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Research Article

The Impact of Tourism Growth on Environmental Degradation in Pakistan: A Comprehensive Analysis of the Relationship Between Tourism Expansion and Environmental Challenges

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Abstract

The ecology in Pakistan is substantially impacted by the tourism industry's fast rise. We conducted a study using unit root tests to evaluate data stationary and ARDL (Autoregressive Distributive Lag) models on data ranging from 1990 to 2019 to analyze this influence. The dependent variable in our study was environmental degradation, whereas the independent variables were population increase, tourist growth, energy consumption, transportation, and tourism spending. The key findings point to a link between tourism and environmental deterioration. For example, we found that energy consumption, industrialization, transportation, and tourist expansion all had statistically significant positive effects on environmental deterioration, suggesting that growing tourism is a factor in the degradation of the environment. Our empirical results highlight the critical impact that rising tourism plays in Pakistan's environmental deterioration. As a consequence of our research, we advise the Pakistani government to focus particularly on increasing renewable energy sources in order to reduce pollution and control the environmental effects of tourism. Pakistan may achieve this balance between environmental preservation and tourism-driven economic prosperity.

Keywords: Tourism; ARDL; Environmental Degradation; Energy Consumption; Transportation.

Introduction

Tourism is the practice of people travelling for a variety of reasons, usually for a brief period of time, such as pleasure, recreation, exploration, religious activities, family visits, or business commitments. Tourism has become a substantial source of income for many nations in the modern world, promoting wealth and economic progress in both the host nations and the tourist destinations. Tourism has developed into a successful worldwide sector that yearly attracts a sizable number of people to travel both domestically and internationally. Nearly 12% of the world's population, or 842 million people, travelled internationally in 2006, according to estimates from the World Tourism Organization in 2007. The precise size of the tourist sector is rather hazy due to the possibility that some of these travelers made repeated journeys within the same year (Leiper, 1999).

Each year, enormous quantities of money are spent on marketing and advertising vacation spots and different tourism-related goods. Travel in the past was difficult, inconvenient, expensive, and frequently dangerous (Williams, 1998); in contrast, the current tourism

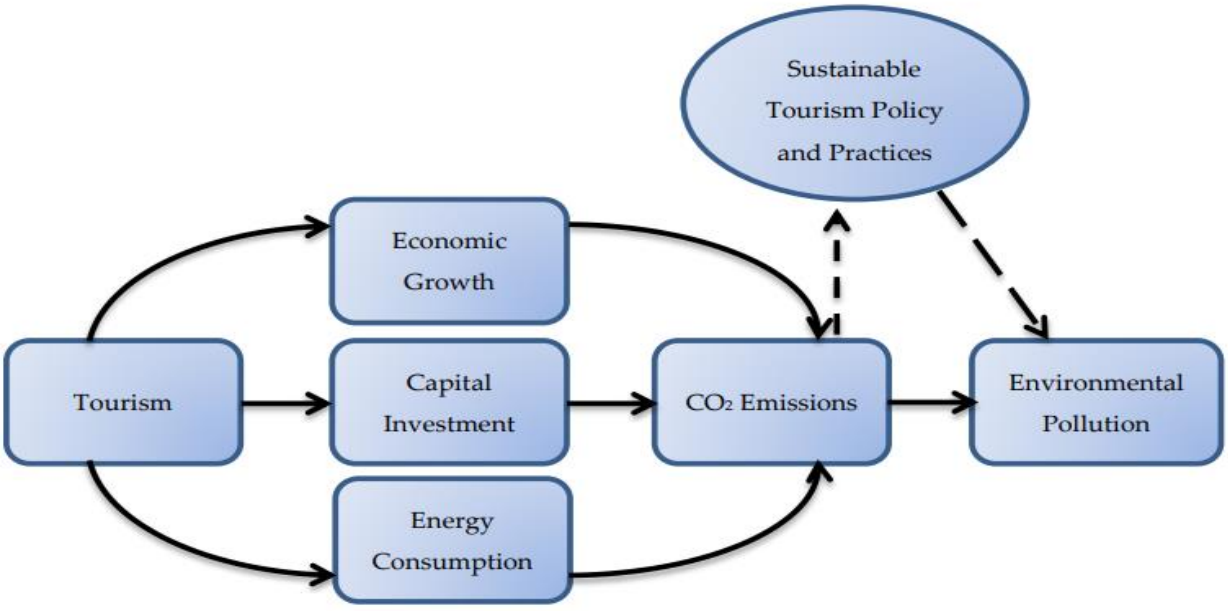
sector has undergone amazing changes to offer more accessible, safer, and more comfortable travel experiences for people throughout the world. However, individuals have travelled throughout history for a variety of compelling reasons. Nevertheless, it is significant that some travelers first publicly acknowledged seeking pleasure as a motivator for their trips in the previous 150 years as travel became more accessible and affordable. In the 1960s, travel to only a few select locations globally, mostly in Europe and North America, was considered to be a very elite pastime. Prior to the 1960s, a wealthy few who had the time and money for long-distance sea or air travel remained the major group that could afford to travel internationally. However, dramatic changes in the second half of the 20th century led to a quick and enormous rise of what is now known as contemporary tourism.

