Social, Economic, And Environmental Impacts Of Tourism In Kumrat Valley (Khyber Pakhtunkhwa, Pakistan)

Mukamil Shah[1] , Irshadullah[2] , Rehmat Ali[3]

[1]Email: mukamil.shah@imsciences.edu.pk
[2]Email: irshaduom3@gmail.com
[3]Email: rehmat.ali@imsciences.edu.pk

Abstract

This study aims to evaluate the social, economic, and environmental impacts of tourism development in the Dir region of Khyber Pakhtunkhwa, Pakistan. To achieve this objective, primary data were collected from 600 respondents—including local residents, shopkeepers, tourists, and hotel managers—through a well-structured and detailed questionnaire. A convenience sampling technique was employed for data collection. Using binary logistic regression and marginal effects analysis, the study investigates how tourism affects key development outcomes such as waste generation, crime perception, and economic benefit. The findings reveal that the number of family members visiting, the purpose of visit (e.g., recreation), and the perceived increase in tourist arrivals are significantly associated with higher probabilities of environmental degradation and crime. Group-based and leisure tourism are particularly impactful in this regard. Conversely, respondents who associate tourism with knowledge exchange are less likely to report environmental harm, suggesting that educational and responsible tourism can mitigate negative effects. While tourism is generally perceived as economically beneficial—especially with increased tourist footfall—concerns arise over inflation and the unequal distribution of employment opportunities. The study highlights the dual nature of tourism: while it contributes to local economic development, it also presents pressing environmental and social challenges. The findings underscore the need for targeted policy interventions that promote sustainable tourism, ensure inclusive economic benefits, and strengthen local capacity to manage the social and ecological pressures brought by increased tourist activity.

Keywords: Tourism, Kumrat, Logit Model, Environment.

1. Introduction

Tourism has emerged as a powerful engine of economic growth, social enrichment, and cultural exchange across the globe. Contributing nearly 10% to global Gross Domestic Product (GDP), it ranks among the most dynamic sectors in the international economy (Zaman, Khan, & Ahmad, 2011). The United Nations World Tourism Organization (UNWTO) describes tourism as a socio-economic activity involving travel outside one's usual environment for purposes such as leisure, business, or other personal interests. Tourists are generally categorized into domestic, inbound, and outbound travelers, with global numbers increasing from 25 million in 1950 to over 1.1 billion in 2014, generating USD 1.2 trillion in international revenues (UNWTO, 2010; Tiwari, 2011). The sector supports over 300 million jobs globally and is forecasted to generate an additional 100 million by 2030, with significant socio-economic spillovers (WTTC, 2018; Khalid, 2023). Beyond its global importance, tourism has gained strategic relevance in the context of developing countries like Pakistan. The country's diverse topography, historical richness, and cultural variety make it a natural candidate for tourism-led development. Tourism contributes to GDP, generates employment, and stimulates sectors such as transport, hospitality, food services, and crafts. In 2017 alone, the industry accounted for 6.9% of Pakistan's GDP, with revenues amounting to USD 19.4 billion and projections indicating a potential rise to USD 36.1 billion by 2030 (Rahman, 2016). However, Pakistan significantly lags behind regional competitors. While countries like Turkey and Sri Lanka welcomed millions of international tourists annually,

[1] Assistant Professor Economics, Institute of Management Sciences Peshawar
[2] MS Economics Scholar, Institute of Management Sciences Peshawar
[3] Assistant Professor Economics, Institute of Management Sciences Peshawar

Pakistan received fewer than one million in 2017 (Khalid, 2023). Despite these limitations, domestic tourism in Pakistan has shown strong growth, with the number of local tourists rising from 46 million in 2009 to 80 million in 2016. Khyber Pakhtunkhwa (KP), in particular, has emerged as a key tourist hub due to its scenic beauty, cultural heritage, and cool climate. Locations such as Galiyat, Naran, Kalam, and Kumrat have witnessed a surge in visitor numbers, especially during festive seasons. In 2018, over 4.45 million tourists visited KP's northern belt, highlighting the potential of tourism as a driver of inclusive growth (Mahsud, 2020). The Dir region, situated in KP's northwestern highlands, exemplifies this potential. Known for its captivating landscapes, including the pristine Kumrat Valley, the area is a magnet for nature enthusiasts and adventure seekers. With its deodar forests, alpine lakes, and historical significance, Dir not only offers visual appeal but also a glimpse into Pakistan's cultural and ecological diversity. However, challenges such as poor infrastructure, inadequate accommodation facilities, environmental degradation, and cultural friction between tourists and local communities hinder the full realization of tourism's benefits in the region.

