(Online) ISSN 2712-0554
Original Research

Heritage and Sustainable Development
Vol. 8, No. 1, 2026, pp.731-752
https://doi.org/10.37868/hsd.v8i1.2104

Barriers to sustainable tourism development and their environmental impacts: an analytical study in Mosul tourist forests

Dina Ahmed Omar[1*], Mohammed Najeeb Al-Bana[2], Fadwa Ali Hussein Alabd[3], Ghada Abdel Masih Hanna[4]

[1,4] Technical Management Institute, Northern Technical University, Nineveh, Iraq
[2] Administrative Technical College, Northern Technical University, Nineveh, Iraq
[3]Technical Administrative College, Northern Technical University, Nineveh, Iraq

*Corresponding author E-mail: dinaao@ntu.edu.iq

Received Sep. 2, 2025
Revised Dec. 19, 2025
Accepted. May 20, 2026
Online Jun. 9, 2026

Abstract

It would be useful to analyze the impediments to sustainable tourism development and their ecological consequences in the environmentally important Mosul Forest tourist location. To research the relationships among the dimensions of sustainable tourism development barriers (administrative and organizational, environmental and planning, financial and investment, socio-cultural), this paper adopted theoretical models of myths. The aim was to evaluate their environmental impacts in terms of vegetation destruction and air pollution; pressure on natural resources due to artificial activities such as mining or farming that produce and therefore need pollutants; as well as threats against biodiversity from human encroachment into natural habitats, which eventually leads up the food chain as ever more deadly forms. There are many impediments to sustainable tourism development in Mosul Forest, and significant environmental impacts. At a significance level of 0.01 (noiz), significant positive correlations and impact relationships exist between all barrier dimensions and environmental impacts. Conversely, regression analysis revealed that environmental and planning problems had the greatest impact on environmental destruction, followed by administrative and organizational obstacles, then financial and investment roadblocks. At the same time, socio-cultural barriers showed a comparatively lower but still significant effect. It leads to a model of analysis that, for the very first time, sets forth the relationships between barriers to sustainable tourism development and environmental impacts in a forest tourism scenario. Proposal: Integrated environmental tourism planning should be promoted. In this way, sustainable tourism governance can be strengthened by more effectively leveraging flattering material in the design of environmental investments; a Greener Environment Award of sorts might also help promote overseas capital inflows into environmentally sound enterprises.

Keywords: Sustainable tourism development, Tourism development barriers, Environmental impacts, Ecotourism, Mosul forests

1. Introduction

As a result, in recent decades, global tourism has undergone a strategic shift toward embodying sustainable tourism principles [1]. Brownnosing development thinking aims to balance its natural tourism resources with rational exploitation to maximize economic benefit, while ensuring environmental conservation and long-term, combined growth. Expressing this shift is a willingness to recognize that limitless growth in the name of tourism

can cause natural resource depletion and environmental damage, endangering conservation efforts as much as it does the potential future development of destinations themselves [2], [3]. Sustainable tourism development here refers to a form of development that considers the present and future economic, social, and environmental effects of tourism, with Governments actively working to satisfy the needs of visitors, the tourism industry, and host societies while protecting the environment [1], [4].

In the context of the current global transition, ecotourism has become an important means of advancing sustainable tourism. It primarily relies on sensitive natural resources, including forests, protected areas, and complex ecological systems. Forests that attract tourists, working notably with tourist organizations, are especially appealing destinations; by supporting biodiversity-rich, beautiful landscapes and offering environmentally friendly ecosystem management, they are a major part of sustainable tourism programs presently being developed there [5], [6]. However, such environments, sensitive ecologically as they are, are also susceptible to environmental degradation in the absence of consistent, cross-cutting policies governing tourism. Excessive tourist pressure, combined with poor regulation, inevitably leads to the deterioration of vegetation, increased pollution, overexploitation of natural resources, and a species extinction crisis, as indicated by numerous studies on the relationship between tourism and biodiversity in natural environments at this stage [7], [8].

With worldwide agreement on issues such as adopting sustainable tourism strategies, many natural tourism regions, especially those in developing countries, still face obstacles that prevent them from effectively achieving sustainable tourism development. These include administrative and organizational barriers stemming from weak long-term tourism policies and poor institutional coordination, as well as environmental and planning barriers arising from insufficient attention to integrating environmental considerations into tourism planning. Also, financial and investment constraints hinder the continued construction of environmentally friendly tourism infrastructure, while socio-cultural obstacles stem from limited environmental awareness among visitors and host communities [9], [10]. These combine to reduce the ability of natural tourist sites to pursue a dual goal: achieving sustainable breeding and not just living off tourism revenues while at the same time damaging the environment and reducing the appeal of destinations [11], [12].

At the regional level, Iraq has natural tourism resources, notably forests and green areas, which could offer new environmental and tourism features. If, based on sustainable principles, their potential was realized through an environmental perspective needed to really make it, and video so supported in law to boot, this might permit economic and tourist diversification that promotes local sustainability. One of these natural tourist forests is the Mosul Liangshan. It is rich in ecological and scenic resources and unique in its diverse vegetation, location, and potential for sustainable tourism development. However, the tangible fact is that there are many difficulties facing these forests: weak sustainable tourism planning coupled with a back-to-nature type of long-term strategies for tourism, anything but environment-friendly golf course facilities are lacking entirely, and little money has been invested in construction directed towards paths such as those that would impact the environment [10], [13].

In light of this situation, it is necessary to conduct a comprehensive study with meticulous analysis into why the Mosul tourist forests will not be able to develop sustainably. By establishing a cause-and-effect model that explains the connections between barrier factors and the degree of environmental degradation in a forest-based tourism environment, this essay also examines the direct or indirect damage these factors cause to the environment more generally.

The significance of the expected contribution of this study lies in providing a conceptual framework that connects planning policy determinants in Iraqi tourist forests to actual environmental consequences, filling an essential gap in the literature on the preservation of natural resources. Furthermore, this paper attempts to provide support for policymakers in the tourism and environmental conservation sectors, as well as members of the general public, by creating a grounding point among current scientific studies on sustainable tourism in hypothetical Iraqi nature reserves. While global interest in studies of sustainable tourism development in

sensitive natural environments has been growing, most scientific literature is devoted either to models applied to large countries or to well-known ecotourism destinations in every nation. Applied research on forest environments in developing countries or on ecologically complex regions within the Iraqi context remains relatively sparse.

One literature review revealed that most research had concentrated mainly on tourism sustainability indicators and general environmental impacts, without revealing an integrated perspective across indices. It is academically neglected to examine the barriers that hinder sustainable tourism development. How would these different situations affect a typical tourist site and lead to stress? [5], [14]. Moreover, studies in ecotourism concerning this region so far have typically focused primarily on places with a desert or coastal orientation, and relatively little attention has been paid to forest sites, as whole ecological systems that require tourism models suited to their specific environmental sensitivities [6], [9].

From this perspective, the study of the Mosul tourist forests has its own particular scientific value. On the one hand, their environmental conditions and ecological qualities make them an important ecotourism destination in Iraq. However, they are currently confronted with administrative, organizational, environmental protection, and financing barriers that limit their capacity to be used sustainably as tourism destinations. On the other hand, this can be seen as a rise in negative environmental impacts. Despite the importance of these natural tourist destinations, the academic literature today lacks a systematic, meticulous study of why tourism there will not develop sustainably. This is where a research gap lies.

The reason why this is so is the lack of an applied cause-and-effect model. It means we miss out on the chance to discover which spatial patterns are traceable across barriers to sustainable tourism development within Iraq's tourist forests and their environmental impacts. What causes might this be due to? The present research project aims to shed light on these questions through an in-depth applied analysis in the Mosul tourist forestlands, thereby contributing to the international literature on sustainable ecotourism in developing countries' natural environments and providing knowledge support for sustainable environmental tourism planning.

2. Problem statement

Since sustainable tourism development is becoming increasingly important in governing natural tourist destinations, the Administration of these forest-oriented environments in developing countries — because of various administrative, organizational, environmental, and financial obstacles—will invariably yield a concrete picture of little sustainability. These barriers affect the integrity of the ecosystem and the maintenance of natural resources. Due to the absence of sustainable planning and weak environmental protection measures, tourist forests are among the most easily polluted environments. This leads to vegetation degradation, increased pollution levels, and over-exploitation of natural resources, all of which threaten ecosystem integrity and biodiversity. Such consequences will therefore gradually bring down not only the Mosul tourist forests 'attractiveness but also threaten their long-term sustainability itself.

