meetings and staff briefings" criterion, with a compliance rate of 77.70%, reflects that hotels are consistently engaging their staff through meetings and briefings. However, the "Informing staff about sustainability initiatives" criterion, at 67.57%, underscores the necessity for enhanced communication and education on sustainability initiatives among hotel staff to foster a more informed and proactive workforce.



**Guest Information:** Hotels show an average compliance rate of 73.14% within this theme. The "Displaying the green key award" criterion leads with a 79.73% compliance rate, suggesting that hotels are proficient in showcasing their Green Key certification to guests. In contrast, the "Informing about sustainable transportation options" criterion, with a 60.81% compliance rate, indicates a gap in providing guests with information on sustainable transportation options. This points to an opportunity for hotels to enhance guest education on eco-friendly travel alternatives.

**Water Management:** This theme features an average compliance rate of 78.78%. The "Monitoring water consumption" criterion achieves the highest compliance rate at 87.84%, reflecting hotels' strong capabilities in tracking water usage. However, the "Rainwater harvesting and usage" criterion, at 64.19%, suggests that the adoption of rainwater harvesting practices is not yet widespread. To improve water conservation, hotels should consider integrating rainwater usage into their water management strategies.

**Energy Management:** Hotels excel in this theme, with an average compliance rate of 84.91%. The "Monitoring energy consumption" criterion stands out with an 89.19% compliance rate, indicating meticulous energy monitoring practices. However, the "Use of renewable energy sources" criterion, at 81.08%, reveals potential for further improvement in adopting renewable energy solutions. Increased investment in energy efficiency and renewable energy practices would benefit hotels both environmentally and economically.

**Waste Management:** In this theme, hotels show an average compliance rate of 79.39%. The "Waste reduction and recycling" criterion leads with an 87.84% compliance rate, illustrating effective waste management practices. Conversely, the "Management of hazardous wastes" criterion, with a 70.95% compliance rate, highlights the need for more rigorous handling of hazardous materials. Ensuring better management and disposal of hazardous wastes is essential to mitigate environmental risks.

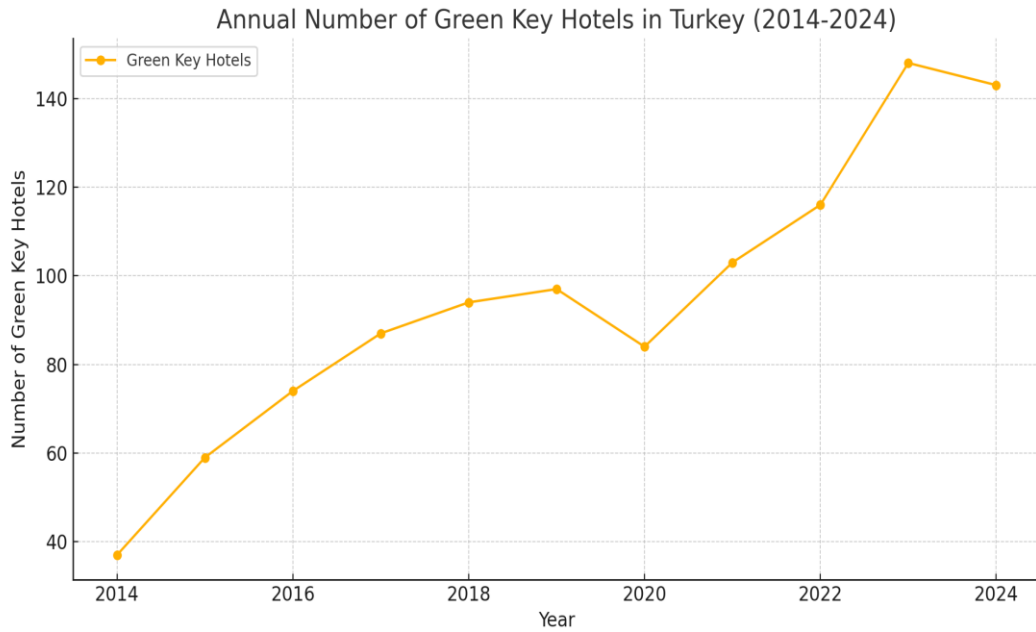
**Chemical Usage:** Hotels exhibit an average compliance rate of 69.26% within this theme. The "Use of eco-labelled cleaning products" criterion has the highest compliance rate at 81.08%, demonstrating the successful adoption of eco-friendly cleaning products. On the other hand, the "Chemical-free swimming pool cleaning" criterion, at 57.43%, underscores the need for greater implementation of chemical-free practices in pool maintenance. Adopting more environmentally friendly solutions is crucial for the health and safety of both guests and staff, as well as for reducing the overall environmental footprint.