This study evaluates the multifaceted impacts of tourism in the Dir region, particularly in Kumrat Valley. It explores the economic, environmental, and social dimensions of tourism to offer a comprehensive understanding of how tourism influences local livelihoods and community well-being. Economically, the study investigates tourism's effects on income, employment, and local enterprise development. Environmentally, it assesses both positive contributions to conservation awareness and negative outcomes such as pollution and deforestation. Socially, it examines tourism's role in promoting cultural exchange and identity, alongside risks like social tensions and value erosion. By offering empirical insights into these dimensions, the study aims to support evidence-based policymaking that promotes sustainable tourism in ecologically sensitive yet economically promising regions like Dir. It seeks to inform local governments, planners, and stakeholders in devising strategies that not only enhance tourist experiences and regional revenues but also preserve the environmental and cultural fabric of the region.

2. Literature Review

Several empirical case studies provide insight into how tourism affects local communities. For instance, Gnanapala and Sandaruwani (2016) examined tourism's socio-economic impact in Sigiriya, Sri Lanka, a site known for its historical and cultural significance. Using primary data from households and interviews with government officials, the study found that while tourism improved infrastructure and income, it also led to negative effects such as rising drug use among youth and environmental degradation. Importantly, community perception emphasized economic benefits over environmental protection. In Pakistan, Khan et al. (2011) analyzed tourism's impacts in Chitral through a student survey. Respondents largely supported tourism's role in job creation and improved living standards but expressed concern over its negligible impact on environmental preservation. Similarly, Jaafar et al. (2015), studying Malaysia's Kinabalu National Park, found that tourism boosted community pride and infrastructure development, although residents noted issues like congestion and cultural disruption. Other studies further emphasize the dual nature of tourism's effects. For instance, Dowling (1993), in Western Australia's Gascoyne region, revealed widespread public support for environmental protection among both tourists and locals. However, concerns over pressure on local services remained. In Botswana, Oladeji et al. (2016) reported a negative relationship between quality of life and environmental impacts of tourism, using social exchange theory. Guha and Ghosh (2007) applied a quasi-experimental design to compare tourism-affected and unaffected villages in India's Sundarbans. They found

that tourism led to increased household income, improved infrastructure, and greater cultural visibility, though some inequality persisted. Overall, the literature consistently shows that while economic and cultural benefits often outweigh the downsides, negative externalities—especially environmental—must not be overlooked.

Tourism's environmental footprint has been well-documented in both theoretical and empirical literature. Shujahi and Hussain (2016) analyzed tourism in Abbottabad, KP, and found that the influx of tourists during peak seasons led to congestion, noise pollution, garbage accumulation, and rising prices—issues affecting both tourists and residents. Using both primary and secondary data, they highlighted the critical role of unplanned infrastructure and unchecked commercialization in degrading natural beauty and biodiversity. Islam et al. (2016) provided a more generalized review of tourism's environmental effects. Drawing on global literature and expert interviews, they noted how tourism infrastructure—roads, hotels, and transportation—often contributes to air and water pollution, ozone layer depletion, and wildlife disturbance. Similarly, Zaman et al. (2011) studied the relationship between tourism indicators and CO_2 emissions in Pakistan, finding a unidirectional long-run causality from tourism development to environmental degradation. Their econometric findings confirmed that unchecked tourism expansion contributes to forest depletion and natural resource degradation. These studies highlight the importance of integrating environmental planning into tourism development. They recommend improved regulatory frameworks, public awareness, and sustainable infrastructure to minimize ecological damage.

Tourism's potential as a growth engine is well recognized in development economics. Several empirical studies validate the "tourism-led growth hypothesis." Tang and Abosedra (2014), using panel data for MENA countries (2001–2009), found a statistically significant positive relationship between tourism and GDP growth. However, they also noted that political instability eroded tourism's economic potential. Tiwari (2011) confirmed tourism's positive impact on economic growth across Asian countries including Pakistan. However, foreign direct investment was found to have an inconclusive or negative effect, highlighting the unique catalytic role of tourism. Gautam (2012), using Nepalese data (1975–2010), found a bi-directional long-run and short-run relationship between tourism and growth, supporting the argument that each variable reinforces the other. In Turkey, Coskun and Ozer (2014) explored this relationship under the uncertainty framework. Their findings indicated that both economic and tourism growth are mutually reinforcing, with economic uncertainty impacting tourism performance. Lazaro et al. (2014) also contributed to this discussion by establishing a strong relationship between climate conditions and hotel occupancy in Puerto Rico—highlighting how environmental factors mediate the tourism-growth nexus. More recently, Danish and Wang (2023) analyzed BRICS countries and confirmed that tourism boosts economic growth while contributing to environmental degradation. Interestingly, they found that tourism investment, unlike tourism receipts, had a mitigating effect on CO_2 emissions, suggesting that quality-focused investments could help balance growth and sustainability. Mustafa and Santhirasegaram (2014) offered similar conclusions for Sri Lanka, finding bi-directional causality between tourism and GDP in both long and short run. Finally, Nguyen and Funck (2023) studied Japanese island communities and reported that although tourism provided seasonal income and employment, it also exacerbated income inequality between tourist and non-tourist villages. These findings underscore the need for inclusive tourism policies that ensure equitable benefits distribution.

