

Research Article

Conservation of natural green spaces as a strategic approach to environmental harmony and sustainable tourism

Abdul Basit^{1*†}, Muhammad Areeb Khalid^{2†}, Hamza Ali^{3*}, Syed Tanveer Shah⁴, Fazli Wahid², Muhammad Suleman Khan²

¹Floricultural Biotechnology Lab. Department of Horticulture, Kyungpook National University, Daegu, 41566, South Korea

²Department of Horticulture, The University of Agriculture, Peshawar, 25120, Pakistan

³State Key Laboratory for Crop Stress Resistance and High-Efficiency Production, College of Horticulture, Northwest A&F University, Yangling, Shaanxi 712100, China

⁴Department of Agriculture, Faculty of Biological and Health Sciences, Hazara University, Mansehra KPK, Pakistan

†These authors have contributed equally to the research work

*Corresponding author's email: hamzaali@nwafu.edu.cn

Abstract

Urban environments have profoundly impacted natural ecosystems, particularly in large cities. Industrialization, urban sprawl, and air pollution have hindered sustainable green development and affected the availability of recreational spaces, peace, and eco-tourism. Among the most appealing features of urban green spaces is natural greenery, which can be leveraged as a tool for promoting eco-tourism. Most tourists visiting these areas travel by private tourist buses, with some using personal vehicles. Winter is considered the peak season for visits, driven by tourists seeking a peaceful environment and mental relaxation through the attraction of snowfall. This seasonal preference highlights the connection between natural spaces and stress reduction. The government has taken steps to conserve natural green spaces through initiatives aimed at controlling deforestation and launching large-scale conservation projects. Collaboration between environmental and tourism departments could further enhance both conservation efforts and tourism. About 34.8% of respondents believe that natural greenery and vegetation in urban areas have improved in recent years and expressed a desire for more greenery during future visits. This study concludes that the preservation of natural green spaces plays a vital role in fostering eco-tourism and contributes to the national economy. Ensuring their continued conservation will provide long-term benefits for both the environment and the tourism sector.

Keywords: Green Spaces, Environment, Tourism, Sustainability, Conservation

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Introduction

A public green space refers to any publicly accessible land classified as a natural surface. These spaces are predominantly natural, exhibit a sense of quality, and feature well-maintained facilities [1]. Green spaces, which can be either public or private, are found in both urban and rural settings and are primarily covered by vegetation. Examples include parks, forests, golf courses, sports fields, and other natural expanses. These spaces are especially crucial in areas with small residential plots, such as rural regions or high-density urban areas dominated by multi-story buildings [2]. In this research, qualitative green spaces are defined as those that serve specific functions for communities. These functions encompass social, ecological, economic, psychological, health, and amenity aspects [3]. Such spaces facilitate social interactions, promote biodiversity conservation, offer economic benefits, enhance psychological well-being, improve health, and provide amenities for community enjoyment. The external natural environment can significantly influence both physical and mental health, as well as eco-tourism in the area. Therefore, natural green spaces are seen as vital centers where visitors and local users can engage with natural processes. While a barren landscape could potentially promote social interaction in public spaces, it may not be as effective in fostering meaningful engagement.

Natural landscapes possess a captivating allure that draws tourists, shaping tourism offerings based on travelers' motivations and expectations. Acknowledging this dynamic, scholars emphasize the importance of incorporating a structured planning process for organizing tourist activities [4]. However, without comprehensive territorial planning and sound policies, tourism activities can become disconnected from their surroundings, leading to adverse

consequences [5]. These impacts include environmental degradation and the loss of resources that are essential to these tourist attractions. Before discussing the role of natural landscapes in tourism, it is necessary to define both the landscape and tourism. A landscape consists of visible features, such as green meadows, water bodies, landforms, and mountains. The natural landscape, however, remains largely unmodified by human activity. Given the transformative power of tourism, scholars widely agree on the need for thoughtful planning to manage tourist activities [4, 6].

While tourism is often associated with negative impacts on natural areas, such as habitat destruction and increased carbon footprints contributing to climate change [7], scholars advocate for the inclusion of tourism in land planning for natural spaces [8]. This integration is essential for ensuring territorial sustainability [9]. Developing countries, including Malaysia, Nepal, Kenya, and Thailand, have successfully leveraged ecotourism, which significantly contributes to their GDP and sustainable livelihoods. Ecotourism supports local communities and provides crucial funding for natural resource management [10]. Pakistan, with its wealth of attractive recreational sites, can similarly enhance its economy through effective site management and conservation, boosting employment and revenue generation.

Tourism serves as a powerful tool for social and economic development, poverty reduction, job creation, infrastructure development, and export revenue generation for many nations. Well-planned and sustainable tourism not only promotes sustainable development but also fosters connections with other sectors, generating employment and trade opportunities. As one of the largest and fastest-growing global industries, tourism generates billions of dollars in revenue and bookings, making it a vital component of the global economy.

Through responsible tourism practices, the transformative power of this industry can be harnessed to promote sustainable development, community empowerment, and environmental preservation. Although previous studies have shown that dense vegetation can reduce crime rates, there is no existing research indicating that the presence of large plantations directly contributes to a decrease in crime activity [11]. A study linking crime rates with dense vegetation showed a negative correlation between crime and vegetation, based on police crime reports [12]. Visitor perceptions of recreational sites are crucial in their decision to visit, and the way they perceive tourism development is essential for the conservation and protection of natural resources. This ensures the long-term competitiveness of tourism offerings [13, 14]. Bartczak (2015) further emphasizes the strong connection between altruism, environmental concerns, and individuals' willingness to contribute financially to natural resource management [15]. Ignoring visitors' perceptions of recreational sites when evaluating their value can lead to biased conclusions.

The objectives of the study were: to study the role of tourism in natural green spaces and find out how the natural green spaces of the Galyat area play a key role in the development of the tourism industry; to study the environmental services and the need for the development of natural green spaces; to find out the problems relating to natural green spaces and eco-tourism; to study the reason why tourists want to visit the areas that have natural green spaces; and to find out the benefits of natural green spaces on human health..

