

Capacity Building for Tourism Infrastructure: A case of Tourism influenced regions in Uttar Pradesh

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Abstract - Tourism is a prime economy globally and is a pillar of Make in India Programme because since the Indus valley civilization India has been a focal point of attraction. The nature of tourist destinations is varied in our country from religious, to historical to architectural and mostly with the geographical context. These factors have evolved tourism destinations, in majority of our states and it functions as prime economy in the tertiary sector of economic influence. Tourism not only impacts the destination but on the other hand gives an economic influx in the allied activities and components and in conjugation supports the periphery of the destination. Many cities even function as tourist transit node as their primary economy. On the contrary due to the high tourism influx in the cities without proper inclusive planned development and management, an immense capacity load on the physical infrastructure and services can be observed. This paper focuses on issues pertaining to Solid waste management and Transportation in religious and historical tourist destinations. Thus, there is a need for capacity building for the infrastructure impacted by tourism, which also shall result in the upgradation of the lifestyle of the urban/ peri-urban area residents. As tourism of a region has a dependency on the infrastructure, this paper focuses on the relationship between tourism potential of a region and the infrastructural determinants of the city and aims to derive a equational model supporting the relationship. The model shall further determine coefficients of the various determinants and suggest the interventions required for upgradation or retrofitting possibilities. The outcome of the paper is to put forward the model suggested above and possible recommendations for policy formulation focusing on the urban area to support the tourism potential of the region.

Key Words: Capacity Building, Urban Tourism, Inclusive Planning, Policy formulation.

1. INTRODUCTION

Travel and Tourism contributes to the three high-priority goals of any country viz: income generation, employment generation, and foreign-exchange transactions. Tourism is a major sector of the economy globally and a pillar of the Make in India program which plays an important role in the development of many countries which can be traced back to the ancient Indus Valley Civilization. The Ministry of Tourism in India is the apex body regulating control over the tourism sector in India which focuses on the Incredible India campaign and simultaneously collaborates with various stakeholder agencies, State governments, Union Territory, and private stakeholders to promote a niche tourism products and system in the country. The tourism statistics of India had evolved from the past with the formation of history which concerns religious, historical to architectural and mostly with the geographical and Geo-morphological character of the destinations. The sector had shown dynamic changes in the statistics over the timeline since post-independence. With the evolving tourism along with destinations, this sector has been transformed into a major industrial category, as it not only impacts the destination but, on the contrary, supports the region adjoining the destination since it helps revenue generation by the process of creating of several economic possibilities for the local residents.

The dynamic tourism growth in the country is been observed from 2.37 million tourists in 1997 to a rise of 10.93 million tourist arrival in 2019, which accounts for 461% growth in the sector in the past two decades. With these rising statistics, it becomes essential to maintain a proactive approach toward catering to the effects of the tourism in a region. The tourism sector has been classified into several typologies like eco-tourism, heritage tourism, cultural tourism, Vedic mini-city tourism, Agri-tourism, craft-handloom tourism, weekend tourism, adventure tourism, caravan tourism, MICE tourism, wellness tourism, water tourism, rural tourism, sports tourism, etc. The government of India envisages many sectoral plans for the economic, social, and environmental fronts. These include the development and management of tourism destinations, conservation of the environment, cultural significance, and the product. The prime focus lies upon generating employment opportunities, community participation, cleanliness (Swachh Bharat Mission), and skill development. Based on the impact of tourism a need rises for the demand for the infrastructural facilities to cater to the tourism demands and ensure sustainable development for the tourist destinations. Infrastructural dimensions include transportation, water Supply, sewerage-sanitation, and solid waste management.

2. LITERATURE REVIEW

A region's tourism potential is defined by its physical, cultural, climatic, and landscape characteristics and this is encompassed in the literature available on tourism attractiveness (Suryawanshi, n.d.). Analysis of sectors and factors impacting the inbound and outbound tourism in Vietnam was conducted through an analytical hierarchy process that ranked destinations according to the conditions of the destinations, as defined by the transport (Hoang, 2018), Using the partial adjustment method the author defines a relationship between the tourist demand and the physical infrastructure of a (Suraj V Ayyappan, 2014). Infrastructure plays an import role in destination development and have been defined as factors based on the income of the tourists, distance and relative prices of tourists have been cited as materials in forming the tourism demand equation that helped in establishment of relationship. (Seetanah B, 2011). A study on the Smart city initiative on tourism development was analysed using Analytical Hierarchy process to examine the priorities. (Seunghwan Myeong, 2018). A methodology was described in the analysis of the region of Murshidabad in West Bengal, India examines the factors of tourism with infrastructure and suggest a relation of dependency using Weighted sum method. (Abdulla Al Mamun, 2012).

