

## An Assessment of Environmental Sustainability Factors in the Development of Tourism in Swaraj Dweep (Havelock Island) of the Andaman and Nicobar Islands.

SEEMANTA KUMAR DEKA<sup>1\*</sup> and RASHMI BARUAH<sup>2</sup>

<sup>1</sup>Department of BBA (Tourism), Jnrm, Port Blair, Andaman & Nicobar Islands, India.

<sup>2</sup>Department of Business Administration, Ustm, Meghalaya, India.

### Abstract

The core intent of the paper is to study the different environmental sustainability factors in relation to the development of tourism in Swaraj Dweep of the Andaman & Nicobar Islands. The study is limited and based on the different perceptions of tourists concerning different environmental sustainability factors effecting tourism development on the island. Consequently, from various literatures, a listing of different environmental sustainability factors of tourism development has been carried out. A convenient sample survey has been conducted among 400 tourists who have visited the islands to find out their perceptions on the environmental factors. The average perception of tourists shows that "Protection of Natural Vegetation and Marine life" is the most important environmental sustainability factor for tourism development in the islands. The paired sample "t-test analysis" that has been applied by the researcher to find out the degree of influence amongst the different listed environmental sustainability factors in the course of the development of tourism on the islands. The outcome of this paper will help policymakers to devise and execute policies related to sustainable tourism development on the basis of tourists' viewpoint in Swaraj Dweep (Havelock Island) - one of the promising tourist destinations of the Andaman and Nicobar Islands.



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### Introduction


Environmental sustainability in today's context is incontrovertibly an important concept and it has always been a matter of policy-making argument with public scrutiny. Its significance is due to the

fact that it inclines to describe trade-offs with social & economic constituents of sustainable development.<sup>29</sup> It is based on development that is attuned to the conservation of vital natural processes.<sup>32</sup> In the tourism-based industry, the measurement

**CONTACT** Seemanta Kumar Deka ✉ [dekasimanta@gmail.com](mailto:dekasimanta@gmail.com) 📍 Department of BBA (Tourism), Jnrm, Port Blair, Andaman & Nicobar Islands, India.



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of environmental sustainability factors is pre-requisite for maintaining and managing the pliability of ecological structures.<sup>42</sup> It is predominantly imperative in favour of the destination of tourists where activities related to tourism are growing immensely in an environmentally fragile ambience.<sup>57,58</sup> Environmental factors are an indispensable part of tourism. As a tourist, while selecting a destination, environmental factors always play a key role. The different environmental factors available in nature in a tourist destination always offer a vivid flavor of experience to tourists. It acts as one of the major motivational forces for a tourist to travel. The different perception of tourists on environmental factors becomes an important discourse in the planning process of tourism development in a tourist destination.<sup>7</sup> On the blue façade, the Island Andaman and Nicobar is a heaven which is green.<sup>61</sup> This island has tremendous potential to develop as a popular tourist destination, since it is a heaven on the land.<sup>41</sup> In the process of development of tourism in the islands, the resorts with an eco-friendly atmosphere have impacted a lot.<sup>20</sup> The notion of island tourism is very vulnerable in character. The fragile environment of islands is very easily troubled and spoiled through tourism activities. Therefore, there is a pre-requisite plan for environmental protection on the islands.<sup>77</sup> An appropriate developmental plan is obligatory in a tourist destination to uphold equilibrium between the socio-cultural, artificial and natural environments.<sup>55</sup> Hence, the natural, socio-cultural and man-made environment must be considered carefully.<sup>3</sup> Sustainability is the key issue for island tourism. For sustainable tourism development, natural and manmade attractions and activities should be flawlessly balanced.<sup>30</sup> The natural resources like flora and fauna, forests and pleasant weather with natural and manmade attractions like coastal beach resorts on islands are blend of environmental factors that attracts tourist to a specific tourist destination.<sup>54</sup> In the Himalayas, Andaman & Nicobar Islands, Lakshadweep islands and North Eastern region, eco-tourism packages considering the environmental factors of sustainability for tourism development must be promoted with the help of the local community. Local government authorities must provide education and training to tourist guides and the host community in this endeavor.<sup>52</sup> The tour operator also must be encouraged to create an atmosphere where both producers and consumers develop an attitude

through their actions, so that sustainable tourism activities can be established.<sup>12</sup> Thus, in this paper the researchers try to look and figure out the diverse perceptions of tourists on the different environmental sustainability factors and also their degree of influence on the development of tourism in Swaraj Dweep (Havelock Island) in the Andaman and Nicobar Islands.