Research Methodology

Site selection

Hazara Division serves as a gateway to the most natural and scenic northern areas of

Pakistan and offers extensive opportunities for tourism. Much of the region is covered with forests and natural green spaces. The selected study area extended from Abbottabad to Dunga Gali, including Abbottabad's hilly zones, Nathia Gali, Bara Gali, and Dunga Gali. Overall, the Galyat region covers approximately 250,000 acres and has a population of 189,426. It is recognized as one of the finest representations of damp temperate forests in Pakistan, stretching about 40 km along an east–west range [16].

The study area was selected based on the following considerations: the region contains abundant natural green spaces; it supports a well-established tourism industry; the forests and landscapes within the Hazara Division provide vital environmental services; and the area was easily accessible for the researcher.

Tourism in natural green spaces is a broad and expanding concept. This study was motivated by the observation that tourism in the Galyat region has considerably increased over the past decade due to the wide array of environmental benefits offered by these natural spaces. Tourism can play a meaningful role in encouraging the preservation of natural landscapes. Understanding both the positive and negative impacts of tourism is essential, as unmanaged tourism may harm the environment. Moreover, involving local communities and visitors in conservation efforts can help mitigate threats and support the long-term sustainability of natural green spaces.

Sampling and data collection

Data were collected through random sampling of visitors across the study sites. A semi-structured questionnaire, developed in the Department of Horticulture at The University of Agriculture, Peshawar, was used to collect responses from randomly

selected participants. A total of 204 respondents, 51 each from Abbottabad hilly areas, Nathia Gali, Bara Gali, and Dunga Gali were surveyed.

Sampling design

The study relied on primary data collected through a questionnaire. Respondents were guided through each question to ensure clarity. Visitors served as the primary target group, and the sample size was considered representative of the broader population.

Research parameters

The study investigated several key dimensions related to natural green spaces and tourism. These included the respondents' profile; visits to natural green spaces; sources and reasons for visiting Galyat; observations regarding natural green spaces and their pleasant effects; effects of natural green spaces on environmental health; environmental effects of trees in natural areas; effects of natural green spaces on human health; environmental problems threatening natural green spaces and tourism; features that attract tourists; perception of tourism as a tool for enhancing natural green spaces; effects of seasonal tourism on visitor attraction and environmental quality; and possible ways to conserve natural green spaces in tourist destinations.

Questionnaire main survey

According to Cohen et al. (2007), a questionnaire is a self-report instrument used to gather information on specific variables in a research study. The survey comprised closed-ended questions, which restrict responses to predetermined options and thus facilitate comparison, summarization, and statistical analysis. This format is efficient for collecting large amounts of data from diverse respondents. However, closed-ended questions may also

introduce bias because respondents must choose from preselected answers.

Data analysis

The collected data were analyzed using SPSS (Statistical Package for the Social Sciences). Frequencies and percentages were calculated, and the Chi-square test was applied where necessary to assess associations between closely related variables. Results were presented in both tabular and graphical formats. SPSS is widely used in social science research, and in this study, it supported the analysis of non-parametric attributes. Multiple-variable bar graphs were used to visually represent results, as shown in the charts [6].

The Chi-square equation used in the analysis [6] is:

$$X^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where, O_i = observed frequency E_i = expected frequency

Whereas, for the calculation of frequency distribution with different responses from respondents, the following formula was used.

$$\text{Percentage} = \left(\frac{\text{Absolute Frequency}}{\text{Total number of cases}} \right) \times 100$$

The critical value of the Pearson Correlation Coefficient was analyzed using SPSS (Version 16). It may also be computed manually using formula [6] (Basit 2022):

$$\text{Critical Value of } r = \sqrt{\frac{t^2}{t^2 + df}}$$

Where,

- t values are obtained from the Critical t Table
- $df = n - 2$

Pearson Correlation Coefficient (r) was calculated using formula.

$$r_{xy} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{(n\sum x_i^2 - (\sum x_i)^2)(n\sum y_i^2 - (\sum y_i)^2)}}$$

Where r_{xy} is the Pearson correlation, x_i and y_i are the individual sample points of the variables x and y .

Results and discussion

To understand the fundamental scenario of the natural green spaces and their impact on tourism and the environment a qualitative research study was carried out focusing on the perceptions of tourists and some locals. Some of the major findings of this study are reported as follows:

Age class-wise group distribution of the respondents

The age distribution of the respondents is illustrated in Figure 1. Data analysis indicated that, out of 204 respondents, 54.4% belonged to the age group 18–28 years, followed by 31.4% in the 29–40 years age group. The smallest percentage, 14.2%, was found in the 41 years and above category. From these results, it is evident that the majority of respondents were teenagers, followed by adults, with the lowest representation in the elderly group.

The findings of this green space survey align with existing scholarly literature on green space users. A study by Mak and Jim (2019) similarly observed that younger individuals were more likely to engage in green space activities, while the elderly were less active in using these spaces. The researchers emphasized that young adults

tend to be highly active and have a strong desire to connect with friends, business partners, and family members in green spaces [17].

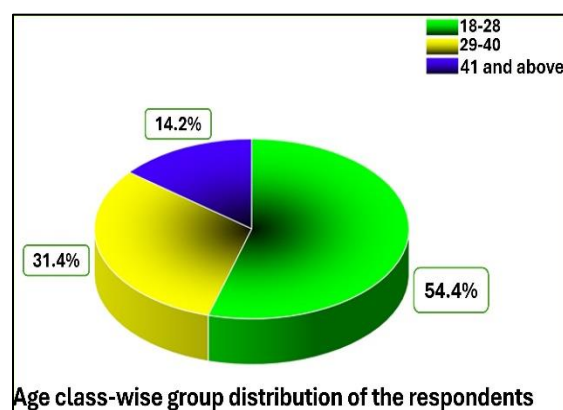


Figure 1: Age class-wise group distribution of the respondents.

Gender-wise distribution of the respondents

The gender-wise distribution of respondents is shown in Figure 2. It is evident from the figure that a majority of the respondents were male, comprising 62.3%, while the remaining 37.7% were female. The positive correlation observed between the gender variable and frequent visits to the site suggests that men tend to visit the site more frequently than women.

