A Comparative Study on the Environmental Impact Due To Tourism Development on Two Tourist Centres of Kerala-Varkala and Kalpetta

Savitha S,

Higher Secondary School Teacher In SociologyMgm Nss Hss, Lakkattoor,Kottayam, Kerala, India
Corresponding Author: Savitha S,

Abstract: Tourism Industry is a major contributor of solid wastes. Being floating population tourists do not show much responsibility and interest in handling the waste generated by them. The real sufferers are the host population and the wild life who starve for fresh air and fresh drinking water.   Kerala is one of the most popular tourist destinations in the country. Named as one of the ten paradises of the world by National Geographic Traveler**,** it is famous especially for its ecotourism initiatives. Growing at a rate of 13.31%, the tourism industry is a major contributor to the state's economy. In 2016 as around 10.3 lakh foreign and 1.32 crore domestic tourists came visiting the state generating a total tourism revenue of 38000 crore. The prominent social problems created by tourism development is the environmental damage and health risk associated with it. Mismanaged solid waste is the driving force behind all the environmental issues. In spite of all disadvantages, undoubtedly, tourism acts as a catalyst for the economic development of an area. The main objectives of the paper is to compare the environmental problems, air, water, noise pollution and solid waste problems prevailing in the two selected tourist centres Varkala and Kalpetta. A sample of 49 residents are selected by Simple Random Sampling. The selection of the ratio 26:23 is fixed based on the proportion of total number of residents on these two Centres. In addition one expert each from each centre is selected and information is gathered from them by interview method to know the waste profile, waste treatment and disposal options. The tools used for analysis of primary data consist of Arithmetic Mean, Standard Deviation, and Independent Sample t-test. As per the response of the selected residents, Air Pollution, Noise Pollution and Environmental Problems are higher in Varkala compared to Kalpetta. As per the opinion of Experts, the total waste collection is estimated as 5 tons in Vakala and 4 tons in Kalpetta. Composting is the treatment technique used in Varkala Municipality while, in Kalpetta no treatment methods are used. Sustainable tourism development will find answers to the manifold problems prevailing in the tourism sector of Kerala and authorities must strive for it in a war footing.

I. INTRODUCTION

Currently, tourism is becoming one of the most dynamic economic activities in the world. During, the last few decade tourism has developed as a global industry and one of the fastest growing trades. Tourism development is responsible for creating a lot of health and environmental problems in the state. Tourism Industry is a major contributor of solid wastes. Being floating population tourists do not show much responsibility and interest in handling the waste generated by them. The real sufferers are the host population and the wild life who starve for fresh air and fresh drinking water. Most of the tourist centres in Kerala are located in or around forest area. Unplanned tourism development, definitely lead to deforestation and thereby pose serious threat to the ecology. It is true that, Tourism Industry is a major revenue generator to the State but, at the same time, it is a destroyer of the natural resources too. So, it is high time, to think of the ways and means to a Sustainable Tourism Development with minimum harm to the ecology and environment as each and every individual is responsible to hand over the fast depleting natural resources intact, to the future generation. We are so badly in need of a Tourism Policy in the light of the recently announced Kasturi Rangan Report.

Kerala is one of the most popular tourist destinations in the country. Named as one of the ten paradises of the world by National Geographic Traveler**,** it is famous especially for its ecotourism initiatives. Its unique culture and traditions**,** coupled with its varied demography, have made the State one of the most popular tourist destinations in the world. Growing at a rate of 13.31%, the tourism industry is a major contributor to the state's economy. In 2016as around 10.3 lakh foreign and 1.32 crore domestic tourists came visiting the state generating a total tourism revenue of 38000 crore.

II.   STATEMENT OF THE PROBLEM

The Kerala Tourist Industry is rapidly expanding because of increasing international and domestic tourists. The natural features of Kerala's local ecosystems with coral reefs, sand beaches, and mangroves are under threat by poorly managed solid waste and cause a lot of environmental problems. Tourism results in creation of additional wastes which have direct and indirect effects on the somewhat unique and quite vulnerable environmental resources. Development of a Sustainable Tourism Industry will find solutions to the manifold problems of ever increasing environmental issues. Development of Tourism Industry resulted in a drastic change in the volume and the composition of solid wastes. It has been estimated from different studies that, per capita solid waste generation of tourists are double that of local residents. It is clear that most prominent negative impacts contributed by tourism are irrational consumption of natural resources, consumerism and unnecessary waste generation.