Security concerns play a critical role in shaping tourism trends, especially in politically volatile regions. Raza and Jawaid

(2013) analyzed time-series data (1980–2010) and confirmed that terrorism significantly reduces tourism receipts in Pakistan, with a 1% increase in terrorism activity leading to a 0.38% decline in receipts. Kakar and Waliullah (2008) found that terrorism incidents led to a 13% fall in tourism revenue, and the effects lasted up to two years. Alam and Minque (2018) explored how terrorism also affects foreign direct investment (FDI), noting that both FDI and tourism suffer simultaneous setbacks in conflict-prone zones. Their ARDL model confirmed both short- and long-term negative impacts. Ali et al. (2018) addressed the post-terrorism image recovery of destinations and found that physical security and cultural diplomacy are key to restoring tourist confidence. Together, these studies emphasize that without ensuring physical safety and national stability, efforts to promote tourism will remain ineffective in countries like Pakistan.

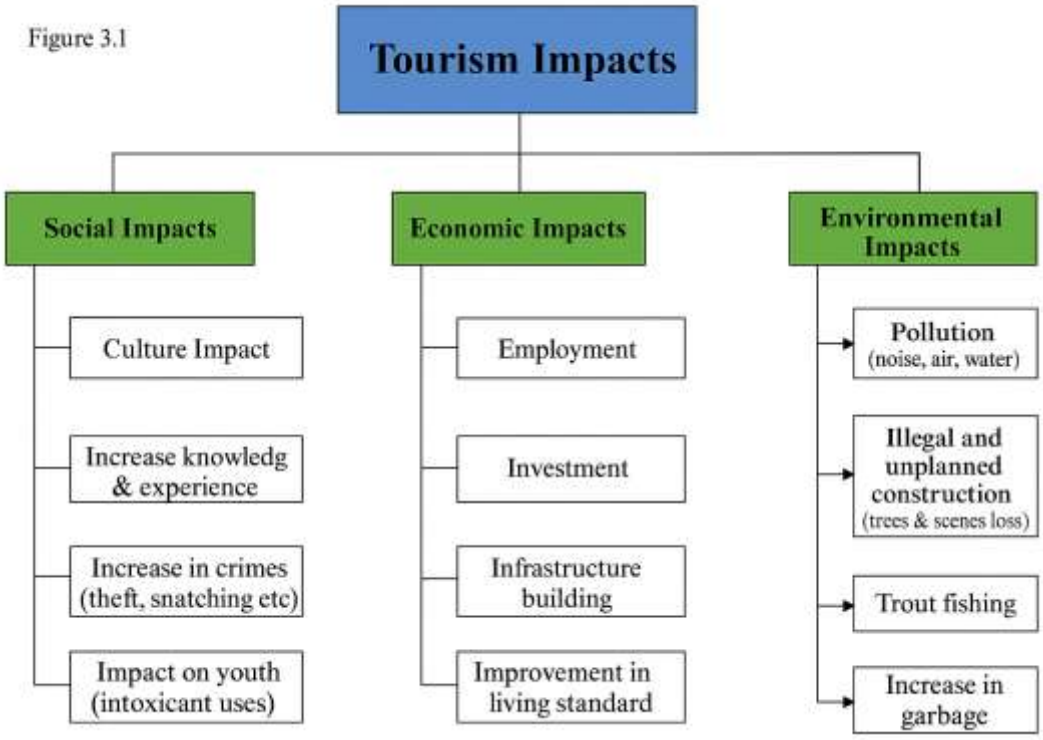
3. Methodology

This section outlines the comprehensive methodology adopted for the study. It begins with the research design and philosophical orientation. The methodology covers the theoretical framework, variable definitions, data collection strategy, and econometric modeling. The goal is to empirically evaluate the social, economic, and environmental impacts of tourism in the Dir region, focusing particularly on Kumrat Valley. Tourism affects multiple dimensions of community life. Empirical studies (e.g., Kolawole et al., 2016) have shown that tourism yields both positive and negative outcomes. In urban areas, environmental and social concerns dominate, while in rural regions, economic benefits are often prioritized. However, these benefits are frequently accompanied by social and ecological costs, necessitating comprehensive analysis. Tourism is hypothesized to improve local economies through employment, income growth, and infrastructure development. At the same time, environmental consequences—such as noise, air, and water pollution, illegal construction, and deforestation—tend to increase. This study seeks to balance the measurement of both positive and negative impacts, thereby informing more sustainable tourism development policies in the Dir region. The study targets all individuals residing in or visiting the Dir region, including local residents, tourists, hotel managers, and business owners. A total of 600 respondents were selected using convenience sampling, with questionnaires distributed across Kumrat (300), Osherai Dara, Laram Top, and Shen Ghar (100 each). Due to participant hesitancy and seasonal tourism concentration, convenience sampling was appropriate. The survey period (May–June 2023) captured peak activity around Eid-ul-Fitr and Eid-ul-Azha. The questionnaire included both closed and open-ended questions, capturing diverse perspectives on tourism's effects. Data collection was conducted in person and covered various social strata and occupational groups involved in tourism services. Field visits were conducted with assistance from local contacts. Data was collected using both interviewer-administered and self-administered questionnaires. The final dataset included only valid responses and was cleaned in Microsoft Excel before being imported into SPSS. Descriptive and econometric analyses were subsequently performed. To evaluate tourism's impacts quantitatively, binary logistic regression was used. This model estimates the probability of outcomes (e.g., increased garbage, crime, or economic benefit) based on explanatory variables such as visit frequency, group size, and perceived job creation. Logistic regression ensures predicted probabilities remain within [0,1], addressing shortcomings of linear probability models.