### Research Site

Andaman and Nicobar is one of the beautiful islands in India. There are 826 islands in total. But only<sup>38</sup> islands are occupied by the public. Port Blair is capital city. About 80% of islands are covered with forests. The two major industries of the islands are “tourism” and “fishing”. But, according to government policies, tourism activities are allowed only among the islands of Andaman’s group and are prohibited among the Nicobar group due to some security, aboriginal and environmental issues. Port Blair, Baratang, Diglipur, Hut Bay, North Bay, Viper, Netaji Subhas Chandra Bose Islands, Swaraj Dweep and Shaheed Dweep are the major tourist destinations belonging to the Andaman groups. Swaraj Dweep was previously popularly known as Havelock Island. Among the above-mentioned major tourist destinations of Andamans, Swaraj Dweep is the most popular tourist destination. It is popular for white sandy beaches, flora and fauna and resorts. The beaches are popular for “water sports tourism activities”.

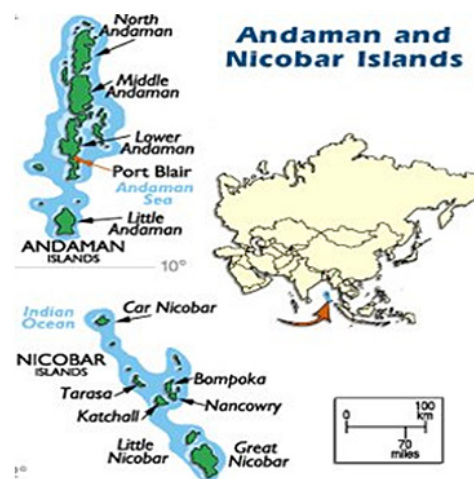
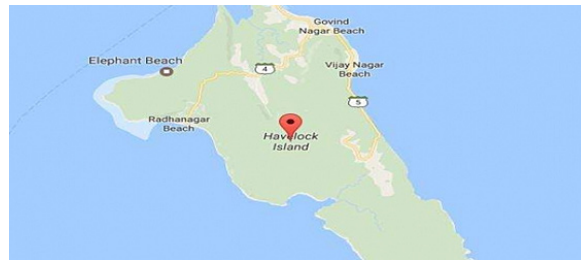


Fig. 1: Map of Andaman and Nicobar Islands



**Fig. 2: Map of Swaraj Dweep (Havelock Island)**

**Table 1: Domestic Tourist Arrivals in Andaman and Nicobar Islands**

Year	Domestic Tourist	% of Growth
2011	202221	----
2012	238669	11.8%
2013	243703	10.2%
2014	285146	11.7%
2015	296684	10.4%
2016	384552	12.9%
2017	487229	12.6%
2018	498279	10.2%
2019	505398	10.1%

Source: [www.andaman.gov.in](http://www.andaman.gov.in)

### Literature Review

Over recent decades, the discourse on environmental sustainability in tourism has grown in importance, due to the fact that the stake holders of the tourism industry have developed a common consensus to combat the undesirable impact of tourism activities on environment by minimizing and limiting the use of environmental resources.<sup>1</sup> Nowadays, though the concept of environmental sustainability could be applied to all spheres of tourism actions.<sup>15</sup> but there is also growing concern and condemnation among stakeholders with regard to its thought process, practices and benefits.<sup>24,36,45,75</sup> Traditionally, environmental sustainability has been taken care of as the main constituent in the discussion concerning tourism competitiveness in tourism literature.<sup>59</sup> It has been particularly viewed as a key agent in the long run for tourism competitiveness in a tourist destination and also its effect on the standard of life of the host populace.<sup>38,39,23</sup> The factors of environmental sustainability have a larger effect in comparison to any other factors on tourism competitiveness.<sup>19</sup> Some few studies also shows that although there is growing interest for, environmental sustainability in