The prominent social problem created by tourism development is the environmental damage and health risk associated with it. Mismanaged solid waste is the driving force behind all the environmental issues and the Government plays a key role as a facilitator to implement a proper Solid waste management policy for the tourism sector. In addition the contribution of local authorities and stakeholders are highly demanded for the success of the policy implementation and they are responsible for maintaining the Tourist Centres neat, clean and attractive. Each group has a role to play for Sustainable Tourism Development with minimum harm to 'Mother Earth'. In spite of all disadvantages, undoubtedly, tourism acts as a catalyst for the economic development of an area. In the light of these issues it is considered appropriate to make a comparison between the two important tourist centres of Kerala. Hence, the problem is stated as '**A Comparative Study on the Environmental Impact Due to Tourism Development on Two Tourist Centres of Kerala-Varkala And Kalpetta.**'

III.   OBJECTIVES OF THE PAPER

1. To compare the environmental problems prevailing in the two selected tourist centres
2. To compare air, water and noise pollution levels of the two selected tourist centres
3. To know the quantity, characteristics and composition of solid waste in the study area
4. To know the waste treatment and disposal methods used in the study area
5. To find out the problems in the two selected tourist centres regarding Solid Waste Management

IV.   METHODOLOGY AND SAMPLING DESIGN

The Paper uses both primary and secondary data. Secondary data is collected from different published sources of various Government Departments, other Agencies and Municipal Authorities. For the purpose primary data collection two tourist centres, Varkala from Southern Kerala and Kalpetta from Northern Kerala are selected. Varkala is a coastal tourist centre and Kalpetta a hill station. One expert each from each centre is selected and information is gathered from them by interview method to know the waste profile, waste treatment and disposal options. The experts belong to officers of respective Municipalities as both tourist centres selected are managed by Municipal Administration. In addition, on the basis of number of residents, by simple random sampling data is collected from respondents by using a structured questionnaire to study the environmental implications.

V.   TOOLS USED FOR DATA ANALYSIS

The tools used for analysis of primary data consist of Arithmetic Mean, Standard Deviation, and Independent Sample t-test.

a.   Environmental Implications Of Solid Waste Management

The Environmental Implications of the two Tourist Centres are examined by using four parameters namely, Air Pollution, Water Pollution, Noise Pollution and Environmental Impact. For the purpose, information is gathered through a Questionnaire from twenty six residents from Varkala and twenty three from Kalpetta. The respondents are selected by Simple Random Sampling. The selection of the ratio 26:23 is fixed based on the proportion of total number of residents on these two Centres. The Environmental Implications are analyzed by using t-test.

Table 1: Group Statistics

	Name of the Municipality	N	Mean	Std. Deviation	Std. Error Mean
Air Pollution	Varkala	26	**22.9615**	4.52973	.88835
	Kalpetta	23	19.4348	4.56096	.95103
Water Pollution	Varkala	26	30.7308	6.61246	1.29681
	Kalpetta	23	28.6522	4.78263	.99725
Noise Pollution	Varkala	26	**10.8846**	4.50179	.88287
	Kalpetta	23	6.9565	4.35345	.90776
Environmental Impact	Varkala	26	**51.5000**	6.08112	1.19261
	Kalpetta	23	42.5652	7.95913	1.65959

Source: Primary Data

Table 2 Significance of t Values

	t	df	Sig. (2-tailed)
Air Pollution	2.711	47	**.009***
Water Pollution	1.246	47	.219
Noise Pollution	3.096	47	**.003***
Environmental Impact	4.444	47	**.000***

Source: Primary data
*Significant at 5% Level of Significance

It is visible from Table 1that, all Environmental Problems are high in Varkala as the Mean Scores of the response of residents in Air Pollution is 22.96, Noise Pollution is 10.88 and Environmental Impact is 51.50. higher than the Mean Scores of Kalpetta. The Mean Score Variations are statistically significant in all cases except Water Pollution at 5% Level of Significance. As per Table 2, the t-value for Air Pollution is 2.711, Noise Pollution is 3.096 and Environmental Impact is 4.444(with p<0.05).Hence, it is concluded that, as per the response of the selected residents, Air Pollution, Noise Pollution and Environmental Problems are higher in Varkala compared to Kalpetta.

VI.   WASTE PROFILE ANALYSIS
Waste Profile Analysis consists of estimation of characteristics and composition of Municipal Solid Waste in the two selected tourist centres Varkala and Kalpetta. It includes an attempt to understand the Ratio of Biodegradable and Non biodegradable Waste, Moisture Content of MSW, Calorific Value of MSW, Ratio of Domestic Waste to Total Waste, Total Quantity of Daily Waste Generation in the Municipality, Per Capita Waste Output in the Municipality and Yearly Rate of Increase in Waste Output.

Table 3 Composition of Solid Waste

Variable	Varkala	Kalpetta
Waste Composition (Biodegradable:Nonbiodegradable)	2:3 tons	1.5 : 2.5 tons
Total Quantity (Daily Waste Generation)	5 tons	4 tons

It is visible from the above table that, the total waste collection is estimated as 5 tons in Vakala and 4 tons in Kalpetta. The waste composition that is, the ratio of biodegradable and non biodegradable waste is 2:3 tons in Varkala and 1.5:2.5 tons in Kalpetta.