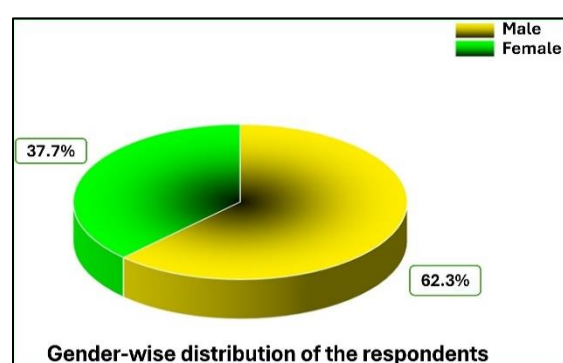


Figure 2: Gender distribution of the respondents.

These findings align with previous research which similarly indicated that men are more frequent visitors to natural sites compared to women [18].

In the context of Pakistan, where social traditions and customs often require women to travel with their families, particularly male family members, these gender differences are especially notable. The green space survey conducted at the three sites clearly revealed a higher proportion of males using the green spaces. This observation supports established literature on gender and green space usage. Speake et al. (2013) also argue that males are more dominant users of green spaces compared to females, as they are generally more active and have a stronger inclination towards outdoor activities [18].

The educational background of the respondents

The respondents were asked about their educational background, as shown in Figure 3.

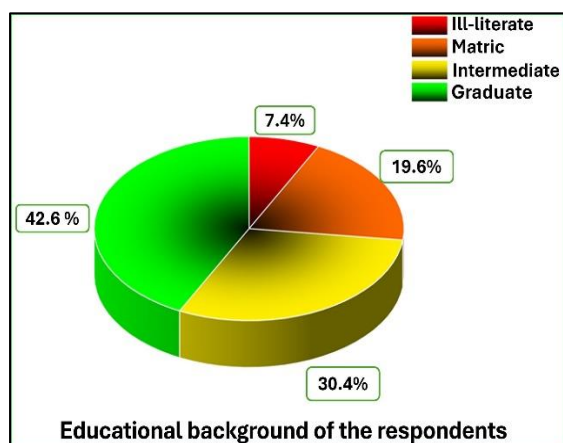


Figure 3: Group-wise distribution of the respondents based on education.

Of the total 204 respondents, 42.6% had completed their graduation, while 30.4% had completed their intermediate education. 19.6% of the respondents were educated up to the matriculation level, and only 7.4% were illiterate. The positive correlation observed between the education level of respondents and the frequency of visits suggests that individuals with higher levels of education tend to visit the site more frequently. These findings are

consistent with the research by Gurluk and Rehber (2008), who also identified a positive relationship between the number of visits to green spaces and educational attainment [19].

Profession of the respondents

The professional background of the respondents is presented in Figure 4. Among the 204 respondents, 51.5% were students attending various colleges and universities, while 37.3% were employed in different sectors. Additionally, 7.8% of the respondents were business owners, and only 3.4% were housewives.

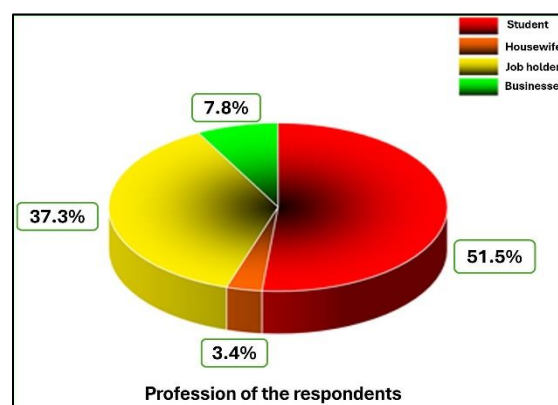


Figure 4: Profession of the respondents.

Most visited areas and transportation mean in the natural green spaces

Figure 5 shows the distribution of respondents' visits to natural green spaces. 51.5% of the respondents reported visiting Nathia Gali as their primary tourist destination, while 7.8% preferred Dunga Gali as the most visited spot. Regarding transportation, 37.3% of respondents used personal cars to reach these locations. Additionally, 15.7% of respondents used other forms of transport, including motorcycles or taxis.

The cross-table data between the most visited places and the means of transportation indicated that 27.9% of respondents reached Nathia Gali using a

tourist bus, while 27.5% visited by bus, with most of them being tourists arriving with private tourism companies. Only 4.9% of respondents indicated that they reached Dunga Gali using the local transportation system.

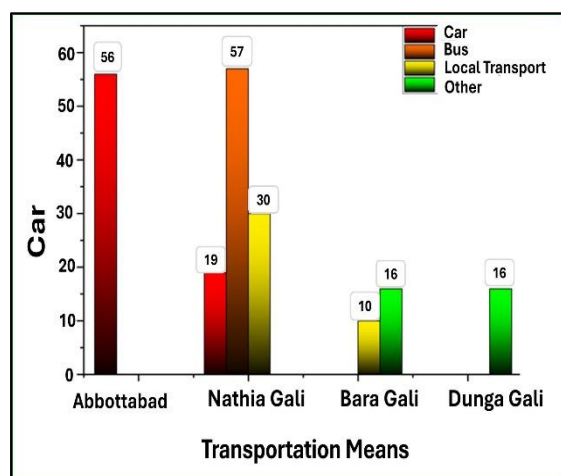


Figure 5: Respondent's perception regarding the mode of transportation and most Visited tourist place in the Hazara division (Pearson Chi-Square: 295.127).

Natural green spaces play a significant role in attracting tourists. The availability of different means of transportation contributes to the accessibility of these spaces, enhancing their appeal. Respondents were asked about the most visited areas and the transportation modes used to reach them. The data analysis, using the Chi-square test (Figure 5), showed a significant association between the areas visited by respondents and the transportation methods they used.

Accessibility is an important measure of the effectiveness of traffic networks and has been extensively applied in land planning [20], urban planning [21], and tourism planning [22]. In the context of green spaces, accessibility refers to the ease of reaching these spaces from surrounding areas, quantified in terms of distance, time, cost, and other factors. This measure plays a crucial role in determining the potential of green spaces to serve residents, influencing

their usage by various demographic groups, including the elderly, children, and individuals with disabilities [23].