3. RELATION OF TOURISM WITH TRANSPORT AND SWM INFRASTRUCTURE

Basic infrastructure such as water supply, solid waste management, sewage treatment and transportation, is essential for the development of a region and is a major economic driver that is influenced by tourism. Transportation infrastructure is critical for regional development, as it acts as a mediator between the Tourism Generation zone to the Tourism Destination zone by providing accessibility to the tourists. Acting as a factor of economic growth as it not only providing accessibility but also provides connectivity to the tourism products and services. While, Municipal Solid Waste Management (MSWM) is an important urban basic service that has an impact on a region's public health and environment. In developing country like India, tourism creates more challenges for the collection and management of waste due to tourism influx. Tourist inflows and accompanying development can significantly increase the volume of the Municipal waste, posing a threat to the health and Hygiene of the residents. According to Zorpas, Voukkali, and Loizia, a hotel visitor can generate an average of 1 kilogram of solid trash every day (2015) as compared to a standard 400 grams of waste as per Indian Standards of URDPFI. International tourists generate more trash than domestic visitors due to higher consumption and per capita hotel floor area.

Thus, Local governments in tourist destinations step forward to deal with the "tourism effect," on Infrastructure by increase of capacity in the Destination zone than the other zones, due to a higher production of nonbiodegradable waste such as PET bottles, plastic packaging, and augmentation of the existing Transportation facilities such as the regulation over the Non-Motorized Transportation. (Gidaracos, Havas, & Ntzamilis, 2006).

United Nations World Tourism Organization works towards providing guidance and share good practices on policies and governance models aimed to effectively support the tourism sector at the different levels such as national, regional and local. The governance directive and models' structure and policies promote structuring of Tourism policy and strategic planning, including Governance and vertical cooperation, i.e. national-regional-local levels and Public Private Partnership (PPP) strategies. URDPFI developed by the Government of India resolute in extensive consultations with various Ministries, experts, professional and academic institutions, and other stakeholders. Transportation and Solid waste management are the sectors of Infrastructure of a city that is mostly impacted due to tourism influx, as these sector experiences direct dependency of mobility of the tourist and generation of thrash. In order to conduct the research, work the study is divided city and infrastructural determinants were identified.

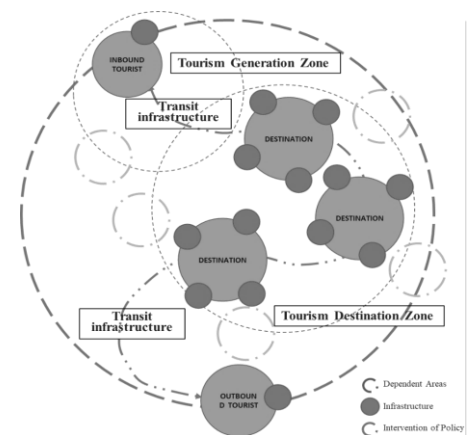


Fig 1: Conceptualizing Tourist Zones

3.1. DETERMINANTS OF STUDY

The regions of the state of Uttar Pradesh in India are been delineated as per the tourism influence factors and network analysis has been done based on the factors of the determinants of Transportation, Solid waste management and Accommodation. A number of determinants has been sorted which indicates towards the study of Tourism Potential (TP) and its impact on the infrastructure(s). A series of case study were made on the grounds of Transport, MSWM and Accommodations on cities like Varanasi, Lucknow, Ayodhya and Prayagraj (formerly Allahabad) and common determinants were identifying and data collection was done for each case (city) on an urban scale. Following determinants were identified and each determinant was supported by

a code i.e, for Transportation determinants like Generation of Tourists (T_Gen), Modal Choice (M_Cho), Condition of Roads (R_Con), Number of Destinations (N_Des), Permanent Population (P_Per) and Population Floating (P_Float).