In the context of Iraq, the Mosul tourist forests have a fair proportion of environmental value and tourism potential. However, their use for tourism still suffers from several weaknesses in development planning, environmental management, and programmatic strategies, which are evident when considered alongside the specific ecological attributes of their oak forest environments. This circumstance has led to several conspicuous environmental harms: many areas with vegetation suffer one calamity after another, including overharvesting and soil disturbance from human-made threats. In contrast, other areas lose the protection they originally afforded to humans and wildlife alike. These problems call for an examination of the types and scale of barriers to achieving sustainable tourism development in these forests, as well as the actual environmental impacts caused by these barriers.

Accordingly, through the following main question, the research problem can be formulated:

What are the barriers to sustainable tourism development in the Mosul tourist forests, and what are the environmental impacts?

This main question leads to several sub-questions:

- What is the availability of requirements for sustainable tourism development in the Mosul tourist forests?
- What are the major administrative, organizational, environmental, financial, and socio-cultural barriers that are limiting sustainable tourism development?
- What are the environmental impacts resulting from these barriers in the tourist forests?
- What is the nature of the relation between sustainable tourism development barriers and the environmental impacts of the Mosul forests?
- To what extent do the environment-itself concerns raised by those obstacles contribute to environmental degradation in forest-based tourism sites?

3. Research objectives

The purpose of this study is to conduct a systematic scientific analysis of barriers to sustainable tourism as shown in the Mosul tourist forests and to examine their environmental implications. Using an explanatory framework in which all these aspects are fitted together, deposition variables for sustainable forest-based tourism management were presented vis-à-vis environmental outcomes.

It is posited that, due to the lack of implementation of sustainable tourism principles and the presence of multidimensional barriers, resurgent environmental degradation is inevitable at natural tourism sites. Consequently, these barriers need to be analyzed to uncover their levels and actual roles. With this as the justification, the thesis sets out to achieve a group of integrated main and sub-objectives that together provide a comprehensive assessment of the state of sustainable tourism development in Mosul forests: 1. Determine the barriers to sustainable tourism development in the Mosul tourist forests. 2. Measure the degree of environmental impacts caused by the weak application of sustainable tourism principles in forest-based tourism sites. 3. Analyze the concentration relationship between barriers to sustainable tourism development and environmental effects in the Mosul tourist forests. 4. Test whether barriers to sustainable tourism development have a significant impact on environmental degradation in forest tourism sites. 5. Develop an explanatory model that shows how the symptoms of sustainable tourism barriers affect the natural environment, guiding decision-makers as they formulate policies for sustainable environmental tourism. 6. Offer a tool for tourism planning that turns toward using forest resources to attract tourists on the one hand, while taking into account various environmental advantages as well.

4. Significance of major research

The significance of this study lies in its focus on a contemporary issue at the intersection of tourism, its management, sustainable development, and environmental management—specifically within environmentally sensitive natural areas like tourist forests — requiring altogether new models for both long-term planning and management that proceed from sustainability principles. Consequently, tourists could flood out of the forest without clear ideas about how their travel activities might be sustained in an ecologically sound way, leading not only to an exacerbation of its resource shortages but also to damage to natural landscapes. This highlights the need for analytical scientific studies to understand better the various factors that impede the establishment of sustainable tourism. In addition, it seeks ways to offset environmental side effects from such endeavors.

The scientific significance of the study lies in its analytical model linking barriers to sustainable tourism development with environmental effects within the context of a forest-based tourism environment in a developing country; all too few such cases appear elsewhere. Finally, this research also expands the theoretical framework on management regimes for natural tourist destinations from an environmental sustainability perspective by examining the dimensions of Sustainable Tourism barriers and their influence on forest ecosystems, both directly and indirectly through various channels. Although kind researchers have pointed out

problems with ecotourism development in weak journals lacking them--such as Rural Tourism "and China Tourism" in particular there is a radical scarcity of specialized journals which could carry out this task.

From a practical aspect, the study provides scientific indicators that can serve as decision-making tools for tourism and environmental departments when designing policies and strategies for forest tourist resorts. This helps to realize sustainable tourism planning mechanisms suitable for the local ecological environment. In addition, the study provides an analytical database to guide tourism investments towards environmentally sound projects and to raise community awareness and consensus on the need to protect natural tourism. Once again, this approach may help strike a balance between tourism-led economic development and environmental sustainability in the Mosul tourist forests.

5. Literature review

The literature review forms the basis for the study's conceptual model, which is built around and examines the main variables. Among other things, it sheds light on the intellectual background of sustainable tourism development, its obstacles, and their environmental effects, while reviewing prior research on these variables. This is a necessary review to understand current theoretical trends in ecological tourism destination management and to situate the present study within the broader body of knowledge on sustainability ecotourism research.

The theoretical framework is then split into three main axes. The first axis addresses sustainable tourism development and is divided into dimensions. The second axis addresses the barriers to sustainable development of natural environment-based tourism products. Finally, the third axis examines environmental impacts resulting from inappropriate tourist activities in forests and other natural areas. It then critically examines earlier studies from an analytical perspective, evaluates the original paper's main conclusions, and explains what they do and do not imply in comparison with international research. The critical analytical approach not only emphasizes major findings from relevant international studies but also highlights similarities and differences in relation to this study. To bolster the theoretical foundation of our proposed concept model, a thesis synopsis is finally given.

5.1. Sustainable tourism development: concept and dimensions

The concepts of sustainable development, sustainable tourism, and ecotourism are relatively recent and, particularly since the early 1990s, have been the subject of controversial debate. There is no generally accepted understanding of their precise meaning, and a definitional approach appears problematic. The aim of this Research Note is therefore to provide a brief overview of their background, different interpretations, values, and principles, as well as the linkages between them. This should lead to an understanding that implementation of these concepts is not just an academic and technical discourse but, more so, a socio-political question.

Given the critical need to align the use of natural resources for tourism to maximize returns while protecting the environment and maintaining the sustainability of destinations over time, sustainable tourism has gained wide recognition and acceptance. It is actually a design platform that takes into account not only the needs of tourists but also those at home, as well as environmental and infrastructure considerations for development, so that future generations will still have resources left [1], [4]. This view advocates a global approach to revising state tourism policies. It integrates environmental, economic, and social elements in regional tourism practice, presenting them as a single doctrine of sustainable development for destinations [11], [15].

The rise of a conservation and community vision and dissatisfaction with developmental economics converged at the United Nations Conference on the Human Environment at Stockholm in 1972. However, early conceptualizations of sustainable development appeared in the literature, albeit with a strong environmental and economic focus. In 1972, the Club of Rome released a report entitled The Limits to Growth, which challenged the traditional assumption that the natural environment provided an unlimited resource base for population and economic growth and could cope with the increasing amounts of waste and pollution caused by industrial society.

Similarly, in 1973, Ecological Principles for Economic Development linked the environment to economic development, and the World Conservation Strategy, endorsed by various countries, further developed Dasmann et al.'s ideas on this link. This document was followed up by Caring for the Earth in 1991 (International Union for the Conservation of Nature (IUCN), United Nations Environment Program [2], [8]. From a theory based on the requisite dimensions of sustainable tourism development and their role in addressing exploitative conduct in nature-based places of living, we may extract four main aspects. The first, in environmental terms, means maintaining natural ecosystems, conserving biodiversity, and reducing pollution and resource consumption, thereby making sensitive areas unattractive to tourism [3], [5]. This point of view shows that the continued existence of natural capital is the keystone for implementing sustainable tourism. If the environment is damaged in any way, the future competitive power of tourism destinations will decline further [8].

The second dimension is economic. It hopes to get tourism activities based on the free use of natural resources, and how can you achieve sustainable returns from this? This can be done through initiatives such as investment projects that tighten resource budgets while reducing waste discharged into the environment. In this way, both economic development and environmental protection [12], [16]. This dimension is also connected to destinations' ability to provide regular income for local communities, thereby generating labor opportunities without damaging ecosystems [17]. The third dimension is socio-cultural. It seeks to bring local society into tourism development processes, resulting in added environmental knowledge. In this way, tourism resources will remain reasonably pure over time (for environmental sustainability), and there will be social approval for sustainable tourism projects as well [9], [10]. This dimension reinforces the view that without strong community participation, sustainable tourism is not possible. For one thing, the community is vital in protecting natural resources [13]. Recent writings indicate that achieving sustainable tourism development in natural areas, especially woodland tourist spots, requires employing unified tourism environmental plans tailored to each location's carrying capacity and geared towards reducing the load on natural resources while maintaining ecological balance. [6], [7], caution that not only do sustainable management methods for natural tourist spots go beyond environmental laws to feature continual environmental monitoring mechanisms, but this must be undergirded with initiatives such as responsible tourist practices and encouraging visitor behavior that has minimal impact on the environment and looks to long-term sustainability of the ecosystem [2], [14].