### 4.3. Secondary Data Analysis

The Green Key certification is an international eco-label awarded to tourism facilities that adhere to strict criteria related to environmental management and sustainability. This certification aims to promote sustainable tourism practices by encouraging hotels and other tourism-related establishments to implement environmentally friendly practices. In Turkey, the Green Key certification has gained significant importance over the years, with many establishments striving to achieve and maintain this status. The certification not only enhances the environmental performance of the facilities but also provides a competitive advantage in the market by attracting eco-conscious tourists.

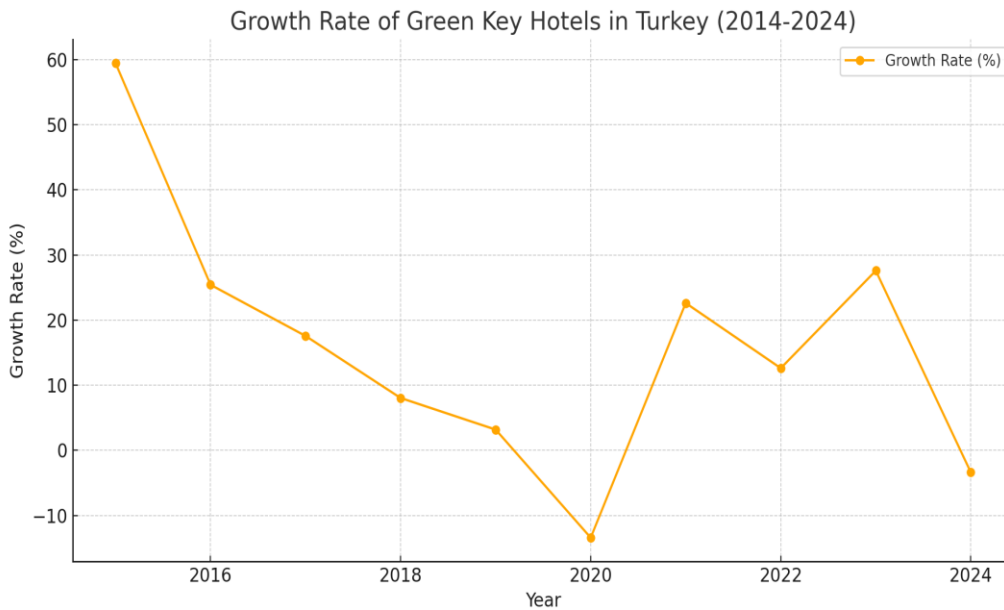
#### 4.3.1. Annual Growth Analysis

The annual growth rates and trends of Green Key certified hotels between 2014 and 2024 have been thoroughly examined. Figure 2 illustrates the yearly number of Green Key hotels and highlights the corresponding growth rates. Significant increases were observed in 2021 and 2023, with hotel numbers rising by 22.6% in 2021 and 27.6% in 2023. These growth trends can be attributed to increasing awareness of sustainable tourism practices and heightened environmental consciousness.



**Figure 2:** Annual Number of Green Key Hotels in Turkey 2014-2024 (Created using Matplotlib)

The graph of annual growth rates shows the rate of change in the number of Green Key certified hotels (Figure 3). While some years, such as 2020, show decreases, there is an overall positive growth trend. The 13.4% decrease in 2020 is attributed to the adverse effects of the Covid-19 pandemic on the tourism sector. However, a rebound of 22.6% growth in 2021 indicates increasing awareness of environmental sustainability among hotels.