International arrivals and departures have significantly increased in the tourist industry during the previous ten years. According to the Euro monitor International Database (2013), between 1999 and 2011, the number of international tourist arrival trips increased from 675,277,000 to 1,004,681,000, while the number of international tourist departure journeys increased from 590,511,000 to 858,913,000. It is clear that the tourist sector significantly contributes to the world economy. According to forecasts made by the World Tourism Organization (WTO, 2013), it contributed 9.9% of the global gross domestic product (GDP) in 2008 and will do so again by the end of 2018. Additionally, this thriving industry has contributed significantly to the creation of 7 million new employments globally.

Literature Review

The elements affecting Pakistan's national environment have been the subject of several studies. There are two main sections to this review. It first examines how tourist development affects the environment before including studies on environmental deterioration. Amzath and Laijun (2014) looked at the relationship between Maldivian tourist growth and carbon emissions in their study. They examined information from the World Bank and records of the Maldives tourist industry that covered the years 1972 to 2010. The study examined a variety of measures as explanatory variables, including tourism gross domestic product, visitor numbers, and travel time from international airports to resorts, and bed nights. The researchers utilized the Ordinary Least Squares approach for empirical analysis and unit root tests to determine data stationary in order to investigate the association. The findings of the regression analysis showed a highly substantial positive association between carbon emissions and tourism development indices. This shows that the Maldives' rising carbon emissions are substantially influenced by the expansion of tourism and industry. The article suggested numerous actions for the government to take in light of their results. In order to increase industry output while lowering carbon emissions, these measures include promoting the construction of guest houses with more lenient rules, increasing the number of beds without increasing the number of resorts, building more international airports, limiting domestic transfers, and improving tourist attractions.In order to investigate how tourism affects environmental degradation in the US, Raza et al. (2017) used a sample of 231 monthly observations, wavelet-based Granger causality analysis, and carbon dioxide emission data (in million metric tonnes) for the years 1996 to 2015 from the official US Energy Information Administration website. The results show that, in the short, medium, and long terms, tourist growth has a significant beneficial impact on carbon emission. The Granger causality test using wavelets revealed a one-way causal relationship, with tourism growth causing environmental deterioration. According to the report, in order to significantly cut carbon dioxide emissions, US officials should give priority to cleaner energy sources including hybrid engines and carbon-neutral transportation options for land

transportation. The effect of tourism on economic development and carbon dioxide emissions in Eastern and Western European Union (EU) nations was studied by Paramati et al. (2017). To create balanced panel data sets for both areas, they used yearly data on GDPPC, CO2 emissions, tourism, FDI, and commerce from 1991 to 2013. In order to take into consideration cross-sectional dependency and heterogeneity, panel econometric approaches were used. According to the study, tourism increased CO2 emissions in Eastern EU whereas it lowered them in Western EU, pointing to a negative impact on the environment in Eastern EU. A long-run equilibrium link between the variables was established by the findings of the Westerlund panel co integration test. A heterogeneous panel causality test revealed that, in the near term, tourism increased CO2 emissions in Eastern EU while having a negative impact on tourism in Western EU. These results demonstrated how important tourism is to fostering economic growth. But the effect on CO2 emissions was greatly influenced by the implementation of sustainable tourist policy and effective management. In Shakouri et al.'s (2017) study on selected Asia-Pacific countries from 1995 to 2013; they investigated the impact of tourism and economic growth on CO2 emissions. Using panel data, the researchers tested the Environmental Kuznets Curve hypothesis to explore the long-term relationship between economic growth, tourism, energy consumption, and CO2 emissions. The findings revealed that tourist arrivals had a significant positive influence on carbon dioxide emissions in the long run. Additionally, the Granger causality test indicated a one-way causal relationship from energy consumption to tourism arrivals and from CO2 emissions to tourism arrivals in the Asia-Pacific region. While previous research has explored the connections between tourism, economic growth, and CO2 emissions, there has been a notable absence of studies focusing specifically on the relationship between tourism and environmental degradation in Pakistan. Therefore, our study aims to fill this gap by investigating the influence of tourism growth on environmental degradation in the country.