Ensuring equal access to a high quality of life and a favorable living environment, regardless of socioeconomic status, has become a global concern [24]. Research has shown that disadvantaged populations, with limited access to parking facilities and inadequate conditions, tend to have lower levels of parking utilization and recreational activities. This contributes to poor health outcomes often associated with poverty [25]. Studies have highlighted differences in park accessibility and their impact on the quality of life, emphasizing that economically disadvantaged individuals have fewer opportunities for recreational access due to the scarcity of parks and open spaces in their neighborhoods. The provision and quality of parking facilities and amenities often vary based on socioeconomic factors [26].

Transportation plays a pivotal role in the tourism industry, as it facilitates the movement of tourists to and from destinations. The transportation system at a tourist destination significantly influences the overall experience, shaping the choices individuals make regarding their travel methods and destination preferences. Improved transportation modes and affordable fares have increased accessibility to various tourist sites. However, accessibility to these sites can vary depending on factors such as the site's characteristics, infrastructure condition, and public transportation system effectiveness, as noted by Page and Lumsdon (2004) [27].

Healthy activities liked and carried out mostly in natural green spaces

Figure 6 illustrates the activities of respondents upon reaching natural green spaces. Of the 200 respondents, 43.1%

indicated that they visited green spaces primarily for mental relaxation, followed by 29.4% who visited for sightseeing. Only 9.8% of respondents reported engaging in other activities such as business, work, or visiting friends and family.

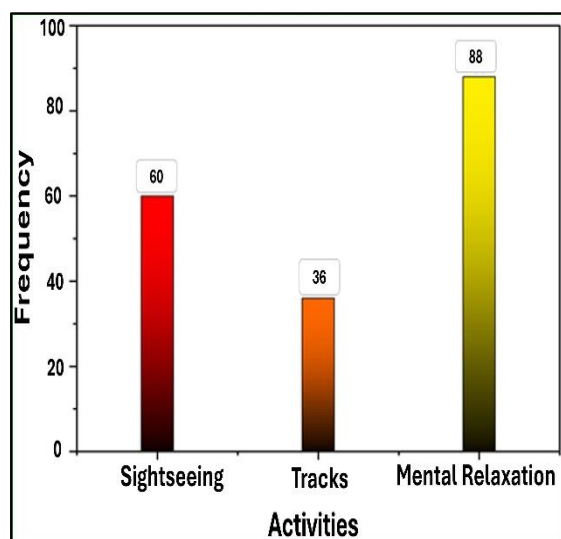


Figure 6: Respondents' views regarding activities they did in natural green spaces

The impact of natural environments, commonly referred to as green spaces, on health and health-related behavior has garnered significant attention across various fields, including epidemiology and psychology [28]. Green spaces, which include open, undeveloped land with natural vegetation such as parks, forests, playing fields, and river corridors are known to have distinct positive effects on well-being [29]. Research shows that contact with these environments independently promotes physical activity [30]. Furthermore, engaging in physical activity within green spaces may provide greater psychological and physiological benefits compared to other settings [31].

The influence of green spaces extends beyond promoting physical activity. Studies have demonstrated that simply being in or having visual exposure to green spaces can have restorative effects on

psychological and physiological well-being, leading to reduced blood pressure and stress levels [32]. Additionally, evidence suggests that exposure to green spaces may contribute to faster healing for patients recovering from surgical procedures.

Previous studies in leisure research have primarily focused on the role of park-based leisure activities in enhancing moods, reducing perceived stress, and fostering a sense of wellness [33]. However, there is limited research explicitly investigating how the level of park-based leisure activity affects the physical health of park users. Studies indicate that conveniently located exercise facilities, such as parks, are associated with increased levels of vigorous physical activity among both adults and children [34, 35]. Moreover, the presence of enjoyable scenery in the neighborhood has been positively linked to physical activity [36].

Beyond the physical health benefits, there are numerous psychological advantages for park users stemming from proximity to natural environments. Research conducted among workers [37] and college students [38] has highlighted various psychological, emotional, and mental health benefits associated with having a view of nature. Physical activity and psychological health are also interconnected. Reviews of exercise and depression studies indicate that exercise can significantly reduce depression symptoms, both among individuals diagnosed with depression and those without, suggesting a positive impact on mental well-being [39]. Thus, parks play a crucial role in improving psychological health through both physical activity and the restorative effects of nature. Additionally, for elderly individuals living in inner-city areas, exposure to green spaces has been found to have a significantly positive correlation with social integration [40].

The pleasing effect of natural green spaces and their relationship with a healthy environment

Figure 7 presents the results of the analyzed data, where the Chi-square test indicated a significant association between the pleasant effects experienced after reaching natural green spaces and the overall impact of these spaces on health. The mean data reveals that the majority of respondents, 44.1%, visited natural green spaces primarily due to the peaceful environment, while a smaller percentage, 27.5%, cited clean air as their reason. Additionally, 47.1% of respondents noted that they traveled to green spaces seeking mental peace, while only 5.9% mentioned other reasons for their visit.

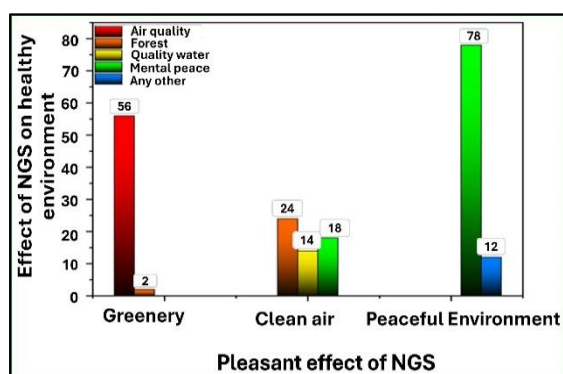


Figure 7: Respondents' views about the effect of natural green spaces on the environment and tourists' pleasant effects after reaching natural green spaces. (Pearson Chi-Square 308.355).

Regarding the interaction between the pleasant effects of visiting natural green spaces and their impact on a healthy environment, 38.2% of respondents highlighted that they visited these spaces for mental peace, seeking the tranquility they offer. Notably, no respondents (0.0%) identified the greenery and peaceful environment as a separate motivating factor.