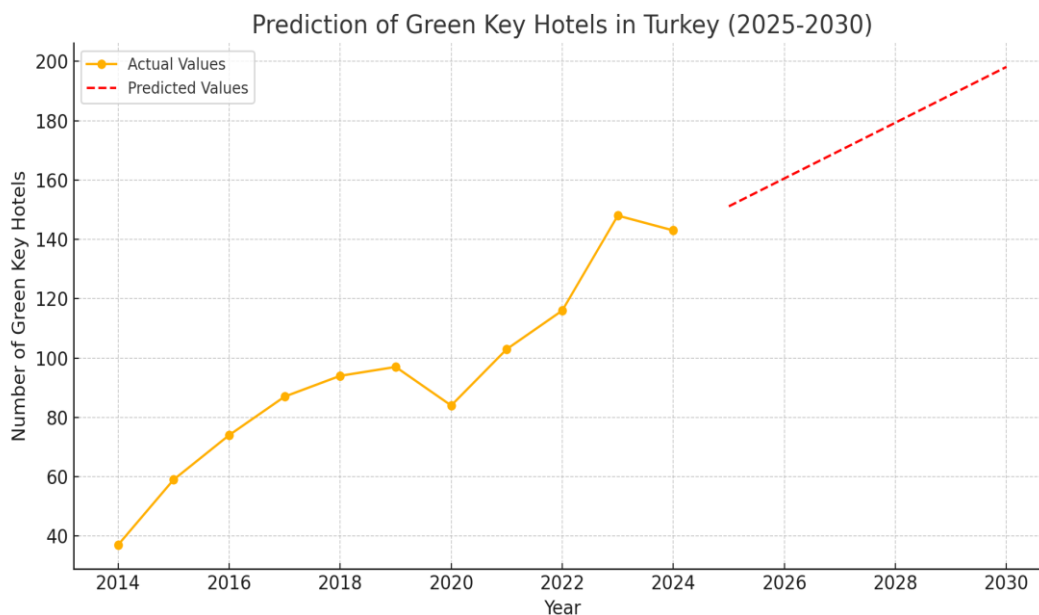


**Figure 3:** Annual Growth Rates of Green Key Hotels in Turkey 2014-2024 (Created using Matplotlib)

#### 4.3.2. Prediction Model

A model has been developed to predict how the number of hotels will change in the coming years. Figure 4 shows the predicted number of hotels for the period 2025-2030. Based on current data, the prediction model forecasts an increase in the number of Green Key certified hotels between 2025 and 2030. This indicates that

sustainable tourism practices will become even more important in the future. The predicted number of hotels for 2030 is 198, representing an approximate 38% increase from 2024. The prediction model and graph were created using Matplotlib in Python.



**Figure 4:** Predicted Number of Green Key Hotels in Turkey 2025-2030 (Created using Matplotlib)

The analysis of Green Key certified hotels in Turkey from 2014 to 2024 demonstrates a robust and growing commitment to environmental sustainability within the hospitality industry. The significant annual increases, especially in recent years, reflect a broader trend towards eco-friendly tourism. Despite setbacks such as the Covid-19 pandemic, the sector has shown resilience and a strong recovery, underscoring the importance of sustainable practices. The forecasts for 2025-2030 indicate that this positive trajectory is set to continue, promising a future where sustainable tourism is not just an option but a standard practice. This ongoing growth in Green Key certifications will likely contribute to Turkey's competitive edge in the global tourism market, attracting a growing segment of eco-conscious travellers.

### 4.3.3. Correlation Analysis

The Green Key certification is an international eco-label awarded to tourism facilities that adhere to strict criteria related to environmental management and sustainability. This certification promotes sustainable tourism practices by encouraging hotels and other tourism-related establishments to implement environmentally friendly practices. This study aims to analyse the correlation between the number of Green Key certified hotels, tourist numbers, and tourism revenues in Turkey for the year 2023.

Table 3 provides an overview of the number of Green Key certified hotels, the number of tourists in 2023, and the tourism revenues for the top ten cities in Turkey.

**Table 3:** Overview of Green Key Certified Hotels, Tourist Numbers, and Tourism Revenues in 2023

City	Green Key Certified Hotel Count	Number of Tourists (2023)	Tourism Revenue (2023-USD) <sup>1</sup>
Antalya	70	13,235,672	12,634,570,000
Muğla	20	4,381,265	4,002,430,000
İstanbul	20	16,029,347	14,501,780,000
Ankara	8	900,238	1,002,950,000
İzmir	5	1,400,789	1,503,420,000
Bursa	3	650,127	702,560,000

<sup>1</sup> Tourism revenues for 2023 are approximately calculated in US Dollars.