While for MSWM determinants such as Waste Generation (W_Gen), Collection cycle (W_cyc), Floating Population (T_Flow), Household Size (HH_S), Number of Accommodations (N_Acco), Disposal and treatment facilities (W_Disp) are been considered. Whereas, For Accommodation determinants like number of Accommodations (N_Acco), Duration of stay (D_Stay), Category of Hotel (H_Cat), Distance of Accommodation form Destination (D_Acco), Number of destinations (N_Des), Floating population (P_Float) and Availability of Hotel (HA).

Primary survey and Secondary data were collection was done through google forms at destinations to follow the COVID protocols.

4. DATA COLLECTION AND METHODOLOGY

Data collection for the study aimed at the Primary and the secondary sources of data available from Various departments and through Master Plans of the respective cities of Lucknow, Varanasi, Ayodhya and Prayagraj (formerly Allahabad). The primary collection of the data was the through Perception survey of the residents conducted through google forms. The data collected was interpreted and analyzed through the following methodology:

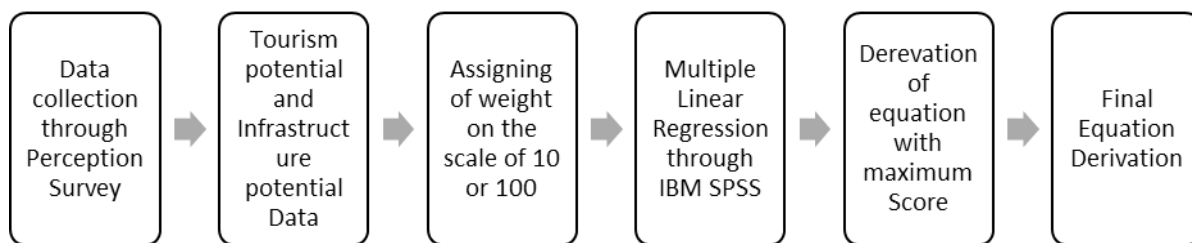


Chart -1: Methodology

4.1. TOOLS AND TECHNIQUES OF DATA COLLECTION

A perception survey is a study or research effort that collects opinions about a factor or an issue under study. This information is mostly qualitative, which means it will be based on opinion rather than facts. The participants are generally asks multiple choice questions or Yes/No Questions or might be given choices such as "excellent, better, best., good, poor and bad.

A series of questions are framed to analyses the Tourism potential to the Infrastructural potential, such as Age Group, Direction of entry into the city, Number of tourist Spot covered in the City, Attractiveness of the Cultural and Historic Sites, Aesthetics and the Art value of the city, Travel cost, Travel length to tourist destination, and Quality of the local tourist product, which helped to frame the Tourism Potentiality of the region, while determinants such as Travel Mode, Road conditions, Solid waste Disposal rating, Duration of stay, Probability of finding a hotel room, Distance of Accommodation from destination, Category of the Accommodation provided information to frame the Infrastructural Potential.

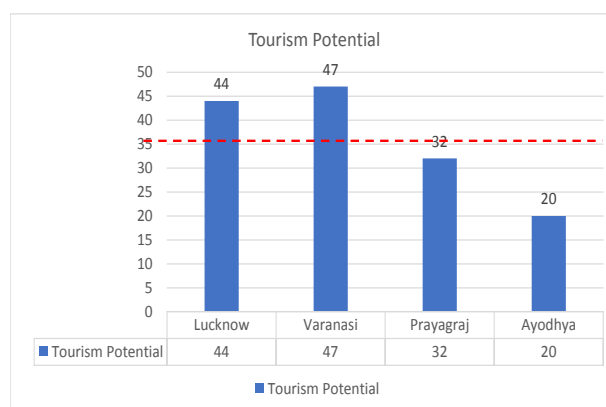


Chart -2: Ranking of the Cities

All the questions are ranked and the mean average is calculated for each section with a minimum 30 survey. All the means are rounded of out a weight of 10 or 100 and plotted on the Scatterplot. The process is repeated for each of the 4 cities in observation.