As a result, sustainable tourism means comprehensive measures to manage resources across environmental, economic, and social dimensions, all of which help maintain current levels of tourism attraction while retaining natural resources. Such theoretical dimensions provide the necessary scientific basis for our audit of the prospects for sustainable tourism development in warrior tourist areas, to diagnose the obstacles it faces, and, within an analytic model that examines tourism sustainability needs and environmental integrity implications, to assess the resulting environmental consequences.

5.2. Barriers to sustainable tourism development in natural environments

Sustainable tourism development is a major issue in the literature on the management of tourist destinations that are also natural sites. One thing that is stressing the system is the presence of barriers to such development. This situation has grown over time and makes it difficult for ecosystems in potential tourist areas. Scholars today write that, in particular, in natural locales.

In remote forests and nature reserves, numerous interconnected barriers span almost every aspect of administrative, organizational, economic, environmental, and socio-cultural governance in natural tourism areas, which compete for limited human visitors. They thus combine to inflict a triple dilemma on the management of resources: development makes things worse rather than better, and we are unable to manage, in any comprehensive sense, all that is involved with our natural environment. Administrative and organizational barriers include weak long-term tourism policies; a lack of institutional coordination among the agencies responsible for managing both tourist facilities and natural resources, due to private ownership in most cases; and, finally, limited enforcement of environmental regulations embedded in site-specific management schemes. The literature on the governance of sustainable tourism points out that this absence renders efficient

administrative decision-making ineffective and sustainable planning more difficult. However, it also increases the risks associated with natural resource exploitation [8], [12]. It also means that a lack of expertise in eco-tourism management limits the capacity of those engaged in tourism establishments to adopt a management regime grounded in scientific principles [10], [11].

Planning and environmental barriers arise from the lack of integrated environmental land-use planning that determines the ecological carrying capacity of natural tourism sites and controls tourism based on its impact on ecosystems. Academicians in this field consider that environmental factors have not been fully incorporated into the planning of tourist movements. They also point out that in forest environments, higher human pressure on vegetation cover stems from unmet integration needs and, worse still, uncontrolled tourism growth in these areas further diminishes overall environmental quality [5], [7]. Nor are environmental predictions made in the early stages of a tourism project at destinations without long-term balances resulting from success or failure to assess adverse environmental effects for tourism projects--thus those taken decisions rather unthinkingly lead towards environmental disorder and imbalance in natural tourism destinations [6].

Financial and investment barriers refer to the limited funding allocated for the development of environmentally friendly tourism infrastructure. This is regarded as one of the greatest obstacles to achieving sustainable tourism development in natural areas [9]. The lack of sustainable investments leads to insufficient environmental facilities, such as proper solid waste management plants, renewable energy installations, and well-maintained roads with natural qualities, and to negative environmental impacts from tourism-related activities [2], [17].In addition, investors' reluctance to finance long-term, tourism-oriented projects that require upfront costs for environmental orientation is another barrier. This is particularly true in countries where resources allocated to the tourism industry are limited [16].

Socio-cultural barriers manifest in a lack of environmental awareness among tourists and local people regarding the importance of preserving natural tourism resources, as well as in poor tourist behavior that reflects a throwaway mentality towards both discipline and beauty. The literature suggests that the absence of environmental education programs and low participation by local settlements in managing to maintain tourist resources downgrades natural tourism practices from sustainable ones, adhering to etiological pressures within these sites on the natural environment to degrade, and poses a greater risk in managing sensitive ecosystems, exposing them to northern enemies [9], [13]. Therefore, the barriers to sustainable tourism development in natural environments are a multifaceted system of challenges that have direct and indirect impacts on the efficiency and sustainability of the management environment of the tourist forest. Diagnosing these barriers and studying them in their many aspects is key to our understanding of the challenges faced by forest tourist development sites in promoting sustainability-based environmental tourism policymaking, an essential note for those working to combine tourism and natural resource protection policy planning in these locations.

5.3. Environmental impacts of unsustainable tourism in tourist forests

With the rapidly growing but unregulated tourism development in natural habitats, people are beginning to pay more and attention than ever before directly or indirectly persuade nature to accept its own obliteration one study shows that unsustainable development of tourist resources can induce a train environmental impacts, thereby affecting the ability of scenic spots to continue functioning ecologically and in tourism terms over long periods of time [5]. The visitor forestry, where otherwise sensitive natural components such as soil, cover, and biodiversity can come into direct contact with development activities, exhibits many of these impacts particularly clearly.

Firstly, one of the major environmental impacts is that, due to human pressure alone, plant degradation occurs: from dirt trails worn out by overuse and the like (for example, visitor numbers may increase without reference to ecological carrying capacity) to thoughtless brushing over successive stages, right up to the point where colonization has ceased. As a result of continuous human pressure, ground vegetation is damaged, soil erosion occurs, the ecosystem's capacity for natural regeneration declines, and the ecological balance in tourist-oriented

forests is adversely affected [7]. Moreover, towns expand into the forest with hardly any consideration, emitting noxious air pollution and leaving little space for planting.

Secondly, environmental pollution in tourist forests, whether from the solid waste generated by tourism or the visual and aural neglect of that land caused by masses of tourists inundating a site with few controls in place, has been exacerbated. The literature shows that when no mechanism exists to manage waste from a tourist destination effectively, waste spills into soil and surface water, threatening the health of organisms in forest ecosystems and reducing the site's natural attractiveness [2].

A third major consequence of unsustainable tourism is the pressure it places on natural resources. Whether through the high consumption of water, energy, and environmental resources by various tourist activities, or through environmental resource depletion, long-term ecological conditions become inefficient. Studies find that overconsumption of environmental resources in natural tourism areas directly alters the ecological balance, leading to the destruction of forest ecosystems [5].

The fourth negative impact of unsustainable tourism is habitat change for the Organisms living in forest tourist regions. Unregulated tourist activities and people's noise uproot wildlife, causing their behavior patterns to at least temporarily alter or make them leave their natural homes altogether, which leads to problems further down the food chain. It emphasizes that in the environmental literature, species extinction is one of the most serious and long-term consequences of unsustainable tourism, as it reduces ecosystem resilience and the capacity to cope with future environmental changes [7].

In this way, the environmental impacts of unsustainable tourism in tourist forests may be encapsulated in four basic dimensions: vegetation degradation, environmental pollution, damage to natural resources, and biodiversity loss. These axes form the basic basis for measuring environmental degradation in scenic-spot tourism destinations [5]. They are also our dependent variables as we examine how severely its natural environment has been affected by obstacles to tourism on the path to real sustainability.

5.4. Previous studies and critical analysis

To build on the foundation laid by previous studies, we have sought to present the ideas of additional scientists and their research results in an uninterrupted or nearly uninterrupted manner. These show how the study of SD has developed over time since it became an issue people began to look at in 1996. Previous studies are the foundation of any scientific research and should explain research trends in sustainable development, the barriers to it, and its environmental impact on natural environments. In this way also the current study can be situated as a whole within other Johnson of literature Premature exposure to high levels of information on sustainable tourism can be harmful However, methods of research vary according to the subjects and areas studied -- thus a critical review is necessary to indicate strengths but also limitations of earlier studies, and to justify the present research [12], [14].

At the international level, there is extensive literature on sustainable tourism from both managerial and environmental perspectives. Buckley (2012) examined how the study of sustainable tourism has developed in natural destinations and has come to mean concrete practices. Results showed that financial and administrative issues, along with a weak environmental commitment, are the biggest obstacles to tourism sustainability. In this context, the study also indicated that unsustainable tourism leads to habitat destruction and biodiversity loss, thereby supporting tourism planning policies that prioritize the conservation of natural resources and strengthen environmental management in tourist destinations [5]. Similarly, Hall (2010) looked at the relationship between tourism and biodiversity. The study concluded that the tourism phenomenon poses no small threat to biological diversity. Uncontrolled tourism in virgin natural environments, including forests especially, destroys animal habitats and leads to population reduction for some species at least Threatening the ecological balance of natural tourism destinations The study goes on to point out that in such sensitive tourist areas, the absence of effective environmental controls and a lack of sustainable tourist planning will certainly leave them wide open to environmental destruction [7]. These observations are in line with reports from independent investigations by

other scholars that emphasize that only sound environmental management can offer lasting benefits for eco-tourist destinations [3], [8].

Bramwell and Lane (2011) focus on sustainable tourism governance, demonstrating that weak institutional coordination and the management of natural tourism destinations by various government departments pose a major obstacle to achieving sustainable tourism development [12]. This viewpoint emphasizes that the integrated management of natural tourist resources requires distinct policies and effective institutional collaboration to maintain a balance between tourism exploitation and environmental conservation. Studies that underline the importance of tourism governance in driving tourism development have also recently been interpreted to refer to protection and conservation in tourist destinations [4], [18].