Methodology

In this analysis, we used time series data from the World Development Indicator that covered the years 1990 through 2019. After the data gathering stage, we performed calculations and meticulous analysis that resulted in important findings.

Model 1:

ED =f (TG, GDP, EC, IND.TR)…….Equation 1

Where

ED= Environmental degradation
TG =Tourism growth
GDP = Gross domestic product
EC = Energy consumption
IND =industrialization
TR =transportation

In this Model Dependent Variable is Environmental degradation and Independent Variable is Tourism growth, Gross domestic product, Energy consumption, Industrialization, and Transportation. The econometric form of equation 1, above was then stated as Follows:

$$ED = \alpha + \beta_1 TG + \beta_2 GDP + \beta_3 EC + \beta_4 IND + \beta_5 TR + \mu_1$$

In the specified model, we have the intercept (β0) and coefficients (β1, β2, β3, β4, and β5 corresponding to the explanatory variables. The error term (μ) accounts for the influence of omitted variables that are not explicitly included in the model.

Table 1.

Variable	Measurement	Source of data
Environmental Degradation	CO_2 emission kg per 2010 US$ of GDP	WDI
Tourism growth	Percentage of total exports	WDI
Gross domestic product	GDP growth annual percentage	WDI
Energy consumption	Energy use (kg of oil equivalent) per $1,000 GDP	WDI
Industrialization	Industry (including construction), (annual % growth)	WDI
Transportation	Transport services (% of commercial service exports)	WDI

Table 02.

Variable	Mean	STD	Min	Max	Median
Environmental degradation	2.335158	2.2345	-6.24642	13.23556	3.14255
Tourism growth	103.2048	12.7131	70.52216	126.34	102.74
Transportation	1.542310	0.729210	0.425500	1.935313	1.102530
Energy consumption	1.23	4.28	5.12	2.24	3.13
Industrialization	82.58432	43.21564	33.24951	210.6727	12.23151
GDP	71.40734	51.2242	13.402235	230.2359	38.1202

Descriptive Statistics described

- Mean
- Standard Deviation
- Minimum
- Maximum
- Median

Table 3. Test for Presence of level of relationship with ARDL model.

F-Statics	95% I (0)	95%I (1)	90% I(0)	90% I(1)
9.950791	3.47	4.57	3.03	4.06

- Null hypothesis: There is no long run relationship exist the F-statistic >upper critical value I (1)4.06 at 10% level.

Calculating the ARDL

Table 5. ARDL (1, 0, 0, 1, 0)

Long Run Form Dependent variable: Environmental degradation		
Independent Variables	Coefficient	Prob.
Tourism growth	0.028173	0.0646
Energy consumption	0.002616	0.0160
Gross domestic product	-0.007336	0.0274
Industrialization	-0.000103	0.0000
Transportation	-0.005046	0.0002