- i. Lucknow = 44
- ii. Varanasi = 47
- iii. Prayagraj / Allahabad = 32
- iv. Ayodhya = 20

Based on the Analysis of Tourism potential VS Infrastructure, a Basic Minimum Average Value of 35.75 is calculated, through which the city eligible in the circuit is shortlisted. Lucknow (LK) and Varanasi (VA) is above the mean, Allahabad (AL) is near the mean, but Ayodhya (AY) with a score of 20, doesn't qualify to be in the circuit, hence it can be improved by improvement of infrastructure.

Linear Regression was used to analyze the set of data in form of ranks using IBM SPSS.

Following assumptions are taken for the selection of Case study:

- i. Geography of the destination is to be constant to perform reliability test, in order to reduce errors in analysis.
- ii. Market conditions are assumed constant.
- iii. Analysis is to be made on same scale
- iv. Tourism Typology must be constant.

5. RESULTS

The process of modelling numerous answers, or dependent variables, using a single set of predictor variables is known as multivariate multiple regression. It regresses each dependent variable on the predictors independently.

A three-step analysis was taken into account using Multi Linear regression and SPSS outputs frame a relationship between the determinants and helps in equation formulation.

5.1. TRANSPORTATION

An enumeration of data is done on the Basis of the variables as listed above,

Table -1: Variables of Transportation

	LUCKNOW	Weight on Score 10	VARANASI	Weight on Score 10	PRAYAGRAJ	Weight on Score 10
Generation of Tourist (T_Gen)	4950000	3.22	6000000	3.91	4400000	2.87
Modal choice (M_Cho)_	-	-	-	-	-	-
NMT	143550	2.00	162000	2.25	413600	5.75
Private	2182950	3.78	1944000	3.37	1650000	2.86
Pedestrian	143550	1.17	810000	6.58	277200	2.25
PT	2475000	3.25	3084000	4.05	2063600	2.71
		2.55		4.06		3.39
Condition of Road (R_Con)	2578	4.34	2277	3.83	1086	1.83
No. of destination (N_Des)	63	5.43	39	3.36	14	1.21
Population permanent (P_Per)	2817105	5.49	1198000	2.33	1117000	2.18
Population Floating (P_Float)	13500	2.41	30000	5.36	12500	2.23
		33.63		39.10		27.27

The dependent variable for the Study is **Generation of tourists.**

- i. Check for R and R²

Table -2: R & R² Table

Model	R	R Square	Adjusted R ²	Std Error of the Estimate	Durbin-Watson
1	1.000 ^a	1.000			0.333
a. Predictor Constant: M_Cho, R_Con					
b. Dependent Variable – T_gen					

The Result being 1 shows a positive indication of relation between the Variable

- ii. Analysis of Coefficient

Table -3: Coeff. Analysis Table

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig	91.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	0.340	0.000				0.340	0.340		
R_Con	0.330	0.000	0.826			0.330	0.330	0.935	1.070
M_Cho	0.568	0.000	-0.812			0.568	0.568	0.935	1.070

a. Dependent Variable: T_Gen

The variance inflation factor (VIF) is a metric for determining how much multicollinearity there is in a collection of multivariate regression variables. If a VIF is greater than ten, substantial multicollinearity is present, according to a rule of thumb often employed in practice. The regression is in reasonable form in this case, with values around 1.

A formula for Transportation can be derived as such –

$$Y_{trans}=0.33(R_{con}) + 0.568(P_{Float}) + 0.34.....(1)$$

5.2. Solid Waste Management

An enumeration of data is done on the Basis of the variables as listed above,

Table -4: Variables of SWM

	LUCKNOW	Weight on Score 10	VARANASI	Weight on Score 10	PRAYAGRAJ	Weight on Score 10
Waste Generation (tourism) (W_Gen)	74.25	2.41	165	5.36	68.75	2.23
Collection cycle (W_Cyc)	3	4.29	2	2.86	2	2.86
Tourist flow (T_Flow)	4950000	3.22	6000000	3.91	4400000	2.87
Population (W_Pop)	2817105	5.49	1198000	2.33	1117000	2.18
Household Size (HH_S)	5.6	3.33	5.6	3.33	5.6	3.33

No of Accommodation (N_Acco)	4040	2.56	9298	5.89	2443	1.55
Disposal and Treatment (W_Disb)	900	5.29	400	2.35	400	2.35
waste generation per capita (WG_Cap)	5.5	3.33	5.5	3.33	5.5	3.33
		29.93		29.37		20.70