When it comes to applied research in protected natural areas, Eagles et al. (2002) proposed a comprehensive framework for managing tourism in protected areas, showing that local people's participation and environmental education programs are highly significant in mitigating the negative environmental impacts of tourism and enhancing the sustainability of nature reserves. Their conclusions agree with other contemporary ecotourism studies. Local communities are a vital link in the sustainable management of natural resources [6], [13].

On the other hand, research addressing obstacles to sustainable tourism development in forests in developing countries remains relatively limited. Most studies focused on evaluating sustainability indicators or exploring the general environmental impacts of tourism. Still, they did not conduct an in-depth study of the connection between barriers to sustainable tourism development and environmental impacts at specific natural sites. The literature suggests that most applied models in sustainable tourism have been implemented in developed countries or globally recognized ecotourism destinations. In contrast, natural areas in developing countries still lack in-depth applied research on the connections among administrative system integration, planning challenges, and actual environmental consequences [10], [15].

Drawing on a critical analysis of past research, some conclusions can be tentatively drawn. International research has primarily focused on theories and practices of sustainable tourism in natural environments, where eco-tourists must come, with a low human population and dense vegetation cover. Still, once such an environment is formed, both environmental management and sustainable planning are necessary to mitigate those impacts. However, those studies have not directly addressed the barriers to sustainable tourism development in tourist forests in developing countries. They have not taken stable or presentations within such environments with limited institutional and financial resources. Furthermore, most accessible applied research has focused on protected areas or globally renowned ecotourism destinations. Little attention has been paid to tourist forests as highly complex ecological tourism systems that require a specific mode of operation and must conform to their environmental sensitivity [6], [17].

Thus, in this paper, an applied analytical model is developed to systematically identify the multi-barrier impediments to sustainable tourism development, with the root cause identified as environmental impacts in a concrete forest tourism environment, represented by Mosul city’s tourist forests. This method can help fill a clear gap in research since there is a scarcity of applied studies on sustainable tourism in Iraq’s tourist forests. In contrast, it also provides an academic basis for implementing sustainable ecological tourism planning policies in the natural environments of developing countries, thereby enhancing the harmonization between managing sustainable tourism and preserving environmental resources at such sites.

6. Conceptual model and hypotheses

First, the conceptual model depicts the analytical framework on which this study is based, explaining the causes and revealing the nature and extent of environmental impact resulting from barriers to sustainable tourism development in tourist forests. It is elaborated in the following section. The results come from that model. This chapter presents the work's findings (see above), summarizes its main conclusions, and offers some suggestions for further research directions based on an analysis of these conclusions made in light of wider recent developments in East-West relations or any new insights gained during an ongoing project to promote

sustainable international tourism among Chinese and foreign travelers, tentatively titled "experience pure China." The construction of this model is based on the theoretical writings and preceding research literature. These studies have shown that failure to implement sustainable tourism principles effectively and the presence of multifaceted barriers both lead to increased environmental pressures on natural tourism destinations, especially in ecologically sensitive forest environments [5], [7].

As a multidimensional independent variable, the study's conceptual model identifies barriers to sustainable tourism development across four dimensions—administrative and organizational, environmental and urban planning, finance and investment, and social culture. The dependent variable is environmental impact, which reflects the level of deterioration in tourist forests through dimensions such as destroyed vegetation, pollution, pressure on natural resources, and loss of biodiversity. This model reflects a theoretical presupposition that declining barrier difficulty associated with the development of sustainable tourism will have significant environmental impacts on forest tourism sites in particular, thereby posing a threat to the sustainability of natural resources and environmental quality for tourism.

Based on the above theoretical basis, the model hypothesizes direct correlations between various dimensions of barriers to sustainable tourism development and environmental impacts in Mosul tourist forests. This then allows testing the strength of these relationships and identifying which dimensions are most important in driving environmental deterioration. The model responds by addressing the inadequacies identified in earlier studies — namely, the lack of a direct analytical link between barriers to sustainable tourism development and environmental outcomes in forest tourism environments, especially in developing-country contexts — thus providing theoretical and practical input to this area. The model of study is shown in Figure 1.

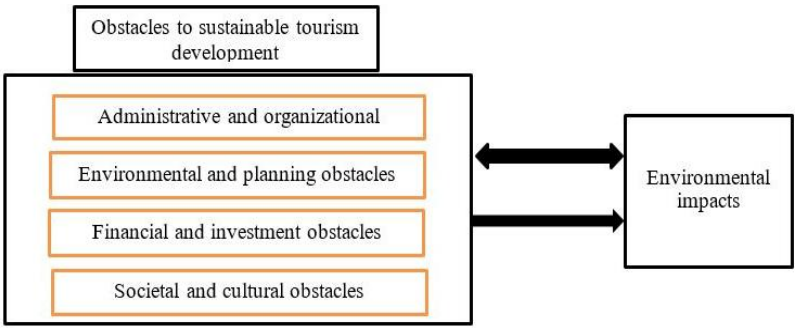

Figure 1. Model of study

6.1. Research hypotheses

Based on the theoretical framework and previous studies, the research hypotheses are formulated as follows:

First: correlation hypothesis

There is a statistically significant correlation between barriers to sustainable tourism development, both collectively and across their dimensions, and environmental impacts in the Mosul tourist forests.

Sub-hypotheses:

1. There is a significant correlation between administrative and organizational barriers and environmental impacts.
2. There is a significant correlation between environmental and planning barriers and environmental impacts.
3. There is a significant correlation between financial and investment barriers and environmental impacts.
4. There is a significant correlation between socio-cultural barriers and environmental impacts.

Second: impact hypothesis

Barriers to sustainable tourism development have a statistically significant effect on environmental impacts in the Mosul tourist forests.

Sub-hypotheses:

1. Administrative and organizational barriers have a significant effect on environmental impacts.
2. Environmental and planning barriers have a significant effect on environmental impacts.
3. Financial and investment barriers have a significant effect on environmental impacts.
4. Socio-cultural barriers have a significant effect on environmental impacts.

Accordingly, the conceptual model and hypotheses provide an analytical framework for testing the causal relationships among the research variables using appropriate statistical techniques, thereby contributing to the interpretation of environmental degradation in tourist forests in light of barriers to sustainable tourism development.

7. Research methodology

All this indicates the extent of the research task represented by his proposal and article. It also conveys a broad message: there are no real differences in how tourism experiences develop sustainably across regions. Design of his research, including its result methodologies, which are underlined procedures successfully set forth, if sustainably developed, and its impacts on the environment for Mosul tourist forests. Narrowing down the research focus. Methodologically, we research the relationship between cents of tourism along the way. The second section not only introduces the research design and study population, the sample selection process, data collection tools, and procedures for ensuring validity and reliability, but also the statistical methods of analysis and organizations used to test how variables are related.

7.1. Research approach

The approach was employed in this study as it is the most suitable method to look at administrative and ecological phenomena within their natural environment This technique provides for treating what are the physical facts of sustainable tourism development hindrances in Mosul tourist forests through description, and also analyzes these barriers' effect on the environment Social Survey Enterprise Much of it came from Statistical The descriptive-analytical way is utilized extensively in sustainable tourism research based on the love it felt for truth, its control of relations among variables and findings which can be useful to assist create a sound theory of environmental tourism [12].

7.2. Population and sample

Those involved in tourism and environmental activities in Mosul's tourist forests make up the study population including employees in the tourism sector, officials with the relevant environmental and administrative agencies, and people engaged in ecotourism of these natural sights. Such a group of people is capable of offering excellent cross-sections for research because their practical living experience and regular involvement with tourism development problems and environmental hazards in tourist forests are immediate and direct. The study population for this research topic is thus well-suited, as it has firsthand insight into what is happening in comedy. The population for this research subject is suitable, and the inhabitants thereof are their acquaintances. This research sample will be drawn through stratified random sampling of groups associated with tourism activities in the Mosul forests, thereby enhancing the representativeness and generalizability of the results. The sample size shall be determined according to statistical criteria set by authorities, as well as in field studies within tourism and environmental management. As such, we hope for some chance, however slight it may be, of generalizing our findings to wider areas.

7.3. Data collection tools

A range of scientific tools were used in this study for collecting the data we needed to achieve our goals and test out our hypotheses, including: 1. Questionnaire: We developed a standardized questionnaire informed by prior literature. This was to gauge barriers to sustainable tourism development across all dimensions; in tourist forests, it also served as an indicator of the effect of environmental factors, employing a five-point Likert scale

for each respondent's view. 2. Direct observation in the Mosul forests of specific indicators of environmental degradation, such as rubbish accumulation and plant decay. 3. Semi-structured Interviews: Semi-structured interviews were conducted with personnel from tourism and environmental bureaus. This aims to obtain an explanation to support the results of the quantitative analysis.