Tourism affects the economic condition of local residents. Mostly tourism has positive impacts on the local people. It leads to businesses development, as a result people get employment opportunities. The income of the people increases. Tourism development help in investment

development, which also create various jobs opportunities for the local residents. With tourism development the infrastructure of local area is developing. All these things help in rising the living standard of the local residents in the particular area.

Figure 3.1



About the environmental impacts, mostly tourism affect the environment of the area badly because with tourists' arrival pollution problems are rising in the area. It creates noise pollution through congestion and also create air pollution. With tourism development illegal and unplanned constructions are increasing in the area, which affect the environment of the area. It leads to trees cutting, loss of scenic beauty, and loss of bio-diversity. Moreover, with tourism, water pollution occurs. Tourists' practices trout fishing and also garbage pollution are increasing because tourists are throwing wastes in the tourist area, which create various diseases and rising the health costs of local residents. So, the purpose of the study is to compare the negative and positive impacts of the tourism in the study area, so as to suggest measures to develop tourism for the benefit of local residents.

Econometric Model

To empirically assess the social, economic, and environmental impacts of tourism development in the Dir region, this study employs binary logistic regression modeling. Given the binary nature of the dependent variables—whether tourism has led to increased garbage, crime, or economic benefit—the logistic regression framework is well-suited for estimating the probability of an outcome occurring based on a set of explanatory variables. This modeling approach accounts for non-linear relationships and ensures that predicted probabilities remain within the [0,1] interval, addressing the limitations of linear probability models. The selected covariates include demographic characteristics of respondents and tourism-related factors such as frequency of visits, type of visitors, purpose of travel, and perceptions of employment and knowledge exchange. The

models are estimated using the maximum likelihood estimation technique, and marginal effects are subsequently calculated to provide an intuitive interpretation of each independent variable's contribution to the probability of the outcome. This econometric strategy facilitates a robust and policy-relevant understanding of the multifaceted consequences of tourism in the study area.

Given the dichotomous nature of the dependent variables—i.e., whether tourism increases (i) environmental degradation, (ii) social unrest (e.g., crime), and (iii) economic benefit—the study employs Binary Logistic Regression models. The logit model is preferred over linear probability models (LPMs) due to its ability to constrain predicted probabilities within the [0, 1] interval and correct for heteroskedasticity. While the probit model is an alternative, the logit model was chosen for its interpretability through odds ratios.

Let Y_i be the binary dependent variable (1 = impact observed, 0 = no impact). The general logistic model is specified as:

$$\mathbf{P(Y_i = 1|X_i) = \frac{e^{(\beta_0 + \beta_1 X_{1i} + \ldots + \beta_k X_{ki})}}{(1 + e^{(\beta_0 + \beta_1 X_{1i} + \ldots + \beta_k X_{ki})})}} \quad (1)$$

Taking the log-odds

$$\mathbf{logit\,(P_i) = log\,(P_i / (1 - P_i)) = \beta_0 + \sum \beta_j X_{ji}} \quad (2)$$

Where P_i is the probability that impact = 1; β_0 is the intercept; β_j are coefficients for explanatory variables; and X_j are independent variables, such as visit group size (VISIT_MEMBER), visit frequency (VISIT_NUMBER_PER_YEAR), visit type (VISITORS_TYPES), purpose (VISIT_REASON), perceived tourist influx (ARRIVEL), job creation (JOB), and knowledge sharing (KNOWLEDGE).