<b>Gaziantep</b>	2	300,542	251,370,000
<b>Konya</b>	2	750,218	602,480,000
<b>Mersin</b>	2	500,394	452,600,000
<b>Adana</b>	1	400,153	351,290,000

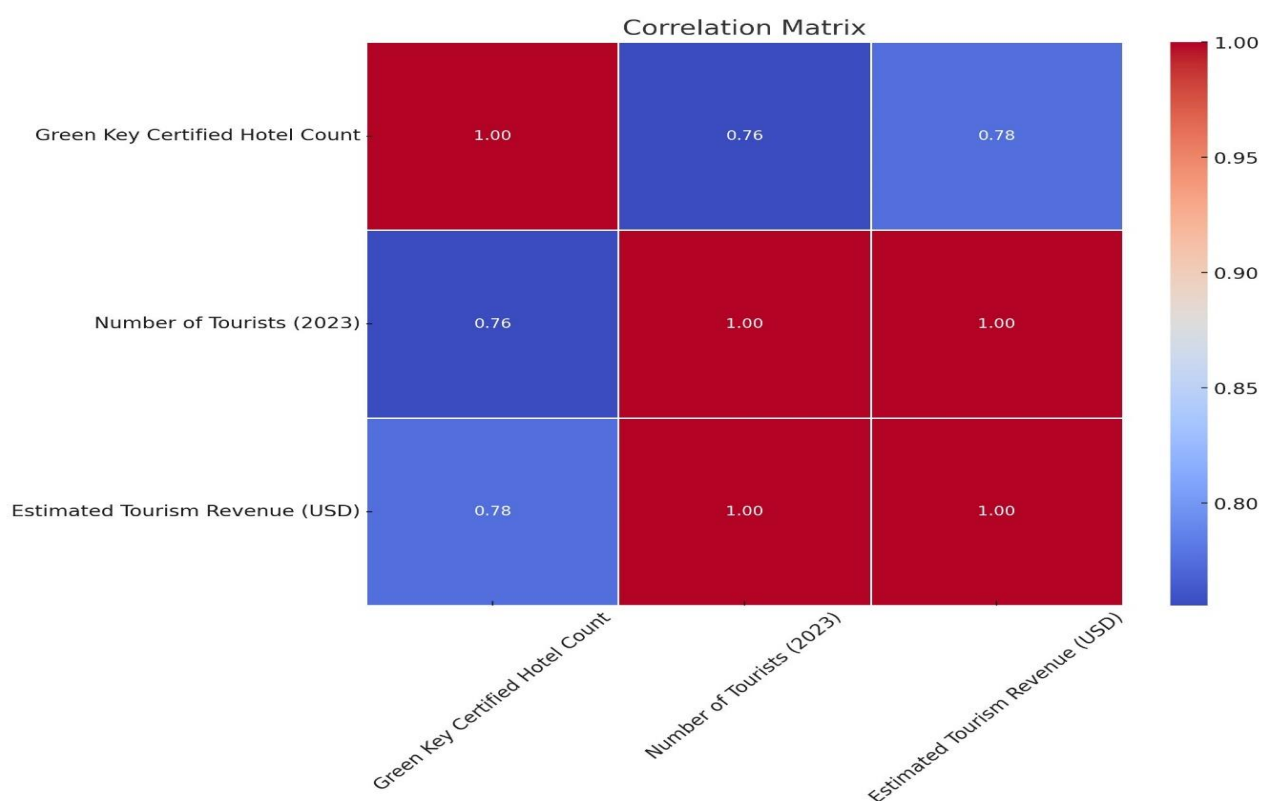
The data illustrates a substantial disparity in the distribution of Green Key certified hotels, tourist influx, and tourism revenue across different Turkish cities. Antalya, Muğla, and Istanbul lead significantly in all three metrics, highlighting their pivotal roles in Turkey's tourism industry (Ministry of Culture and Tourism Turkey, 2023; Turkish Statistical Institute [TÜİK], 2023).

Antalya stands out with the highest number of Green Key certified hotels (70), the second-highest tourist count (13,235,672), and substantial tourism revenue (\$12,634,570,000). This indicates a strong correlation between the number of certified sustainable hotels and both tourist numbers and revenue. Istanbul, with 20 Green Key certified hotels, tops the chart in tourist numbers (16,029,347) and tourism revenue (\$14,501,780,000), reinforcing its status as a major global tourism hub.

Smaller cities like Adana and Mersin, despite having fewer certified hotels, also contribute to the tourism sector, though at significantly lower scales. This variation underscores the potential for targeted growth and sustainable tourism development in less dominant regions.

The correlation matrix below quantifies the relationships between the number of Green Key certified hotels, the number of tourists, and the tourism revenue.

**Figure 5:** Correlation Matrix between Green Key Certified Hotels, Tourist Numbers, and Tourism Revenues



- **Green Key Certified Hotel Count and Number of Tourists (0.755588):** This strong positive correlation indicates that an increase in the number of Green Key certified hotels is associated with a significant rise in tourist numbers. This suggests that sustainable practices and certifications are appealing to tourists, potentially influencing their destination choices.
- **Green Key Certified Hotel Count and Tourism Revenue (0.775471):** Similarly, there is a robust positive correlation between the number of certified hotels and tourism revenue. This relationship

underscores the economic benefits of sustainable tourism practices, as destinations with more Green Key certifications tend to generate higher revenues.