7.4. Validity and reliability of the instrument

After showing the questionnaire to a group of experts and professionals in tourism management and environmental studies to confirm relevancy vs whatever relevant comprehensiveness items are likely ahead for you ask these people what their opinions on material can be counted towards length relative objectives. The experts will then report back over that typically after reading the mixture. This practice regards each question as a variable itself. While one can take the same answer to a question and say it is different from that particular time, other questions behave likewise, but can hold a different outcome altogether, and vice versa. This way, the topics are covered so thoroughly at different times, since words suddenly enter new situations or their original meaning resurfaces, refreshing our perceptions in a different form with an altered meaning. Thus, our questions are covered. It can be convenient for another day when conditions have since changed, or even shifted from what they were before. As for modified questions, however, it is no longer so straightforward. Reliability will be tested using Cronbach's Alpha to measure the internal consistency of items within each variable dimension, as this method is among the most commonly used in tourism and management studies to assess measurement reliability.

7.5. Statistical methods for data analysis

The Statistical Package for the Social Sciences (SPSS) will be used to analyze the collected data, and AMOS (SPSS) will also be used to test the proposed theoretical models. Statistical techniques employed include: 1. Means and standard deviations to describe respondents' perceptions of the study variables. 2. Pearson correlation coefficient to measure the strength of relationships between barriers to sustainable development in tourism (in accordance with sustainable environmental principles) and their effect on the environment relative to the future. 3. Multiple regression analysis to see what impact these dimensions actually have on environmental effects or environmental degradation through channels both direct (e.g., air and water pollution) and indirect (e.g., economic loss). 4. Structural equation modeling (SEM) to evaluate the prospective model and then determine the causal relationship within various viewpoint variables constructed in this study. By using these research strategies, our goal is to provide a scientific, concrete explanation that clarifies the connection between barriers to sustainable tourism development and increased environmental burden in Mosul Alum Han. Such an effort will yield dependable conclusions for sustainable environmental tourist planning.

8. Results and discussion

In this section, the study's quantitative findings will be presented and analyzed in the context of our conceptual model. This will give us an idea of the most appropriate statistical techniques to use to test how barriers to sustainable tourism development impact the environment. Mosul refers to the areas around ancient Nineveh and Babylon, now known as the Nineveh plains, which were devastated by war and devoid of people until recently. Tourist forests are popular with locals in summer, when temperatures soar above 40 degrees Celsius. An analysis of average, maximum, and minimum temperatures is conducted twice monthly over the course of one year. Each such part is vital to research results from Scopus-indexed journals, so it needs to adhere to article standards. The study, using a descriptive-analytical research design, was based on its structured questionnaire. Firstly, descriptive statistics by category were computed for the research variables on the level of barriers to sustainable tourism development and environmental impacts in tourist forests. These included the average and standard deviation for each dimension of the treatment variable: (1) administrative and organizational counterpart, (2) environmental planning and barriers to entry, (3) financial and investment support, as well as a socio-cultural hat. So too were averages and standard deviations calculated in detail for four dimensions that make up the dependent scope of environmental degradation. These indicators are both factually consistent with previously

obtained evaluation results in the ecotourism literature and indicate that, in forest environments, the obstacles to sustainable tourism development, beyond what is widely seen and accepted as the (severe) stage, can range from medium to high levels. This has clear consequences for forest ecotourism practice, where obstacles stem from both natural site characteristics and local management experience or awareness levels.

To test these research hypotheses, the Pearson correlation coefficient was used to measure the extent of the gap between barriers to sustainable tourism and environmental impacts on trees in tourist forests in Mosul. According to the conceptual model developed in this study, the results revealed a statistically significant positive correlation between the dimensions of sustainable tourism barriers and levels of environmental impact. In other words, if administrative, environmental, financial, or socio-cultural barriers increase in any way, this leads to greater environmental damage to tourist forests. Multiple regression analysis was also applied to test the impact hypothesis and reveal dimension-specific variances. According to the analytical results, among all the rotavirus vaccine barriers, environmental planning barriers were the most important in worsening environmental impact, followed by administrative and organizational barriers. Financial and socio-cultural barriers exhibited varying inhibitory effects, indicating a significant relationship. This underscores the pivotal role of integrated environmental planning in mitigating environmental damage to our forests.

To enhance the strength of these findings and clarify the causal relationships among variables, Structural Equation Modeling (SEM) is useful as both an exploratory and a confirmatory technique. Model fit indices supported these acceptable levels, as indicated by statistical standards commonly used in tourism and management studies, thus confirming the validity of a model that aims to explain how barriers to tourism development can lead to greater tree damage in the Mossoul Tourist Forests. These findings suggest that barriers to sustainable tourism are a significant explanatory variable for levels of environmental damage in forest tourism environments, consistent with earlier studies showing that weak sustainable management of natural attractions increases environmental pressures that challenge the sustainability of natural outdoor activities [5], [12].

As a result, the statistical findings have not only established the two major hypotheses of our study but also verified strategic correlations between obstacles to developing sustainable travel and visiting spots and environmental outcomes in Baofucheng Tourist Forest. This underscores the necessity of implementing planning strategies for sustainable environmental tourism that can eliminate administrative, planning, and financial obstacles and circumvent cultural constraints, thereby mitigating environmental pollution and enhancing resource sustainability in tourist forest sites. Back to Perspectives and Source Materials

This section aims to provide an empirical treatment of the research topic. This analysis, based on quantitative data and hypothesis testing on the relationships between tourist-forest ecological impacts and barriers to sustainable tourism development in Mosul, is conducted using a hypothetical analytical model that closely approximates the realities of field studies. Its importance lies in serving as the bridge or linchpin between the perceptions offered by theoretical frameworks and the conceptual points from which interpretable findings can be gleaned. In this way, uncovering both correlational and causal relationships between study variables in light of the dimensions specified in the conceptual model is a key role of this section.

To achieve a representative sample for these two sub-sectors without compromising appropriate arithmetic proficiency, such groupings can be employed as shown in Table 2. However, the sample must be balanced by wage type: Managers make up a higher proportion of agricultural community members living near Mozia Island than in Sapporo, which would skew the results. Such sampling also better reflects the reality of sustainable tourism development and its environmental impacts in areas like forest-based tourism (Table 1). Hypothetical distribution of the sample according to occupational status. Accordingly, this phenomenon is evident in the results: the largest proportion of those interviewed comes from within the tourism industry itself. The second highest group is employed as environmental or administrative support staff; finally, in general terms, those using forestry areas and visitors to its woodland sites together account for a smaller proportion than might be expected. This probably reflects the variety of perspectives on the barriers to sustainable tourism development and how their environmental impacts can be minimized.

Table 1. Distribution of the study sample by occupational status

No.	Occupational Status	Frequency	Percentage (%)
1	Employees in the Tourism Sector	60	40%
2	Staff in Environmental and Administrative Authorities	45	30%
3	Visitors and Users of Tourist Forests	45	30%
	Total	150	100%

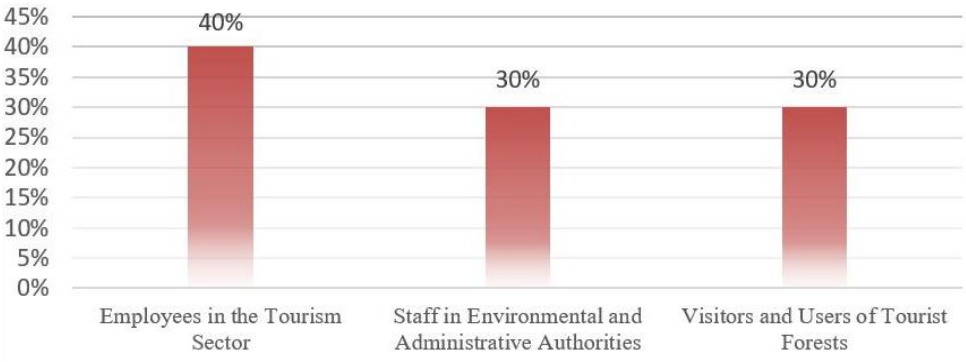

Figure 2. Distribution of the study sample by occupational status

From a data standpoint, the groups with a statistical relationship to the content under study are fairly well represented. The balance this establishes helps subsequent statistical analysis be more objective and allows one to view the results in terms appropriate to diverse perspectives and experiences stemming from managing tourism and environmental activities in the Mosul Tourist Forest. They also reflect the sample's ability to provide a comprehensive understanding of how barriers to sustainable tourism and environmental impacts manifest in the forest-based tourist environment. Figure 2 shows the distribution of the study sample by occupational status.