Model 1: Environmental Impact

Dependent Variable: Garbage (1 = increase)

Model 2: Social Impact

Dependent Variable: Crime (1 = increase)

Model 3: Economic Impact

Dependent Variable: Economic Benefit (1 = increase)

All models include similar explanatory variables, adjusted slightly per outcome domain. Maximum Likelihood Estimation (MLE) was used for parameter estimation.

4. Empirical Results

Logistic Regression Results

The following section presents the empirical findings based on binary logistic regression models applied to assess the environmental, social, and economic impacts of tourism in the Kumrat region of Pakistan. Drawing on survey data from 600 respondents, the analysis explores how key factors such as group size, visit frequency, purpose of visit, and perceived tourist influx influence the likelihood of increased waste generation, crime perception, and economic benefit. Both coefficient estimates and average marginal effects are reported to offer a nuanced understanding of the data, providing evidence for interpreting the broader implications of tourism on local communities and ecosystems.

Table 1 Logistic Regression (Dependent Variable: Garbage)

ins	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
VISIT_MEMBER	0.1970	0.0840	2.3400	0.0190	0.0320	0.3620	**
VISIT_NUMBER_PER_YEAR	-0.0150	0.0110	-1.2900	0.1960	-0.0370	0.0080	
VISIT_REASON	0.3120	0.0920	3.4100	0.0010	0.1330	0.4920	***
VISITORS_TYPES	0.0020	0.0010	3.0200	0.0030	0.0010	0.0040	***
ARRIVEL	0.1140	0.0140	8.0500	0.0000	0.0860	0.1420	***
JOB	0.5790	0.0930	6.2000	0.0000	0.3960	0.7620	***
KNOWLEDGE	-0.8100	0.1960	-4.1400	0.0000	-1.1940	-0.4270	***
Constant	-1.7160	0.7490	-2.2900	0.0220	-3.1830	-0.2480	**
Mean dependent var	0.3870	SD dependent var			0.4870		
Pseudo r-squared	0.0680	Number of obs			600		
Chi-square	289.7860	Prob > chi2			0.0000		
Akaike crit. (AIC)	4005.7570	Bayesian crit. (BIC)			4054.3390		

*** $p<.01$, ** $p<.05$, * $p<.1$

The logistic regression analysis investigates the impact of various tourism-related factors on garbage increase in Kumrat, Pakistan. Results reveal that the number of family members visiting (VISIT_MEMBER) has a significant positive effect, indicating that larger groups contribute more to waste accumulation. Similarly, visiting for tourism or recreation (VISIT_REASON) and traveling with family or friends (VISITORS_TYPES) are associated with a higher likelihood of garbage increase, underscoring the environmental impact of group and leisure tourism. A key finding is that perceived increase in tourist arrivals (ARRIVEL) significantly elevates the probability of garbage problems, reflecting direct pressure on local resources. Interestingly, the frequency of visits per year (VISIT_NUMBER_PER_YEAR) is statistically insignificant, suggesting that repeated visits do not necessarily exacerbate environmental degradation.

Furthermore, respondents who perceive tourism as a source of job creation (JOB) also associate it with higher garbage levels, highlighting a perceived trade-off between economic gain and environmental sustainability. On the other hand, those who believe tourism promotes knowledge and experience sharing (KNOWLEDGE) are less likely to report garbage increase, suggesting that educational or awareness-driven tourism may foster more responsible behavior. These insights indicate the need for targeted waste management strategies, particularly for group and recreational tourists, while promoting eco-conscious and educational tourism to mitigate environmental impacts.

Table 2 Average Marginal Effects **Delta-method**

	dy/dx	Std.Err.	z	P>z	[95%Conf.	Interval]
VISIT_MEMBER	0.0430	0.0180	2.3500	0.0190	0.0070	0.0780
VISIT_NUMBER_PER_YEAR	-0.0030	0.0020	-1.2900	0.1960	-0.0080	0.0020
VISIT_REASON	0.0680	0.0200	3.4300	0.0010	0.0290	0.1070
VISITORS_TYPES	0.0010	0.0000	3.0400	0.0020	0.0000	0.0010
ARRIVEL	0.0250	0.0030	8.3500	0.0000	0.0190	0.0310
JOB	0.1260	0.0200	6.3400	0.0000	0.0870	0.1640
KNOWLEDGE	-0.1760	0.0420	-4.1700	0.0000	-0.2590	-0.0930