Living in large, noisy cities often leads to frustration and stress, making the search for

mental peace crucial. For individuals in such environments, natural green spaces serve as the ideal places for relaxation and mental restoration [45]. These spaces are widely recognized for their restorative effects, as they have been linked to reduced stress, increased physical activity, and enhanced ecosystem sustainability, with improvements in air quality and a reduction in traffic noise [41].

Natural green spaces and human health

Figure 8 illustrates the various impacts of natural green spaces on human health. Among the 200 respondents, 51.0% reported experiencing reduced mental stress, while 38.2% felt that green spaces alleviated the effects of illness. A smaller percentage, 10.8%, indicated that natural green spaces helped in reducing obesity.

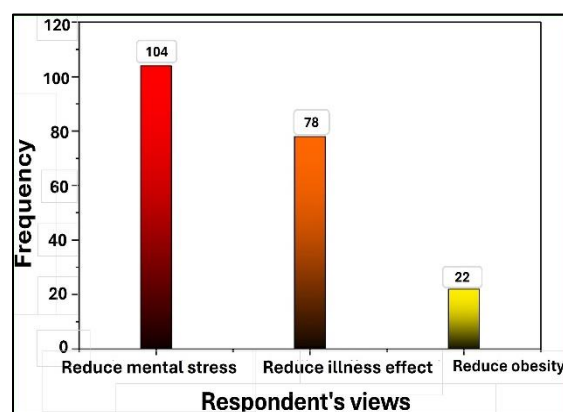


Figure 8: Respondents' views about the effects of natural green spaces on their health.

Beyond the growing interest in green spaces, there is increasing focus on nature-related stimuli that can be incorporated into daily routines to alleviate stress and promote relaxation. For instance, indoor environments can emulate contact with nature by incorporating elements such as foliage or fresh flowers [46]. The healthcare field has shifted its focus from solely treating diseases to promoting overall health, disease prevention, and improving quality of life.

Numerous studies have shown a significant positive correlation between exposure to natural environments and both physical and mental well-being [47, 48]. Questionnaire-based studies consistently highlight that exposure to natural environments has restorative effects, counteracting psychological stress and alleviating mental fatigue [49]. Furthermore, these studies have noted improved mood states and cognitive function among those who spend time in green spaces.

Advanced physiological measurement techniques have provided scientific evidence supporting the benefits of spending time in forests. Research indicates that forest visits lead to reductions in systolic and diastolic blood pressure, as well as pulse rates. Forest environments have been shown to suppress sympathetic nervous activity, which increases during stressful situations, while simultaneously increasing parasympathetic nervous activity, promoting relaxation [50]. Additionally, time spent in forests has been linked to decreased levels of salivary cortisol (a stress-related hormone) and a reduction in cerebral blood flow in the prefrontal cortex [51].

Visiting forested environments has also been associated with enhanced natural killer cell activity and improved immune function in both male and female participants, with the effects lasting approximately a month in males [52]. These findings suggest that individuals experience a heightened state of relaxation in forested environments. Exposure to nature, therefore, not only provides physiological and psychological relaxation but also enhances immunity, highlighting the preventive medical effects of nature.

Natural environments, including green spaces, are increasingly recognized for their role in enhancing mental and physical health. They are acknowledged as an

effective means of mitigating the negative health impacts of urban living. In terms of health outcomes, green spaces have been associated with improved mental well-being, strengthened immune and metabolic systems, reduced cardiovascular diseases, and a decrease in premature mortality [42].

Environmental effects and problems related to natural green spaces

Figure 9 presents data regarding the environmental effects and problems related to the destruction of natural green spaces. Among the respondents, 47.1% identified wildlife conservation as one of the major environmental benefits of trees in natural green spaces, while 12.7% mentioned water recycling as a potential effect of trees in these spaces. Furthermore, 61.0% of respondents highlighted deforestation as a significant problem contributing to the degradation of natural green spaces, with 2.9% acknowledging other issues.

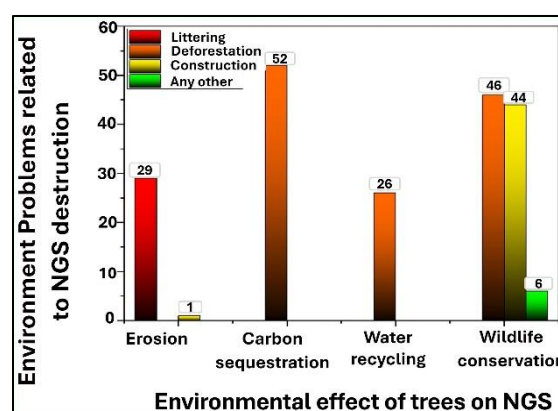


Figure 9. Respondent views regarding the environmental effects of trees and problems related to natural green spaces (Pearson Chi-Square 262.772).

Cross-tabulation of the data revealed that 25.5% of respondents viewed deforestation as a primary issue, which results in reduced carbon sequestration, thereby negatively impacting the environment. Conversely, only a small percentage of respondents, 0.5%, identified construction as a problem affecting natural green spaces.

The increased number of tourists visiting natural green spaces has contributed to higher traffic and a greater presence of cars in the area, which is a major contributor to air pollution [53]. Forest plantations play a vital role in climate change adaptation by helping to absorb carbon dioxide (CO₂). However, the release of CO₂ leads to the destruction and degradation of forests. Deforestation further exacerbates environmental issues, negatively impacting the ecosystem.

The question arises: Why do these areas experience such extensive deforestation? The answer lies in the fact that many hilly regions lack access to natural gas, which forces local communities to rely on wood as their primary source of energy. This significant dependence on wood resources leads to extensive deforestation and environmental degradation [54].

Special feature for attraction to natural green spaces

Figure 10 highlights that a significant percentage of respondents, 44.6%, are attracted to natural green spaces. 21.1% of respondents are drawn to tourist spots, while 3.4% are attracted by other facilities.