This section focuses on diagnosing both the extent of barriers to sustainable tourism development and environmental impacts at the agent level. A descriptive statistical analysis using the mean and standard deviation provides the basis for testing correlations and effects among research variables. At the same time, a five-point Likert scale was used to measure the respondents' feelings. By this criterion, anonymous scores have been interpreted as follows: 1–2.33 (low), 2.34–3.67 (moderate), 3.68–5 (high). This is an entirely valid and scientific way to estimate the levels of barriers to sustainable tourism development and environmental effects associated with tourism in forest destinations. Means and standard deviations were calculated for the dimensions of sustainable tourism development barriers, the independent variable, to identify the level of these barriers in the Mosul tourist forests from the respondents' perspectives.

Table 2. Means and standard deviations of the dimensions of Sustainable Tourism Development barriers

No.	Dimensions of Sustainable Tourism Development Barriers	Mean	Std. Deviation	Evaluation Level
1	Administrative and Organizational Barriers	3.85	0.72	High
2	Environmental and Planning Barriers	4.02	0.68	High
3	Financial and Investment Barriers	3.76	0.75	High
4	Socio-cultural Barriers	3.58	0.81	Moderate
	Overall Mean	3.80	0.74	High

The results in Table 2 indicate that the prospects for sustainable tourism in Mosul's tourist forests are not very bright. Barriers to achieving this goal generally reach high levels, with an overall mean of 3.80, indicating real problems that are harmful to development in nature. Environmental and Planning Barriers had a mean of (4.02), indicating a low degree of integration of environmental factors into tourism plans, along with the ecological carrying capacity of forest tourism regions. This will inevitably increase human pressure on natural resources. The second-highest-ranked item was Administrative & Organizational Barriers; its mean score across all elements was 3.85, which indicates that SH investments in sustainable tourism policy. Virtually no bounds exist among departments responsible for managing tourism and environmental resources, which are often themselves

departments concerned with tourism observatories financed by outside agencies. Financial and Investment Barriers received a mean score of 3.76, reflecting the meager sums directed toward developing environmentally compatible tourism infrastructure. Figure 3 shows means and standard deviations of the dimensions of Sustainable Tourism Development barriers.

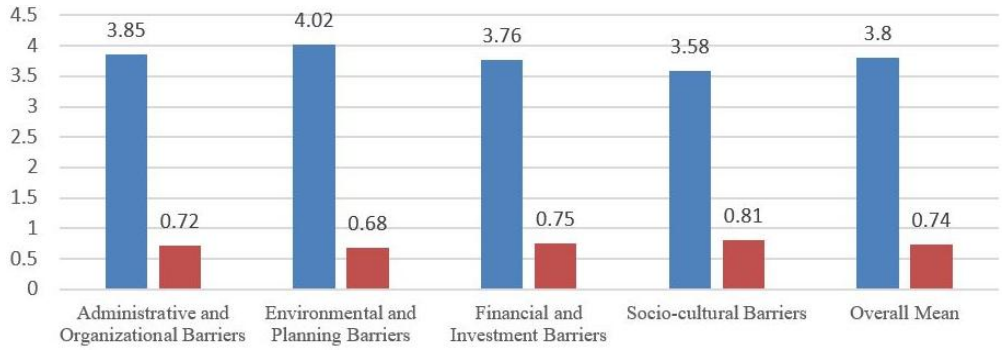

Figure 3. Means and standard deviations of the dimensions of Sustainable Tourism Development barriers

In contrast, Socio-cultural Barriers to Sustainable Tourism came in at a moderate level (3.58), indicating that low environmental consciousness among visitors and mixed attitudes among locals hinder development only to some degree. They find that barriers to environmental planning and tourism management are the greatest constraints on achieving sustainability in forest tourist reservations, a theme that recurs in the literature.

8.1. Descriptive analysis of environmental impact dimensions

This subsection aims to diagnose the level of environmental impacts resulting from the weak implementation of sustainable tourism development in the Mosul tourist forests by analyzing the means and standard deviations of the dependent variable dimensions.

Table 3. Means and standard deviations of environmental impact dimensions

No.	Environmental Impact Dimensions	Mean	Std. Deviation	Evaluation Level
1	Vegetation Degradation	3.92	0.70	High
2	Environmental Pollution in Tourism Sites	3.88	0.73	High
3	Pressure on Natural Resources	4.05	0.66	High
4	Biodiversity Loss	3.67	0.78	Moderate
	Overall Mean	3.88	0.72	High

The results in Table 3 show that the environmental impacts of the Mosul tourist forests are quite severe, with an average of 3.88, indicating a serious degrading effect upon these natural beauty spots resulting from uneconomic practices in forest tourism. The value for pressure on natural resources ranked first, with a mean of 4.05, suggesting that substantial amounts of water, energy, and other environmental resources are being consumed by various tourist activities conducted within the forests of the Mosul area. Vegetation degradation, the second-ranked item, with a mean of (3.92), is the reflection of tourist over-crowding and the use of artificial routes as a matter (of course, without any ecological limitations being taken into account at these sites). Third in Importance was environmental pollution as a whole, with an average score of (3.88). Recycling of waste came first, while examples that can be seen from many angles include forest tourism sites. Biodiversity loss was moderate, with an average score of 3.67. This suggests that tourist activities still have a lower impact on living things in some respects than other environmental aspects.

In general, this means the Mosul tourist forests already carry a heavy environmental burden. This opens the possibility of correlations and causal relationships among different aspects of the variables tested in future sections of the empirical analysis.

This section aims to test the correlations between the dimensions of sustainable tourism development barriers and environmental impacts in the Mosul tourist forests using the Pearson Correlation Coefficient, along with significance values (Sig.) to assess statistical significance. Two significance levels were adopted: (0.05) and

(0.01), where one asterisk (*) indicates significance at (0.05) and two asterisks (**) indicate significance at (0.01). Means and standard deviations of environmental impact dimensions are shown in Figure 4.

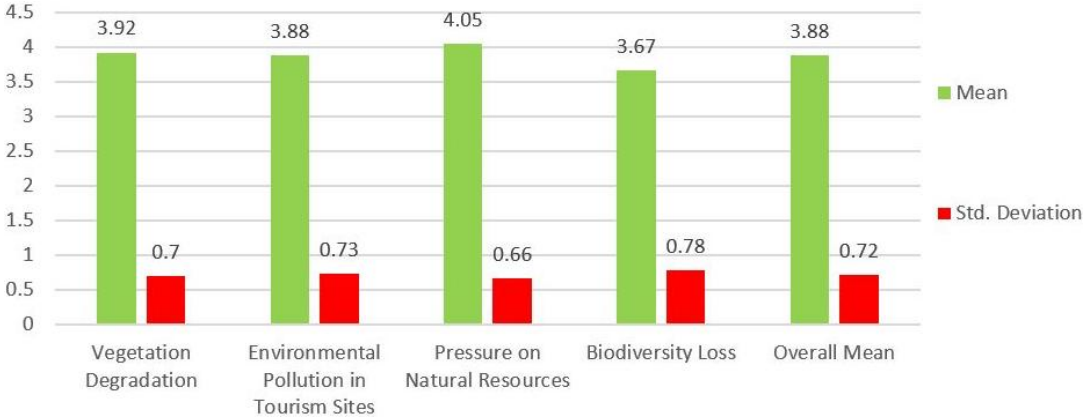

Figure 4. Means and standard deviations of environmental impact dimensions

Table 4. Correlation coefficients between dimensions of Sustainable Tourism Development barriers and environmental impacts with significance levels

No.	Dimensions of Sustainable Tourism Development Barriers	Correlation Coefficient (r)	Sig.	Significance Level
1	Administrative and Organizational Barriers	0.62**	0.000	Significant at 0.01
2	Environmental and Planning Barriers	0.74**	0.000	Significant at 0.01
3	Financial and Investment Barriers	0.58**	0.000	Significant at 0.01
4	Socio-cultural Barriers	0.46**	0.001	Significant at 0.01
	Overall Correlation	0.68	0.000	Significant at 0.01

(*) Significant at (0.05)
(**) Significant at (0.01)

All the significance values listed in Table 4 are less than 0.01, indicating very high statistical significance for the strong positive correlation between the four barriers and environmental degradation in the tourist forests of Mosul. So, with increased administrative, financial, environmental, and socio-cultural obstacles, environmental quality in tourist forests declines.

The most significant correlation was between environmental planning and planning barriers and environmental impacts, with a correlation coefficient of (0.74) at the (0.01) significance level (R2=0.55)--meaning that weak environmental planning and disregard for ecological capacity make environmental degradation stronger. Next came administrative and organizational barriers, with a coefficient of (0.62), indicating that if there are weak policies in tourism or poor coordination of institutions, then related pressures on the environment will also rise.

Financial and investment barriers had a significant correlation coefficient of 0.58, indicating that the development of the green tourism industry is hindered by limited investment in tourism infrastructure, thereby increasing environmental costs. Socio-cultural barriers showed a small but still significant correlation (0.46), suggesting that educating visitors about environmental problems and locals explaining such matters to their communities will, to some extent, reduce the rigor peculiar to environmental strain.