The marginal effects analysis provides a more intuitive understanding by quantifying how each independent variable affects the probability of garbage increase due to

tourism, holding other factors constant. The number of family members visiting a tourist spot (VISIT_MEMBER) increases the probability of garbage issues by 4.3 percentage points per additional visitor, indicating that group size directly contributes to environmental stress. Although the number of visits per year (VISIT_NUMBER_PER_YEAR) has a negative but statistically insignificant marginal effect (-0.3 percentage points), its impact remains unclear. Tourists visiting for leisure or recreation (VISIT_REASON) raise the probability of garbage increase by 6.8 percentage points, showing that casual tourism is more environmentally burdensome. Similarly, traveling with family or friends (VISITORS_TYPES) raises the probability slightly (by 0.1 percentage points), though still statistically meaningful due to large sample size.

Moreover, the perception that tourist arrivals (ARRIVEL) increase leads to a 2.5 percentage point increase in the likelihood of garbage accumulation, reinforcing the environmental toll of mass tourism. People who view tourism as a job creator (JOB) also associate it with a 12.6 percentage point increase in garbage, highlighting a perceived economic-environmental tradeoff. Conversely, respondents who believe tourism enhances knowledge and experience sharing (KNOWLEDGE) associate it with a 17.6 percentage point decrease in the probability of garbage increase, suggesting that educational or mindful tourism could alleviate environmental degradation. These findings emphasize the importance of promoting eco-conscious tourism and managing group and leisure visits effectively.

Table 3 Logistic Regression (Dependent Variable: Crime)

ins	Coef.	St.Err.	t-value	p-value	[95% Con	Interval]	Sig
VISIT_MEMBER	0.240	0.083	2.880	0.004	0.077	0.404	***
VISIT_NUMBER_PER_YEAR	-0.007	0.011	-0.660	0.510	-0.029	0.015	
VISIT_REASON	0.321	0.091	3.530	0.000	0.143	0.500	***
VISITORS_TYPES	0.003	0.001	4.270	0.000	0.002	0.005	***
ARRIVEL	0.111	0.014	7.850	0.000	0.083	0.138	***
JOB	-0.811	0.195	-4.160	0.000	-1.193	-0.428	***
Constant	-1.805	0.749	-2.410	0.016	-3.273	-0.338	**
Mean dependent var	0.387		SD dependent var		0.487		
Pseudo r-squared	0.058		Number of obs		600		
Chi-square	250.203		Prob > chi2		0.0000		
Akaike crit. (AIC)	4043.339		Bayesian crit.		4085.849		

*** $p<.01$, ** $p<.05$, * $p<.1$

The logistic regression results with 'Crime Increase due to Tourism' as the dependent variable show several significant relationships. The number of family members visiting (VISIT_MEMBER) is positively associated with increased crime probability ($p = 0.004$), suggesting that larger visiting groups may either cause or attract opportunistic criminal behavior. Similarly, tourists visiting for leisure (VISIT_REASON) and those traveling in groups (VISITORS_TYPES) are significantly associated with higher odds of perceived crime increase, highlighting potential issues such as overcrowding and unsupervised public gatherings. The variable measuring overall tourist arrival (ARRIVEL) is strongly significant, with a positive

relationship to crime perception, indicating a widespread belief that higher tourist influx may contribute to crime-related incidents in the region.

Interestingly, the perception that tourism increases employment opportunities (JOB) is associated with a significant reduction in the likelihood of crime increase, reflecting that communities valuing tourism for its economic benefits might also experience better social order or hold more favorable views. The frequency of visits per year (VISIT_NUMBER_PER_YEAR) remains statistically insignificant, implying that it is not the regularity of visits but rather the nature and volume of tourists that influence the crime perception. Overall, these findings underscore the dual nature of tourism's impact, suggesting the need for effective community policing, crowd control, and awareness programs in peak seasons to maintain social safety while reaping the economic benefits of tourism.

Table 4 Average Marginal Effects **Delta-method**

	dy/dx	Std.Err.	z	P>z	[95%Conf.	Interval]
VISIT_MEMBER	0.053	0.018	2.890	0.004	0.017	0.089
VISIT_NUMBER_PER_YEAR	-0.002	0.002	-0.660	0.510	-0.006	0.003
VISIT_REASON	0.071	0.020	3.550	0.000	0.032	0.110
VISITORS_TYPES	0.001	0.000	4.320	0.000	0.000	0.001
ARRIVEL	0.024	0.003	8.130	0.000	0.018	0.030
JOB	-0.178	0.043	-4.190	0.000	-0.262	-0.095

The average marginal effects from the logistic regression model provide clearer insights into how different tourism-related factors influence the probability of perceived crime increase in Kumrat. An increase in the number of visiting family members (VISIT_MEMBER) raises the probability of crime increase by 5.3 percentage points, indicating that larger tourist groups may attract or contribute to criminal activities. Similarly, tourism for leisure or recreation purposes (VISIT_REASON) increases crime likelihood by 7.1 percentage points, suggesting that casual tourist behavior may elevate social risks. Traveling with family or friends (VISITORS_TYPES) contributes a 0.1 percentage point increase, though the effect is small, it is statistically significant due to the sample size.