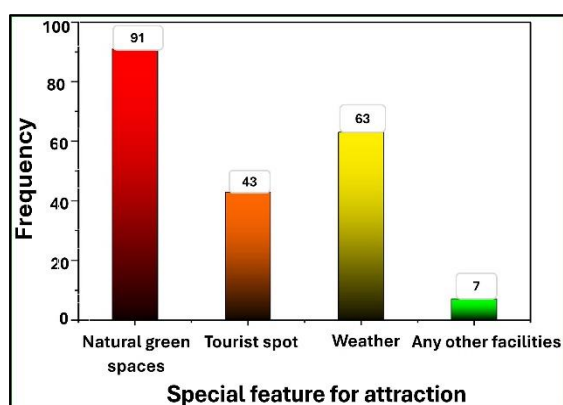


Figure 10: Respondents views about special features that attract them towards tourism and natural green spaces.

People are motivated to visit tourist destinations for various reasons and the

amenities provided at these locations. Some individuals are drawn to natural green spaces for their inherent beauty, others visit due to favorable weather conditions, and some are simply attracted by the specific attractions of the tourist spot. There are also several other facilities that play a role in attracting tourists, such as chairlifts, scenic peaks, and cultural experiences.

Figure 11 shows the impact of tourism on natural green spaces. The results of the Chi-square test revealed a significant association between tourism as a means of enhancing natural green spaces and its effect on the natural environment.

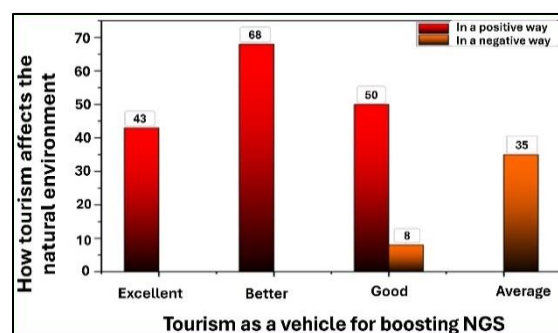


Figure 11: Association of tourism effect on natural environment and tourism as a vehicle for boosting natural green spaces (Pearson Chi-Square 162.543).

The majority of respondents, 33.3%, expressed strong agreement that tourism is a major driver for boosting natural green spaces, while 17.2% considered its role to be average. Additionally, 78.9% of respondents believed that tourism positively impacts the natural environment, while 21.1% thought it had a negative effect. Notably, 33.3% of respondents agreed that tourism plays a critical role in enhancing natural green spaces and has a beneficial impact on the environment. Interestingly, no respondents reported any negative effects of tourism on the natural environment.

Tourism has the potential to generate positive outcomes for the environment by

contributing to environmental protection and conservation efforts. It serves as a platform to raise awareness about environmental values and can act as a financial resource for preserving natural areas, thereby increasing their economic significance [55]. However, the development of tourist attractions can also have adverse effects, such as geological disturbances, soil erosion, and the alteration or destruction of landscapes due to activities like stone blasting, road construction, and bridge building [56].

Tourists visiting scenic areas can impact air quality, as well as the well-being of local wildlife and plant life. Overcrowding, exceeding the environmental capacity of these areas, is a growing issue, accompanied by the challenges of artificial modifications, urbanization, and commercialization within natural scenic areas [57]. The quality of the environment, both natural and human-made, is crucial to the tourism industry.

The relationship between tourism and the environment is complex, involving various activities that can result in detrimental effects. The construction of essential infrastructure, such as roads, and the development of tourist facilities, including resorts, hotels, restaurants, and shops, can lead to negative consequences [58]. Over time, these impacts can contribute to the depletion and degradation of the very environmental resources that tourism depends on.

Many respondents believe that tourism helps boost natural green spaces by raising awareness and fostering their growth, as tourists are more likely to appreciate and support these areas once they visit [53]. However, the majority of respondents also feel that tourism negatively affects the natural environment. The increase in visitor numbers, along with more cars and other forms of transport, contributes to the

pollution of these spaces [53]. People, often stressed by the hustle and bustle of urban life and the pollution in large cities, seek mental peace and relaxation. As a result, they are drawn to natural green spaces to experience a peaceful environment and alleviate mental stress.

Role of government authorities in support of the tourism industry

The results of the Chi-square test revealed a significant association between government initiatives supporting the national tourism industry and potential ways to conserve natural green spaces in tourist areas (Figure 12). In-depth statistical analysis showed that 37.7% of respondents believed that the Billion Tree Tsunami was a government program that supports the national tourism industry. Additionally, 17.2% of respondents suggested that other government initiatives, such as improved roads, easier access to tourist spots, and better information about these places, could help support the tourism industry.

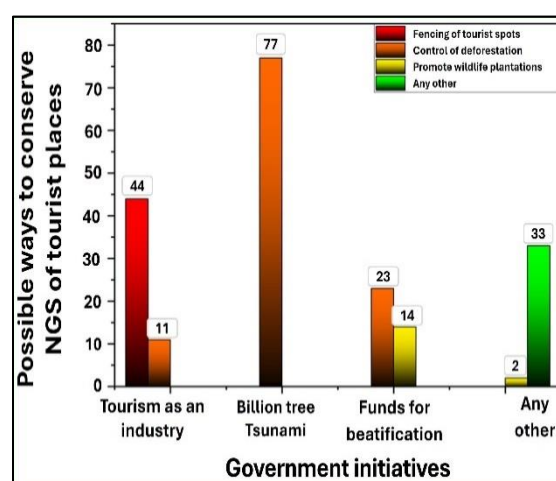


Figure 12: Respondents' views about possible ways of natural green spaces and the Government initiatives that support the tourism industry (Pearson Chi-Square 392.373).

Furthermore, 54.4% of respondents identified controlling deforestation as a primary method for conserving natural

green spaces in tourist areas, while 7.8% believed that promoting wildlife plantations in these areas was key to conservation.

To achieve meaningful positive change, 37.7% of respondents emphasized that government efforts to control deforestation and initiatives like the Billion Tree Tsunami would significantly contribute to the conservation of natural green spaces at tourist spots. On the contrary, only 1.0% of respondents felt that other initiatives should be introduced, such as promoting the introduction of wildlife plants in these areas to encourage natural growth.