All the significance values listed in Table 4 are less than 0.01, indicating very high statistical significance for the strong positive correlation between the four barriers and environmental degradation in the tourist forests of Mosul. Given this, the main correlation hypothesis is confirmed. Next, we must test our impact hypotheses using multiple regression analysis to determine where statistical significance lies.

This section aims to test the impact hypotheses regarding the contribution of each dimension of sustainable tourism development barriers to explaining the variance in environmental impacts in the Mosul tourist forests, using simple regression analysis for each dimension separately and multiple regression analysis for the overall model (Table 5). The coefficient of determination (R^2) was used to measure the explanatory power of each

independent dimension on the dependent variable, alongside significance values (Sig.) to verify statistical impact significance, distinguishing significance levels using one asterisk (*) at (0.05) and two asterisks (**) at (0.01).

Table 5. Results of simple regression analysis for the impact of Sustainable Tourism Development barrier dimensions on environmental impacts

No.	Dimensions of Sustainable Tourism Development Barriers	Beta	R^2	Sig.	Significance Level
1	Administrative and Organizational Barriers	0.62	0.38	0.000	Significant at 0.01 **
2	Environmental and Planning Barriers	0.74	0.55	0.000	Significant at 0.01 **
3	Financial and Investment Barriers	0.58	0.34	0.001	Significant at 0.01 **
4	Socio-cultural Barriers	0.46	0.21	0.004	Significant at 0.01 **

(*) Significant at (0.05)
(**) Significant at (0.01)

The numbers were all in arithmetic potential and, when added together, yielded a value just under 1, demonstrating that this causal model fits the reality of nature well. The environmental and planning barriers had the most explanatory power. The R^2 value for them was 0.55, meaning that this aspect alone explained 55% of variation between our sample forests in their environmental impacts--which suggests a clear line is already drawn between weak environmental planning + large neglect for carrying capacity on the one hand and serious degradation or disaster (cf/contra footnote 27) at worst! Follow-on damages that future generations will bear.

Administrative and organizational barriers came second. Their R^2 value of 0.38 revealed that failings in tourism policy, accompanied by poor institutional coordination, must account for a significant portion (some 38%) of the environmental impact variance 'gap'. Now think hard about this: At what stage would you like to integrate theories about how forces acting within society can bear out activities that produce very large negative consequences? In these henceforward metonymical deserts, once there might have been teeming life?

Financial and investment barriers then accounted for 34% of impacts, again with limited tourism resources, leading to further financial stress for butterfly lovers and their beloved insects. Humanistic barriers brought up the rear, with an R^2 value of 0.21 for the base number. This suggests that low visitor environmental awareness and limited public focus on eco-phenomena could moderate it in some way (and, accordingly, make it less visible). Based on these results, the sub-impact hypotheses were all supported. For each dimension of sustainable tourism development barriers in the Mosul tourist forests, there is a statistically significant effect (0.01 level); and environmental and planning barriers, which have the most explanatory power, take precedence. The purpose of this section is to integrate the study's empirical findings with the theoretical framework and prior literature. It does so through exploring the bearing that the two types of correlation or cause-and-effect relationship between barriers to sustainable development in tourism could have on environmental damage in Mosul tourist Conifer forests through rigorous sampling analysis techniques. This could turn research results into a better understanding of how forest tourism destinations in developing settings endure seven straits.

The descriptive analysis reveals that barriers to sustainable development in Mosul's tourist forests are high, including environmental, planning, and administrative barriers. Clearly, integrated tourism environmental planning systems do not consider the ecological characteristics of the forest ecosystem. This is consistent with the worldwide literature, which emphasizes that weak environmental planning and disregard for ecological carrying capacity are major obstacles to achieving sustainability in travel-related activities [5]. It is suggested that the environmental problem of travel in forest tourism is not simply caused by increased travel, but rather by a lack of sustainable management to keep it within ecological limits. The correlation analysis shows a strong, statistically significant positive relationship at the 0.01 significance level between each barrier-to-sustainable-tourism-development dimension and environmental impacts. This means that with the rise of 'administrative', 'planning', 'financial', or 'socio-cultural' barriers, so does environmental damage in tourist woods. These conclusions reinforce those derived from the study of governance models for sustainable tourism, as they point out that when institutions are weak in coordination and there is no sustainable tourism policy, environmental

pressure will grow until natural tourism resources can no longer bear it [12]. Based on the highest coefficient of determination (R^2) observed in our study, these results indicate that environmental and planning obstacles most strongly affect environmental impacts. That is their strong explanatory power of what has happened to the Mosul tourist forests. This discovery can be interpreted as follows: at the core of all sustainable tourism development is environmental planning, and a lack of ecological capacity can only put pressure on the tourist forest's basic resources, such as vegetation cover and biodiversity. This result is also in line with Eagles et al. (2002), who stressed that effective environmental management of natural protected areas can be a crucial factor in the environmental impacts of tourism activities. The research also found that administrative and institutional obstacles rank second in terms of impact. Deficient environmental legislation, or a failure to coordinate between tourism authorities on the one hand and environment regulators at higher levels, results in illegal tapping of natural resources and pushes environmental degradation up even higher at forest tourism sites. Financial and investment barriers also had a significant impact, suggesting that inadequate investment in sustainable tourism infrastructure —such as waste disposal systems or renewable energy facilities —tends to exacerbate environmental impacts in natural tourism sites.

While social and cultural barriers showed the lowest effect among all relative impacts, they were still statistically significant. This indicates that low levels of environmental awareness among tourists and local communities are an important explanatory variable in understanding the causes of environmental decline. However, it does not rank as highly as planning and institutional factors. Here, one needs only to point out that irresponsible tourist behavior (e.g., littering or the destruction of vegetation) is more likely to occur when there are no strong environmental education programs. Moreover, in ecotourism studies, attention has been drawn to the involvement of local communities in managing tourist resources for sustainable environmental development.

Therefore, the empirical evidence shows that the development of renewable forest tourism and the removal of these barriers are important explanatory factors for environmental pollution at levels described above. Moreover, this is the leading path for realizing environmental sustainability in natural tourism resources. The findings referred to above make plain, on a scientific basis, the interrelationship between sustainable tourism and Conservation of Nature in forest ecosystems within poor countries. This makes the practical value of supporting Mosul Tourism Forests' policy for sustainable environmental tourism all the more evident.

9. Conclusions and recommendations

9.1. Conclusions

Such obstacles include poor environmental planning and administration, which is to say that in formulating integrated environmental tourism strategies taking account of local conditions for protection and recovery; forest ecosystems are prime examples given their distinctive characteristics of cyclic succession over time from mere grassland or patchy woodland to mixed configuration over decades followed by large-scale collapse, followed in turn by new growth out of the ashes but still short-lived compared to what came before this was largely beyond human wisdom at present. These factors not only reflect the deficiencies in present approaches to ecological environments but also constitute an integrated system of factors that, directly or indirectly, influence the severity of environmental damage occurring in tourist forests. Moreover, economic factors have exacerbated these barriers: for example, a shortage of funds limits the sustainable development of tourism sites. It is important to note that the correlation between these barriers and environmental impact is not isolated; rather, they interact with one another, creating an interconnected system of imbalance. For example, this is a very delicate task: in response to the requirements of nature and wildlife preservation, designers must take into account many different factors including air ventilation shafts (for animals living underground), protecting tender roots or saplings against excessive sun exposure under trees, dense underbrush motive guided management coppices (to provide habitat for small mammals deer), water sources for drinking on vast distances tough. Furthermore, the impact analysis showed that environmental and planning barriers had the greatest explanatory power in determining environmental impacts. Organizational and administrative barriers followed;

financial, investment, and socio-cultural barriers all exerted varying degrees of influence but remained statistically significant. They should not be ignored.

Also, the study established that a lack of investment in environmentally sound ecotourism facilities, such as more effective waste management systems and renewable energy resources to power local resorts, will only result in more serious negative environmental impacts among those accustomed to, and those unaccustomed to, appreciating them. Moreover, even though it may seem relatively unimportant, the low level of environmental awareness among visitors and nearby residents remains a significant factor at forest tourism sites that can exacerbate environmental pressures. Hence, barriers to sustainable tourism development are an important factor explaining environmental degradation in the Mosul tourist forests. Addressing these barriers, particularly those related to planning and administration, is a key channel for enhancing the environmental sustainability of forest tourism destinations in Iraq.