The dependent variable for the Study is **Waste Generation**

- i. Check for R and R2

Table -5: R & R² Table

Model	R	R Square	Adjusted R ²	Std Error of the Estimate	Durbin-Watson
1	1.000 ^a	1.000			1.000
a. Predictor Constant: W_Disb, T_flow					
b. Dependent Variable – W_Gen					

The Result being 1 shows a positive indication of relation between the Variable

- ii. Analysis of Coefficient

Table -6: Coeff. Analysis Table

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig	91.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	-5.702	0.000				-5.702	-5.702		
T_Flow	3.010	0.000	0.905			3.010	3.010	0.966	1.036
W_Disb	0.300	0.000	-0.290			0.300	0.300	0.966	1.036

a. Dependent Variable: T_Gen

The variance inflation factor (VIF) is a metric for determining how much multicollinearity there is in a collection of multivariate regression variables. If a VIF is greater than ten, substantial multicollinearity is present, according to a rule of thumb often employed in practise. The regression is in reasonable form in this case, with values around 1.

A formula for Transportation can be derived as such –

$$Y_{swm} = 3.01(T_flow) - 0.30(W_Disp) - 5.702 \dots \dots \dots (2)$$

5.3. ACCOMMODATION

An enumeration of data are done on the Basis of the variables as listed above,

Table -7: Variables of Accommodation

	LUCKNOW	W	VARANASI	W10	PRAYAGRAJ	W10
Number of Accommodation (N_Acco)	4040	2.56	9298	5.89	2443	1.55
Duration of Stay (D_Stay)	2	2.86	3	4.29	2	2.86
Category of Hotel (H_Cat)	3	3.33	3	3.33	3	3.33
Distance of Accommodation from Destination (D_Acco)	4	3.33	4	3.33	4	3.33
No of Destination (N_Des)	63	5.43	39	3.36	14	1.21
Floating Population (P_Float)	13500	3.18	16500	3.88	12500	2.94
Hotel availability (HA)	19170	5.52	10544	3.03	5037	1.45
		26.21		27.12		16.67

The dependent variable for the Study is **Number of Accommodation**.

- i. Check for R and R2

Table -8: R & R² Table

Model	R	R Square	Adjusted R ²	Std Error of the Estimate	Durbin-Watson
1	1.000 ^a	1.000			.857
a. Predictor Constant: D_Stay, N_Des					
b. Dependent Variable - N_Acco					

The Result being 1 shows a positive indication of relation between the Variable

- ii. Analysis of Coefficient

Table -9: Coeff. Analysis Table

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig	91.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	-6.390	0.000				-6.390	-6.390		
D_Stay	2.675	0.000	0.973			2.375	2.675	1.000	1.000
N_des	.239	0.000	0.222			0.239	0.239	1.000	1.000

- i. **Dependent Variable: N_Acco**

The variance inflation factor (VIF) is a metric for determining how much multicollinearity there is in a collection of multivariate regression variables. If a VIF is greater than ten, substantial multicollinearity is present, according to a rule of thumb often employed in practise. The regression is in reasonable form in this case, with values around 1.

A formula for Accommodation can be derived as such -

$$Y_{Acco} = 2.675(D_Stay) + 0.239(N_des) - 6.390 \dots\dots\dots(3)$$

As per the Literature study the Summation of the 3 parameters are to be done to achieve the final formula to analyze the tourism potential of a region or destination

6. FORMATION OF THE EQUATION FOR TOURISM POTENTIAL

From the above analysis and interpretation of data using SPSS, Potentiality equations are being derived for the highest value Intercepts, hence the final equation would be the summation of the infrastructure potential equations. (Abdulla Al Mamun, 2012)

Tourism potential = Infrastructure potential of Transport + Infrastructure potential of Solid waste Management + Infrastructure potential of Accommodation. Hence,

$$\sum Y = 0.33(R_con) + 3.578(P_Float) - 0.30(W_Disp) + 2.675(D_Stay) + 0.239(N_des) - 11.752 \dots\dots\dots(4)$$

7. IMPLEMENTATION OF STRUCTURAL EQUATION

The formed equation is to be implemented for each city under study to understand the actual Tourism potential ranking.