Tourist arrival perception (ARRIVEL) adds a 2.4 percentage point increase in the chance of crime, reaffirming concerns about the social pressures of mass tourism. In contrast, belief in tourism's economic benefits (JOB) significantly reduces the probability of crime increase by 17.8 percentage points. This may reflect that economically integrated communities are more stable or positively perceive tourism. Meanwhile, the frequency of visits (VISIT_NUMBER_PER_YEAR) has no significant effect, emphasizing that it is the composition and purpose of tourism—not the number of visits—that shape security perceptions. These findings call for a balance between economic development and social safety in tourism management strategies.

Table 5 Logistic Regression (Dependent Variable: Economic_Benifit)

ins	Coef.	St.Err.	t-value	p-value	[95% Conf.	Interval]	Sig
VISIT_MEMBER	0.1730	0.0860	2.0300	0.0430	0.0060	0.3410	**
VISIT_NUMBER_PER_YEAR	-0.0170	0.0110	-1.5300	0.1270	-0.0400	0.0050	
VISIT_REASON	0.3200	0.0920	3.4800	0.0000	0.1400	0.5000	***
VISITORS_TYPES	0.0020	0.0010	2.9300	0.0030	0.0010	0.0040	***
ARRIVEL	0.1150	0.0140	8.0900	0.0000	0.0870	0.1430	***
PRICE_INCREASE	-0.5370	0.0970	5.5500	0.0000	0.3470	0.7270	***
Job	-0.8190	0.1960	-4.1800	0.0000	-1.2030	-0.4350	***
gnder	-0.1310	0.0830	-1.5700	0.1150	-0.2950	0.0320	
Constant	-1.4230	0.7700	-1.8500	0.0650	-2.9330	0.0870	*
Mean dependent var		0.387	SD dependent var		0.4870		
Pseudo r-squared		0.068	Number of obs		600		
Chi-square		292.262	Prob > chi2		0.0000		
Akaike crit. (AIC)		4005.28	Bayesian crit. (BIC)		4059.9350		

*** $p<.01$, ** $p<.05$, * $p<.1$

The logistic regression model with 'Economic Benefit from Tourism' as the dependent variable demonstrates that several factors significantly influence perceived economic gains in Kumrat. The number of visiting family members (VISIT_MEMBER) is positively associated with economic benefit ($p = 0.043$), suggesting that larger groups contribute more to local income generation. Tourists visiting for recreation (VISIT_REASON) and those traveling in groups (VISITORS_TYPES) are also significantly linked to greater economic benefits, with their coefficients indicating that leisure and social tourism drive local commerce. Moreover, higher tourist arrival (ARRIVEL) strongly predicts increased economic benefit, reflecting local acknowledgment of tourism as a growth sector.

However, not all impacts are viewed positively. Perception of price increases (PRICE_INCREASE) and tourism's contribution to jobs (Job) both show a negative association with perceived economic benefit. This may indicate that inflationary pressures and uneven job distribution reduce the net benefit felt by residents. The gender variable (female) is statistically insignificant, indicating no distinct gender-based perception in this context. The number of visits per year (VISIT_NUMBER_PER_YEAR) also lacks significance, suggesting that it is not visit frequency but rather the type and volume of tourists that drive economic outcomes. These findings highlight the importance of promoting inclusive, inflation-controlled tourism policies to ensure equitable economic benefit in Kumrat.