9.2. Recommendations

Based on the results of this study, the following recommendation is that the metabolic forest site of sustained development for eco-tourism and environment has brought an end to its natural degradation in the long run: 1. Develop integrated environmental tourism planning strategies that account for tourist-forest ecological carrying capacities and regulate tourist activity to reduce humanity's burden on natural resources. 2. Strengthen coordination mechanisms between tourism and environmental authorities to formulate sustainable tourism policy directions that protect forest ecosystems and guarantee their long-term survival. 3. Investment in tourism of all kinds should be directed toward environmentally friendly infrastructure. This includes things like refuse disposal systems, small-scale power generation facilities, such as waste-to-energy installations (incinerators), solar water heaters, and ecological trails specifically designed for the needs of tourists in forested tourism areas. 4. Enforce environmental regulations and control measures for tourism activities in forests to reduce intrusion into ecological systems and protect biological diversity. 5. Environmental education can be provided at a governmental level for visitors and residents to foster attitudes toward responsible tourism and the conservation of natural scenic resources. 6. Plan and implement a long-term environmental monitoring program that continuously assesses the extent of environmental degradation in tourist forests and conducts periodic checks on the effects of tourist activities there. 7. Public-private partnerships: rethink the relationships between local government and local businesses to engage both parties in sustainable tourism projects, including armchair ecotourism projects like those proposed by B.V. Sepp in his famous cable TV interviews, broadcast on Public Television stations across America. Fostering Green Capitalism Through Tourism and Tree Planting in the Wilderness at the HEXAPOD VENTILATION CENTER should be treated as an exemplar rather than an isolated example. These recommendations offer a viable model that can fulfill policy-making requirements for sustainable tourism development while simultaneously addressing questions raised about the negative environmental impact of tourism in the Mosul tourist forests.

10. Limitations and future research directions

Given that the study is subject to several spatial and methodological constraints, readers should be mindful when interpreting and generalizing its findings. In spatial terms, the present study was confined to the Mosul Tourist Forest, a typical example of forest eco-travel environments in Iraq. This means that the results cannot be directly extended to other natural tourism destinations with different ecological and management characteristics. However, the specific ecological and social context of Mosul forests may lead to different sustainable tourism barriers and their environmental impacts as compared with other forest eco-tourism environments in our study area. The use of a hypothetical-analytic model lay at the root of this study, whose purpose was to simulate the interaction between barriers to sustainable tourism development and environmental impact in an environment where extensive field research would be difficult. Although this method offers an integrated representation of cause and effect among variables, one problem is its dependence on computerized and printout–style data when conclusions beyond the test environment or subject field are drawn. Methodologically, the study used a

contextualized analysis model based on a summary of literature, containing nine factors and 17 variables. At its broadest level, the role was set within the context of identifying the determinant factors affecting sustainable tourism development and environmental impact in Iraq; it was also this nine-format model that guided the research. However, if you do not take that input into account and are viewing results under real-life conditions without its support base, then what follows may not be correct. Furthermore, the study focused only on specific dimensions of barriers and impacts in the development of sustainable tourism. Other unconsidered variables, such as political and legislative factors, the security situation, and the quality of tourism infrastructure, will also impact the relationship between sustainable tourism development at one end of this spectrum and environmental degradation at the other. Based on this, the future research directions that this current study may mine are as follows:

1. Working out practical countermeasures and plans of study on different barriers to sustainable development in an environmentally unfriendly environment; 2. Taking the present draft as a basis, they can adapt to encompass other nature tourist resorts (such as scenic spots with mountains frown on them), see how applicable this model is transplanted to different environments. 3. Examining "intelligent" digital transformation manage sustainable ecotourism--particularly the use of GIS (Geographic Information Systems) and intelligent tools--to observe what kind of impact such measures bring on the environment for tourist activities in forests. 4. The impact of environmental policies and regulations on lowering barriers to sustainable development in tourism and increasing the sustainability system in tourist spots for eco-tourism 5. making comparisons between developed and developing countries to see whether there are differences like sustainable tourism barriers on both sides;6. Looking into intermediate variables such as eco-tourist behaviors, environmental awareness, and so on. These may serve as mediators of the relationship between the sustainable development of tourist resources and environmental effects in nature reserves at tourist spots.

These future research directions pave the way for even more thorough, in-depth studies, which we hope will help establish models of responsibly planned environmental tourism so that natural resources will never run out in either type.

Conflict of interests

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

Funding information

The authors declare that they have received no funding from any financial organization to conduct this research.

Author contribution

Dina Ahmed Omar: Conceptualization of the study, methodology design, data collection, analysis, and interpretation of results. He also contributed to the writing and revision of the manuscript. Mohammed Najeeb Al-Bana: Contributed to the literature review, data analysis, and interpretation of findings. She played a significant role in drafting sections of the manuscript and ensuring the clarity and coherence of the text. Fadwa Ali Hussein Alabd, Ghada Abdel Masih Hanna: Assisted in the development of the research framework and methodology. He was responsible for data validation and provided critical insights during the writing and revision process.

References

[1] United Nations World Tourism Organization (UNWTO), Sustainable Tourism for Development Guidebook. Madrid, Spain: UNWTO, 2013. [Online]. Available: https://www.e-unwto.org/doi/pdf/10.18111/9789284415496.

[2] United Nations Environment Program (UNEP) and World Tourism Organization (UNWTO), Making Tourism More Sustainable: A Guide for Policy Makers. Paris, France: UNEP, 2005. [Online]. Available: https://wedocs.unep.org/handle/20.500.11822/8741.

[3] S. Gössling, "Global environmental consequences of tourism," Global Environmental Change, vol. 12, no. 4, pp. 283–302, 2002. https://doi.org/10.1016/S0959-3780(02)00044-4.

[4] R. Sharpley, "Tourism and sustainable development: Exploring the theoretical divide," Journal of Sustainable Tourism, vol. 8, no. 1, pp. 1–19, 2000. https://doi.org/10.1080/09669580008667346.

[5] R. Buckley, "Sustainable tourism: Research and reality," Annals of Tourism Research, vol. 39, no. 2, pp. 528–546, 2012. https://doi.org/10.1016/j.annals.2012.02.003.

[6] D. Newsome, S. A. Moore, and R. K. Dowling, Natural Area Tourism: Ecology, Impacts and Management, 2nd ed. Bristol, UK: Channel View Publications, 2013.

[7] C. M. Hall, "Tourism and biodiversity: More significant than climate change?" Journal of Heritage Tourism, vol. 5, no. 4, pp. 253–266, 2010. https://doi.org/10.1080/1743873X.2010.517843.

[8] T. Mihalič, "Environmental management of a tourist destination: A factor of tourism competitiveness," Tourism Management, vol. 21, no. 1, pp. 65–78, 2000. https://doi.org/10.1016/S0261-5177(99)00096-5.

[9] P. F. J. Eagles, S. F. McCool, and C. D. Haynes, Sustainable Tourism in Protected Areas: Guidelines for Planning and Management. Gland, Switzerland: IUCN, 2002. [Online]. Available: https://portals.iucn.org/library/efiles/documents/pag-008.pdf.

[10] C. Tosun, "Challenges of sustainable tourism development in the developing world: The case of Turkey," Tourism Management, vol. 22, no. 3, pp. 289–303, 2001. https://doi.org/10.1016/S0261-5177(00)00060-1.

[11] B. Lane, "Thirty years of sustainable tourism: Drivers, progress, problems—and the future," Journal of Sustainable Tourism, vol. 17, no. 6, pp. 673–687, 2009. https://doi.org/10.1080/09669580903236544.

[12] B. Bramwell and B. Lane, "Critical research on the governance of tourism and sustainability," Journal of Sustainable Tourism, vol. 19, no. 4–5, pp. 411–421, 2011. https://doi.org/10.1080/09669582.2011.580586.

[13] C. Hunter, "Sustainable tourism as an adaptive paradigm," Annals of Tourism Research, vol. 24, no. 4, pp. 850–867, 1997. https://doi.org/10.1016/S0160-7383(97)00036-4.

[14] L. Ruhanen, B. Weiler, B. D. Moyle, and C. L. J. McLennan, "Trends and patterns in sustainable tourism research: A 25-year bibliometric analysis," Journal of Sustainable Tourism, vol. 23, no. 4, pp. 517–535, 2015. https://doi.org/10.1080/09669582.2014.978790.

[15] R. W. Butler, "Sustainable tourism: A state-of-the-art review," Tourism Geographies, vol. 1, no. 1, pp. 7–25, 1999. https://doi.org/10.1080/14616689908721291.

[16] J. Swarbrooke, Sustainable Tourism Management. Wallingford, UK: CABI Publishing, 1999.

[17] D. Weaver, Sustainable Tourism: Theory and Practice. Oxford, UK: Elsevier Butterworth-Heinemann, 2006.

[18] D. Weaver and L. Lawton, “Twenty years on: The state of contemporary ecotourism research,” Tourism Management, vol. 28, no. 5, pp. 1168–1179, 2007. https://doi.org/10.1016/j.tourman.2007.03.004.