7.1 Components of Municipal Solid Waste
Municipal Solid Waste comprises of different components like, Plastic, Paper, Cardboard, Compostables etc. Here, an attempt is made to measure the level of the presence of these component elements in the Solid Waste of the two selected tourist centres, based on information gathered from Experts.

Table 4 Different Types of Waste and Their Levels

Type of Waste ↓	Varkala	Kalpetta
Plastic	Medium	High
Paper	Medium	High
Cardboard	Medium	Low

Glass	Low	Low
Compostables	High	High
Metal	Low	High
Clothes	Low	Low
Hazardous Waste	Nil	Nil
Electronic Waste	Nil	Nil
Constuction & Demolition Waste	Nil	Low

From the above table, as per the opinion of Experts, it is observed that, in the collected waste, the presence of the components of solid waste Plastic, Paper and Cardboard are Medium in Varkala Municipality while, Glass, Metal and Clothes are Low. The presence of Compostables are High while, Hazardous Waste, Electonic Waste and Construction and Demolition Waste are not at all present. While considering Kalpetta Municipality, the presence of Plastic, Paper, Compostables and Metal are High but, Cardboard, Glass, Clothes and Construction and Demolition Waste are Low. Hazardous and Electronic Waste are totally absent in Kalpetta.

VII.   WASTE TREATMENT AND DISPOSAL
Proper waste treatment and disposal is the healthiest way to control the massive issues solid waste can cause to the environment and society. History witnessed that, many technologically advanced solid waste disposal and treatment techniques experimented in advanced countries are miserably failed. As a result a total rethinking has happened world over, leading to the adoption of traditional treatment techniques like Composting and Biomethanation as the most preferred options. Especially, because of the high degree of presence of biodegradable waste, traditional methods like Composting and Biogas production are highly suitable in Indian conditions. As far as possible waste should be treated, reused and recycled. The left over waste should be disposed properly with least harm to the environment. Waste disposal should be well controlled as the very minimum waste should hit the land. Well engineered Sanitary Landfilling is the most preferred option for safe disposal of ultimate waste.

From information gathered from experts it is evident that, Composting is the treatment technique used in Varkala Municipality while, in Kalpetta no treatment methods are used. But, as per the opinion of Experts, both the Municipalities where, this study is concentrated are following the same primitive method called Open Dumping.

VIII.   FINDINGS OF THE STUDY
1. As per the response of the selected residents, Air Pollution, Noise Pollution and Environmental Problems are higher in Varkala compared to Kalpetta.
2. As per the opinion of Experts, the total waste collection is estimated as 5 tons in Vakala and 4 tons in Kalpetta. The waste composition that is, the ratio of biodegradable and non biodegradable waste is 2:3 tons in Varkala and 1.5:2.5 tons in Kalpetta.
3. As per the opinion of Experts, in the collected waste, the presence of the components of solid waste Plastic, Paper and Cardboard are Medium in Varkala Municipality while, Glass, Metal and Clothes are Low. The presence of Compostables are High while, Hazardous Waste, Electonic Waste and Construction and Demolition Waste are not at all present. While considering Kalpetta Municipality, the presence of Plastic, Paper, Compostables and Metal are High but, Cardboard, Glass, Clothes and Construction and Demolition Waste are Low. Hazardous and Electronic Waste are totally absent in Kalpetta.
4. According to experts, Composting is the treatment technique used in Varkala Municipality while, in Kalpetta no treatment methods are used.
5. As per the opinion of Experts, both the Municipalities where, this study is concentrated are following the same primitive method called Open Dumping.

IX.   CONCLUSION
Kerala, the sunny, green State lying in the south west corner of India is known for its landscapes and scenic beauty. The people of Kerala are highly literate and its social and human development indices are incomparably high with other states of India. Its child mortality rate and birth rate are at par with advanced countries. It is the only Sate in India, having a sex ratio (female per 1000 male) of 1084with a positive figure. It is rapidly becoming a world tourist centre and rightly known as 'God's Own Country'. The Tourist Centres of Kerala are highly polluted due to the mismanaged solid waste and the survival of wild life is under severe threat. Any type of man-made development should be sustainable and should not hinder the balance of the environment. Cautious efforts are highly demanded for making the fast depleting resources available for the future generation also.

Being a highly prioritized sector generating revenues to the scale of 38000 crore a year, the tourist centres of Kerala should be absolutely hygienic. But sanitation level of many tourist centres is pathetically low. Thrown away waste, scavenging animals and birds and untidy surroundings are reflections of a typical tourist centre of the state. Sustainable tourism development will find answers to the manifold problems prevailing in the tourism sector of Kerala and authorities must strive for it in a war footing.

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