Discussion

Table 5 shows insightful information about the relationship between rising tourism and environmental degradation in Pakistan. Our study shows a favorable and substantial correlation between these two factors. In particular, a 1% increase in tourism growth causes an increase in environmental deterioration of 0.028173. These results are consistent with the research of Sharif et al. (2017), which also emphasized the possible environmental harm that might result from fuel-intensive tourism, which would increase pollution. Furthermore, our calculated model shows a connection between energy use and environmental deterioration. The fact that this independent variable's coefficient is positive means that increased energy use significantly worsens the environment. More specifically, a 1% increase in energy use causes a 0.002616 increase in environmental deterioration. These findings are consistent with those of Salari et al.'s research from 2021, which also noted an acceleration of environmental deterioration brought on by rising energy use. Similarly, industrialization shows a clear connection to the destruction of the environment. The independent variable's coefficient, which has a positive sign, shows that a rise of 0.0000 in environmental degradation occurs from a 1% change in industrialization level. These results are in line with the research conducted by Shahbaz et al. in 2014, which focused on the importance of comprehensive policies for sustaining industrial expansion and guaranteeing enhanced environmental quality. The primary source of the transportation sector's greenhouse gas emissions is the burning of fossil fuels in vehicles including automobiles, trucks, ships, trains, and aero planes. Over 90% of the energy sources utilized for transportation are petroleum-based fuels, namely petrol and diesel. Because carbon dioxide emissions alter the oxygen exchange in the atmosphere, they directly affect human health. Breathing gets increasingly challenging when carbon dioxide levels rise. Increased amounts of carbon dioxide may also be a sign of other dangerous air pollutants, such as volatile organic compounds, which may contaminate the air inside. High levels of carbon dioxide can harm people's health by interfering with the brain system and respiratory system. Furthermore, a substantial and positive association between traffic and environmental deterioration is revealed by our research. Environmental degradation rises by 0.005046 per unit more as transportation costs go up. The results reached by Solomon et al. (2007) are supported by the fact that greater traffic correlates to higher air pollution and increased CO2 emissions. Gross domestic product (GDP) and economic growth have a negative and substantial link. The Environmental Kuznets Curve (EKC) theory describes a dynamic process of development in which emissions in an economy first rise along with wealth growth before peaking. Emissions begin to decrease as income reaches a certain level. Therefore, the connection between CO2 emissions and GDP must be negative for a model to be consistent with the EKC hypothesis. My findings provide credence to Givens and Jorgenson's (2011) research in this area.

Table 6 ARDL (1, 0, 0, 1, 0).

Short Run Form Dependent variable: Environmental Degradation		
Independent Variables.	Coefficient	Prob.
D(TOURIST_GROWTH)	0.003632	0.0726
Coint (-1)	-0.583882	0.0000

The results for short-run dynamics are shown in Table 6. The statistical significance of the error correction terms (ECT) shows how important a role they play in the process of adjusting to long-term equilibrium. The system appears to have a tendency to repair short-term imbalances and converge over time to the long-run equilibrium, according to the ECT's negative and statistically significant value. Essentially, this indicates that a co integration connection exists that controls the speed at which short-term disequilibrium is resolved, ultimately bringing the system back to its long-run equilibrium state.

Conclusion

The current empirical study looked at the relationship between population growth, transport, energy use, and tourist expenditure in Pakistan, as well as the impact of tourism expansion on environmental degradation. To accomplish the goals of the study, the ARDL bound testing approach suggested by Pearson Shin & Smith (2001) was used. The main objectives were to investigate the effects of rising tourism on environmental deterioration in Pakistan and, in light of the results, to offer suggestions for improving the environment. Notably, there was no prior research on the topic of tourist growth's consequences on environmental deterioration in Pakistan, making this study a trailblazing effort. For the analysis, data from 1990 to 2019 were used. The number of visitors was used to gauge tourism expansion, and CO2 emissions were used to gauge environmental damage. These indicators' data were gathered from global development indicators. According to the findings, there was a positive and statistically significant relationship between the increase of tourism, industrialization, transportation, and energy use. This suggests that rising environmental deterioration is a result of growing tourism. In light of these findings, it is essential to develop strategies to lessen the negative environmental consequences of Pakistan's expanding tourist industry. The implementation of sustainable practices and policies that strike a balance between boosting tourism for economic growth and environmental preservation should be taken into consideration by policymakers and other relevant authorities.

Policy Recommendation

On the bases of findings, study suggests following policy recommendations

- It is strongly recommended to control tourist expansion since it immediately enhances the environment.
- The building of guest homes under more environmentally friendly rules is promoted, allowing for an increase in beds without a commensurate increase in resort capacity. The productivity of the sector may also be increased by improving international airports, reducing domestic transfers, and expanding tourism attractions.
- The government should actively support greener energy like hybrid engines and carbon-neutral transportation options in order to reduce the enormous carbon dioxide emissions from land transportation.

- The creation of clear-cut energy and tourist strategies that have a long-term emphasis on sustainable growth is required.

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