The government has taken several significant steps to support tourism development in the country. One notable initiative is the Billion Tree Tsunami, which has made a positive impact on both the environment and tourism [60]. For the first time in Pakistan's history, tourism is officially recognized as an industry. This recognition has prompted the government to introduce multiple initiatives aimed at promoting tourism. One such initiative is the establishment of camping pods in various northern regions of the country. These pods, installed by the Khyber Pakhtunkhwa Tourism Corporation (KPTC), are located in areas such as Sharan Forest, Galyat, and Gabbinjabba (Swat) [61]. The introduction of these eco-friendly accommodations has had a positive impact on both the environment and tourism.

Role of seasonality in tourist attractions to natural green spaces

The data in Figure 13 reveals that 72% of respondents acknowledged the significant role of seasonality in influencing tourism to natural green spaces, while 27.5% disagreed, stating that seasonality does not impact their decision to visit tourist spots. Furthermore, 39.2% of tourists reported visiting these areas to enjoy the snowfall, while a smaller group of 18.1% cited other

reasons, such as seeking mental peace or simply taking vacations and outings.

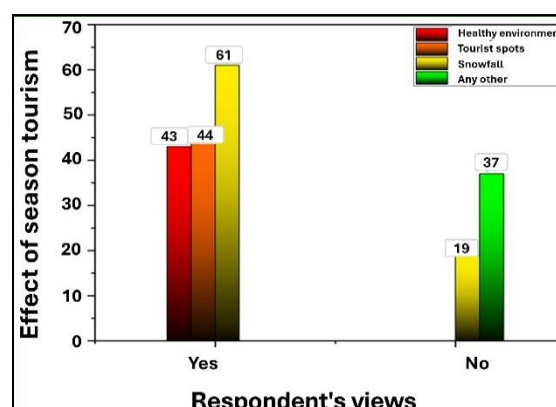


Figure 13: Respondent views regarding the effects of season on tourism (Pearson Chi-Square 131.255).

Regarding the interaction between seasonality and visits to tourist spots, 29.9% of respondents believed that seasonality influenced their visits, specifically to enjoy snowfall. Interestingly, no respondents indicated that seasonality did not affect their visit to tourist spots. In this context, "seasonality tourism" refers primarily to the winter and summer seasons, both of which have a significant impact on tourism patterns. For example, people from the plains of Punjab typically travel to northern areas in summer to escape the intense heat, with temperatures often exceeding 47°C [62], which is considerably higher than in the cooler hilly regions. In contrast, during winter, only those who wish to enjoy snowfall tend to travel to these areas, as the harsh winter conditions such as slippery roads and dangerous driving make winter travel more challenging.

Historically, tourists have sought favorable climates to escape harsh seasons and find solace in more pleasant environments. This tradition dates back to the Roman era when people sought soothing springs and coastal retreats. Seasonal migration patterns developed, with both the young and elderly often relocating permanently to these

desirable destinations [63]. In search of relief from hot summers, people would flock to cooler mountain air or coastal regions with gentle sea breezes. During the colonial era, lowland tropics were often avoided in favor of cooler mountainous regions, as seen in the Spanish New World territories and England's colonies in Asia and Africa [43].

In the 19th century, mountains such as the Alps, Appalachians, and Sierra Nevada became popular recreational destinations for people seeking respite from summer heat and to enjoy scenic landscapes [64]. However, colder climates have seen the largest temporary migrations in history. "Snowbirds," elderly retirees seeking warmth, and vacationers from colder northern latitudes, frequently visit tropical, subtropical, and desert environments, including the Mediterranean and Caribbean regions. In the early 19th century, winter tourists began flocking to destinations like the French Riviera and the Bahamas to enjoy the warmth [65].

The idea of seeking a warm paradise, popularized by artists like Jimmy Buffett in the 1970s, drove North American and European expatriates to explore the Caribbean region in search of their own version of "paradise." Over time, tourism developers favored locations with abundant sunshine, few clouds, and minimal natural hazards. Countries like Mexico, Costa Rica, and the Dominican Republic attracted tourists with their reliable sunshine. For example, when the Banco de Mexico sought an ideal seaside resort location in the late 1960s, Cancún emerged as the preferred destination over the Veracruz coast due to its ideal climate and sun exposure [44].

Many of these temporary tourist hotspots have evolved into permanent residential areas, particularly for English expatriates in Spain and Americans in Mexico. In

summary, the allure of favorable climates has consistently driven tourists to seek refuge in pleasant environments. From ancient Romans to modern-day expatriates, the pursuit of ideal climates continues to shape travel patterns and influence the development of tourist destinations.

Work activities of the environmental and tourism department to enhance tourism

The results of the Chi-square test revealed a significant association between the types of tourism developments in natural green spaces over the past few years and the collaboration between the environmental and tourism departments to enhance natural green spaces and tourism. Figure 14 illustrates that 96.1% of respondents believe that the tourism and environmental departments should collaborate for the betterment and growth of natural green spaces. In contrast, 3.9% of respondents felt that the two departments should not work together.

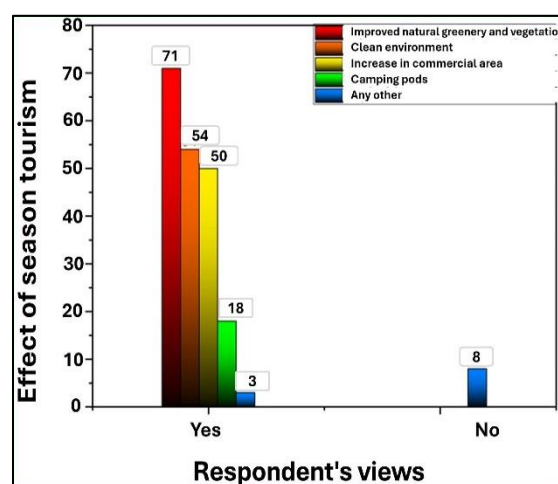


Figure 14: Respondent's views regarding the type of tourism development in natural green spaces in the last few years and does environmental and tourism departments work together (Pearson Chi-Square 146.093).

Moreover, 34.8% of respondents observed an increase in vegetation and greenery compared to their previous visit to the

tourist spot, while 5.4% noted other improvements, such as better tracks and roads, more food corners and restaurants, and additional recreational activities available at the site.