- **Number of Tourists and Tourism Revenue (0.999354):** The near-perfect correlation between tourist numbers and tourism revenue suggests that tourism influx directly translates to revenue generation. This reinforces the importance of attracting more tourists to maximise economic benefits.

The data and correlation analysis highlight the critical role of sustainable tourism practices in enhancing both tourist numbers and economic gains. Cities with higher numbers of Green Key certified hotels not only attract more tourists but also generate greater revenue, demonstrating the value of investing in sustainable tourism infrastructure. This insight can guide policymakers and industry stakeholders in promoting sustainable tourism practices to achieve balanced regional development and economic sustainability in Turkey's tourism sector.

## 5. CONCLUSION

The findings of this study clearly demonstrate the positive impact of the Green Key programme on sustainable tourism practices in Turkey. By examining the environmental practices of 148 Green Key certified hotels, the research highlights significant improvements in energy and water conservation, waste management, and staff training on sustainability. These findings align with the results of similar previous studies.

The widespread adoption of energy and water conservation measures is evident, with high compliance rates in monitoring energy consumption (89.19%) and using low water consumption equipment (81.08%). These results support the work of Styles et al. (2015), who found that water conservation practices significantly contribute to the preservation of natural resources in hotels (Styles et al., 2015). Similarly, Bohdanowicz (2006) showed that energy management practices are effective in reducing the environmental impact of hotels (Bohdanowicz, 2006).

In terms of waste management, the high compliance rates in waste reduction and recycling practices (87.84%) are noteworthy. This finding is consistent with Mensah's (2006) study, which highlighted the importance of effective waste management in reducing environmental risks in hotels (Mensah, 2006). Additionally, there is a need for further efforts in the management of hazardous wastes (70.95%).

Regarding staff training and increasing sustainability awareness, the high compliance rates in regular meetings and staff briefings (77.70%) and staff training (74.32%) are significant. These findings are in line with Chan and Hawkins (2010), who emphasised the crucial role of staff training in integrating sustainable practices into daily operations (Chan & Hawkins, 2010). Tzschentke et al. (2008) similarly highlighted the importance of staff training in raising environmental responsibility awareness.

The correlation analysis of the study reveals a strong positive relationship between the numbers of Green Key certified hotels, tourist numbers, and tourism revenues. The presence of more Green Key certified hotels in destinations like Antalya, Istanbul, and Muğla contributes to attracting more tourists and generating higher tourism revenue. These results align with the findings of Gössling et al. (2011), who highlighted the economic advantages of sustainable tourism practices.

Furthermore, the findings indicate that the Green Key programme enhances the popularity and operational efficiency of hotels. The programme's effectiveness in reducing environmental impacts and promoting sustainable tourism allows hotels to achieve significant gains in both environmental and economic sustainability. These results are also supported by reports from TURÇEV (2022) and TGA (2023).

## Recommendations

### Recommendations for Stakeholders:

1. **Hotel Managers:** Hotel managers should implement sustainable tourism practices more widely to meet the requirements for Green Key certification. Key areas to focus on include enhancing energy and water conservation efforts, improving waste management, and ensuring that staff training on sustainability is ongoing. It's important for managers to recognize that saving energy and water not only lowers operating costs but also makes the hotel more appealing to environmentally conscious tourists.
2. **Tourism Organisations:** Tourism organisations should promote and encourage the widespread adoption of sustainable tourism practices by organising training programmes and supporting hotels in their sustainability efforts.

3. **Policymakers:** Policymakers should prioritize the development and strengthening of sustainable tourism policies while promoting the broader implementation of initiatives such as the Green Key Programme. Such efforts would not only contribute to enhanced environmental sustainability but also foster increased tourism revenues. By incentivizing the widespread adoption of the Green Key Programme, policymakers can simultaneously advance economic growth in the tourism sector and support long-term environmental stewardship.

#### **Recommendations for Future Researchers:**

1. **Data Verification:** Future research should verify web-based data by conducting on-site visits and interviews to ensure the accuracy of reported practices.
2. **Comparative Studies:** Comparative studies of Green Key certified hotels in different countries should be conducted to identify best practices and adapt them for Turkish hotels.
3. **Long-Term Effects:** Research should explore the long-term economic, environmental, and social impacts of sustainable tourism practices.

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