Table 6 Average Marginal Effects **Delta-method**

	dy/dx	Std.Err	z	P>z	[95%Conf.	Interval]
VISIT_MEMBER	0.0380	0.0190	2.0300	0.0420	0.0010	0.0740
VISIT_NUMBER_PER_YEAR	-0.0040	0.0020	-1.5300	0.1260	-0.0090	0.0010
VISIT_REASON	0.0690	0.0200	3.5000	0.0000	0.0310	0.1080
VISITORS_TYPES	0.0000	0.0000	2.9400	0.0030	0.0000	0.0010
ARRIVEL	0.0250	0.0030	8.4100	0.0000	0.0190	0.0310
PRICE_INCREASE	0.1170	0.0210	5.6400	0.0000	0.0760	0.1570
Job	-0.1780	0.0420	-4.2100	0.0000	-0.2600	-0.0950
gender	-0.0280	0.0180	-1.5800	0.1150	-0.0640	0.0070

The marginal effects analysis provides insights into how various factors influence the probability of perceiving economic benefits from tourism in Kumrat. An additional visiting family member (VISIT_MEMBER) increases the probability

of reporting economic benefit by 3.8 percentage points, reflecting how group tourism supports local businesses. Tourists visiting for leisure (VISIT_REASON) raise the probability by 6.9 percentage points, and visitors in groups (VISITORS_TYPES) have a smaller but statistically significant positive effect, emphasizing the importance of social tourism in local economic perceptions. The perception of more tourist arrivals (ARRIVEL) adds a 2.5 percentage point increase, confirming that higher footfall drives economic engagement.

Interestingly, perceived price increases (PRICE_INCREASE) contribute a significant 11.7 percentage point increase in perceived economic benefit, possibly indicating that inflation is interpreted as a signal of heightened economic activity. In contrast, those who associate tourism with job creation (Job) are 17.8 percentage points less likely to perceive broader economic benefit, possibly reflecting dissatisfaction with the quality or distribution of employment gains. The gender variable (female) and frequency of visits (VISIT_NUMBER_PER_YEAR) remain statistically insignificant, underscoring that type and context of tourism matter more than demographic or habitual variables. These results underscore the complexity of economic perceptions and the need for equitable, targeted tourism development.

5. Conclusions and Recommendations

This chapter presents a concise empirical assessment of tourism's social, economic, and environmental impacts on Kumrat, Upper Dir, based on data from 600 respondents, using both descriptive statistics and binary logistic regression. While a majority of locals (57%) reside near tourist sites, they report issues like garbage pollution (74%), traffic congestion (89%), noise (57%), and crime (67%), though 61% deny tourism-induced economic inequality. Health concerns, such as malaria (49%) and skin allergies (35%), are linked to poor waste management, with 72% stating the DMC does not collect garbage off-season. Socially, 82.3% welcome tourism, yet 91% acknowledge its negative cultural impact, despite 60% recognizing its role in knowledge exchange. Economically, 74% observed seasonal price hikes, and 94% credited tourism with job creation, though income distribution concerns persist. Shopkeepers and hotel managers report seasonal profit spikes, with some bearing private waste disposal costs. Tourists mainly visit for sightseeing, facing issues like traffic and poor infrastructure, while 74% note inflated local prices. Logistic regression shows that perceptions of garbage, crime, and economic benefit are influenced by group size, purpose of visit, and perceived tourist volume, with education-oriented tourism reducing negative views. Overall, tourism boosts the local economy but brings pressing environmental and social challenges, necessitating balanced, inclusive policies.

The study highlights tourism's substantial economic potential in Kumrat, especially from May to August, with locals viewing it as a key source of income and job creation, though concerns remain over unequal benefit distribution and seasonal price inflation. Environmental degradation—including garbage buildup, traffic congestion, and noise—poses serious health risks such as malaria, skin conditions, and stress-related issues, leading to higher healthcare costs. Socially, while tourism is largely welcomed, over 90% of respondents believe it disrupts cultural norms, especially in conservative communities, calling for culturally sensitive tourism policies. Infrastructure remains underdeveloped, with poor roads, limited accommodations, and inadequate facilities hindering tourism growth. Public service weaknesses, especially in waste management—largely outsourced to private efforts—reflect institutional gaps. Tourist behavior also influences impact: larger leisure groups contribute more to environmental stress, whereas educational and culturally oriented tourism shows more positive outcomes, indicating the value of promoting responsible tourism practices.

To address the identified challenges, the study recommends strengthening the Dir Municipal Corporation's year-round waste management capacity and promoting public-private partnerships for efficient garbage disposal during peak seasons. Encouraging eco-conscious and educational tourism through awareness campaigns can foster sustainable practices among tourists and businesses. Upgrading infrastructure—especially roads, accommodations, and recreational facilities—is critical, along with regulating accommodation prices and implementing price monitoring to protect locals and tourists from inflation. Inclusive growth should be promoted by launching employment schemes, skill training, and microfinance support for local entrepreneurs. To enhance social safety, community policing and seasonal tourism police units should be introduced, with input from local elders and religious leaders to ensure cultural sensitivity. Establishing a District Tourism Board in Upper Dir—comprising government, community, and private sector representatives—can institutionalize coordinated tourism policy, while seasonal monitoring of health and environmental impacts will support sustainable, evidence-based planning.

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