The second part of the table presents the views of respondents regarding the new developments in natural green spaces compared to their previous visits. 34.8% of tourists noticed that the greenery and vegetation had improved and been enhanced since their last visit to the same spot. Additionally, 1.5% observed other developments, such as infrastructure improvements and new hotels.

If the environmental and tourism departments collaborate effectively, numerous new and exciting developments could take place within the industry. New projects, particularly those focused on sustainability and long-term preservation, would be launched, ensuring a positive and lasting impact on both the environment and tourism.

Changes in the next visit to tourist spots

Since tourism has been recognized as an industry, the government has implemented several initiatives aimed at improving the tourist experience and providing proper guidance. These efforts have led to the installation of new features at various tourist spots. The Billion Tree Tsunami initiative has had a significant impact on both natural green spaces and tourist destinations. Tourists are increasingly looking forward to new developments and changes during their subsequent visits. For example, some visitors are interested in artificial landscapes, such as rockeries and sculptures, while others desire more greenery compared to what is currently present.

Figure 15 outlines the various preferences of respondents regarding the changes they

would like to see on their next visit. Among the 200 respondents, 42.2% expressed a desire for more greenery at tourist spots. 27.5% preferred to see more natural vegetation, while 7.4% indicated interest in other changes, such as additional infrastructure or amenities.

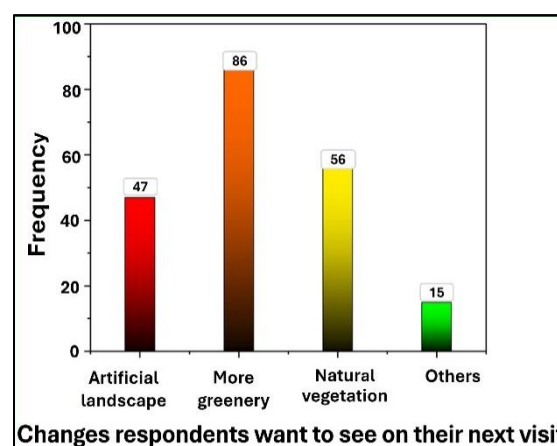


Figure 15: The changes respondents like to see on their next visit.

Possible ways to conserve natural green spaces in tourist places

To conserve natural green spaces in tourist destinations across Pakistan, including the Galyat region, several strategic measures can be implemented. Policymakers, urban planners, and development authorities should prioritize the creation and preservation of dedicated green spaces within cities. Additionally, sustainable tourism practices such as minimizing environmental impact, supporting local communities, and preserving cultural heritage should be adopted to ensure that tourism activities do not harm these natural areas.

Collaboration between the government, local communities, and the private sector is crucial to developing a sustainable tourism industry that benefits all stakeholders while safeguarding the country's natural green spaces. The government's efforts to increase and effectively manage protected areas play a key role in conserving

biodiversity. These efforts can also drive eco-tourism, providing economic incentives that encourage the preservation of natural green spaces in tourist areas.

Common trees in the Galyat area

Galyat is a well-afforested region in Pakistan, home to a diverse range of herbs, shrubs, and trees. The area is known for several towns, many of which have the word "Gali" as part of their name and is famous for its popular tourist resorts. The natural park in the region hosts 104 species of plants and serves as a habitat for various wildlife species. In January 2021, a devastating wildfire swept through the Mushkpuri forest near the Dunga Gali area, destroying trees worth millions of rupees. Despite this setback, the region's ecological significance was recognized when it was included by UNESCO in 2023 as one of its prestigious Biosphere Reserve sites. Table 1 lists the common trees found in this specific area.

Table 1: Common trees found in Nathia Gali

S/No	Common Name	Botanical Name
1	Pine	<i>Genus pinus</i>
2	Cedar	<i>Cedrus libani</i>
3	Oak	<i>Quercus rober</i>
4	Walnut	<i>Juglans regia</i>
5	Maple tree	<i>Acer rubum</i>
6	Silver fir	<i>Abies alba</i>
7	Himalayan poplar	<i>Populous ciliata</i>

Conclusions

The majority of respondents visit Nathia Gali as a tourist destination, primarily using either cars or tourist buses. Additionally, seasons play a crucial role in attracting tourists to natural green spaces, particularly due to the snowfall and the overall healthy environment during specific seasons. Most respondents indicated that they visit tourist spots because of their attraction to natural

green spaces and the peaceful surroundings, which help in gaining mental peace, improving mental health, and reducing stress.

Respondents also expressed a desire for more greenery during their next visit to natural green spaces. Many agreed that tourism positively impacts natural green spaces and serves as a catalyst for their enhancement. A significant portion of respondents identified deforestation as the major cause of the destruction of these spaces, which negatively affects carbon sequestration and wildlife conservation.

Furthermore, respondents acknowledged the efforts of the government, particularly the Billion Tree Tsunami initiative, in conserving natural green spaces. The majority also recognized the collaborative efforts of the tourism and environmental departments in improving greenery and vegetation in natural green spaces over recent years.

Recommendations

To promote tourism and enhance the national economy, it is essential to develop additional tourist spots beyond Nathia Gali and Abbottabad. Expanding tourist destinations will attract more visitors, contributing positively to the country's economic growth. The government and the tourism department should focus on improving the transportation system by upgrading local transport infrastructure, including the construction of better roads. This will facilitate easier access to natural green spaces and tourist spots, encouraging more tourists to visit.

For the conservation of natural green spaces, it is recommended that proper fencing be implemented to prevent deforestation. Additionally, the government should introduce and promote wildlife plantations to help preserve these

spaces and enhance their appeal to tourists. Funds should be allocated for the beautification of natural spaces to make them more attractive to visitors. Moreover, financial resources should also be directed toward building new infrastructure and enhancing existing landscapes, both softscape like plants and greenery and hardscape like pathways and recreational facilities, to improve the overall experience at tourist spots.

Authors' contributions

Conceived and designed the experiments: F Wahid & ST Shah, Performed the experiments: A Basit & MA Khalid, Analyzed the data: A Basit & H Ali, Manuscript Preparation: H Ali & MS Khan

Competing interests

The authors declare no competing interests

Ethics declaration

The study was approved by the ethics committee of the University and was conducted in accordance with the ethics policy of the University.

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