$$\sum Y = 0.33(R_con) + 3.578(P_Float) - 0.30(W_Disp) + 2.675(D_Stay) + 0.239(N_des) - 11.752 \dots\dots\dots(4)$$

Following are the values for City wise analysis:

Table -10: Implementation of

	Intercept 1	R_Con	Intercept 2	P_Float	Intercept 3	W_Dis	Intercept 4	D_Stay	Intercept 5	N_Des	Error	Result
YLK	0.33	4.34	0.3578	2.41	0.30	5.29	2.675	2.86	0.239	5.43	- 11.752	= 2.58177
YVA	0.33	3.83	0.3578	5.36	0.30	2.35	2.675	4.29	0.239	3.36	- 11.752	= 27.9175
YAL	0.33	1.83	0.3578	2.23	0.30	2.35	2.675	2.86	0.239	1.21	- 11.752	= 21.7948

YLK = Tourism Potential of Lucknow, YVA= Tourism Potential of Varanasi, YAL= Tourism Potential of Allahabad

With the above values the outcome can be classified under 3 major classes

- i. TP < 20 - Critical need of Infrastructure to support Tourism
 - a. Preparation of Tourism Master Plan
 - b. Preparation or Modification in CMP
 - c. Setup of Tourism Cell under Local Government
 - d. Empowering Local Government with better structure of SWM
 - e. PPP for Accommodation infrastructure
 - f. Dedicated Transport system to ensure lower congestion and Higher LOS on local road.
 - g. Training and employment of Tourism related Tertiary sector workers.
 - h. Participatory approach by Diagnostics, Consultation, and Action plan
 - i. Policy Guidance Document that mobilizes all Municipal policies and Tourism Ecosystem across a broad circuit.

- ii. TP = 20 -24.89 - Potential need of Infrastructure to support Tourism
 - a. Preparation of Tourism Master Plan
 - b. Preparation or Modification in CMP
 - c. Setup of Tourism Cell under Local Government
 - d. Empowering Local Government with better structure of SWM and Revenue Structure.
 - e. PPP for Accommodation infrastructure and Control over Cost Structure.
 - f. Dedicated Transport system to ensure lower congestion and Higher LOS on local road and Increase share of Public Transportation.
 - g. Training and employment of Tourism related Tertiary sector workers.
 - h. Participatory approach by Diagnostics, Consultation, and Action plan
 - i. Policy Guidance Document that mobilizes all Municipal policies and Tourism Ecosystem across a broad circuit.
 - j. Develop niche Markets and International Promotion
- iii. TP > 24.89 - Upgradation of Infrastructure and Governance support Tourism
 - a. Circuit Definition of Tourism Master Plan
 - b. Circuit planning or Modification in CMP
 - c. Improvisation of Tourism Cell under Local Government
 - d. Empowering Local Government with better structure of SWM and Revenue Structure.
 - e. PPP for Accommodation infrastructure and Control over Cost Structure.
 - f. Dedicated Transport system to ensure lower congestion and Higher LOS on local road and Increase share of Public Transportation and Concentration Towards NMT.
 - g. Action plan incorporated with Master Plan.
 - h. Policy Guidance Document that mobilizes all Municipal policies and Tourism Ecosystem across a broad circuit Upgradation of the Peri Urban Area.
 - i. Develop niche Markets and Strengthening assets
 - j. Reinforce Emerging Sector and Digital Enterprises.
 - k. International Promotion.

8. CONCLUSION

Through the process of data collection and interpretation of the data a structural equation has been formed as a result of the study. Through the result or the equation, cities under the assumption of the study can be evaluated to analyze the tourism potential and infrastructural needs can be suggested under the given criteria. The study delineates the tourism potentiality under three range of figures (<20, 20-24.89 and >24.89). Each range of Tourism potential has certain suggested retrofitting possibilities listed, which would help in policy formulation for tourism specific regions.

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CREDIT AUTHORSHIP STATEMENT

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance.

Ar. Sayan Munshi: Conceptualization, Methodology, Visualization, Formal analysis, Writing - original draft. Dr. Subrajit Banerjee: Resources, Visualization, Formal analysis, Writing - review & editing, Supervision. Dr. Indrani Chakraborty: Resources, Formal analysis, Writing - review & editing, Supervision.

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