tourism but the recent advances are still inadequate in regard to its both theoretical and practical application.<sup>11,68,87</sup> Hence, there is a growing need for knowledge about environmental sustainability and its applicability in general.<sup>35</sup> It should normally be linked with the requirements of the host populace and not with the industry and should be used in the effective utilization of natural resources in order to defend future mankind's needs.<sup>65,81,86</sup> Tourism development, as widely documented, involves a numeral of positive and negative effects on the environment.<sup>2,37,48,69,78</sup> Generally, it is seen that those islands located in the underdeveloped world are more prone to the negative effect of tourism activities due to its inaccessibility features, lesser size with smaller groups of indigenous people with a dissimilar culture, in particular, striking flora and fauna, and also unhurt environment.<sup>5,46</sup> Around the world, many researchers have studied tourism in an island context, like "Malta", "Seychelles", "French Polynesia", "Boracay Island", "Canary Islands" and "Hawaiian Islands".<sup>10,73,71,84,27,76</sup> while rest deal with island tourism in a common and theoretical manner.<sup>49,18</sup> They are of the opinion that all these islands must take into consideration the effect that cause due to the development of large-scale tourism activities on the economy of the host community of the islands, environmental protection as well as degradation and its cost. These islands also need to address the issues which relate to their social-cultural and political structure. "Carrying capacity" needs to be studied in a scientific manner to restrict the problems associated with environmental sustainability.<sup>10</sup> It is imperative to consider the environmental elements of sustainability, but it is repeatedly overlooked or ignored in comparison to economic sustainability.<sup>17,13</sup> This implies the objective of achieving a balance between 'environmental, economic and community issues', although the question here arises about who should decide

about the exact balance among them.<sup>34</sup> An effective decision should be made about the contending “economic”, “social”, and “environmental” load on sustainable development.<sup>22</sup> Generally, activities involved in tourism can usually have a range of negative impacts on the adjacent environment of a tourist destination. It seems that people's intervention in environmentally delicate spots can cause permanent changes in the existing environmental processes on the islands. This is reflected in the destruction of environmental resources like rich and exotic flora and fauna.<sup>83</sup> A lot of research discussed different environmental sustainability factors of tourism development. Like “geographical features”, “microclimatic setting”, “subsistence of water bodies”, “natural beauties”, “existence of natural vegetation and wildlife”, “surface features”, “geomorphologic structure” etc.<sup>26,43-44,80,8,14,21</sup> Its main plan is to safeguard resources, like natural varieties, and retain sustainable utilization of resources that can fetch environmental understanding for tourists for its preservation and benefits.<sup>4,28,82</sup> The measure for sustainable tourism should contain pointer like “socio-cultural”, “political” and “economic” and “environmental” sustainability.<sup>50</sup> For the sustainable development of tourism, its activities must provide economic benefits to the host community along with environmental protection and restriction in respect to the over-commercialization of the indigenous culture of the locals.<sup>85</sup>

### Methodology

A survey has been conducted among 400 samples during the month of October, 2019 to March, 2020. The samples were domestic tourists who have visited Swaraj Dweep from different states of India. A convenient sampling method has been used for the survey. The tourists have been surveyed in places like harbours, resorts, market places, tourist spots and on the cruise. The data collected from the primary and secondary sources has been analyzed and interpreted with the help of descriptive statistical techniques through SPSS (Statistical Package for Social Sciences). The sample size of the convenient sample has been determined based on Yamane (1967) formula as follows:

$$n = \frac{N}{1 + Ne^2}$$

In the above formula, “n” denotes the sample size, “N” is the average domestic tourist arrivals to Swaraj Dweep, which is 4,34,428 (Average tourist arrivals calculated from the last five years 2015-2019 from table no:1) & “e” is acceptable sampling error taken as 0.05. On basis of the above formula, 400 tourists as respondents were obtained as sample size. In the sample size, the respondents( tourists) were frequently in age group between “18 to 65 years” of age and had given their responses in the statement of the 5 points “Likert scale” representing “strongly agree=5” to “strongly disagree=1”.

**Table 2: Respondents profile (n=400)**

SI.No	Variables	Number	Percentage	
01	Gender	Male	220	55%
		Female	180	45%
02	Age	18-35	232	58%
		36-65	128	32%
		Above 65	040	10%
03	State	West Bengal	48	12%
		Tamil Nadu	44	11%
		Maharashtra	40	10%
		Telangana	36	09%
		Gujarat	32	08%
		Delhi	32	08%
		Uttar Pradesh	28	07%
		Karnataka	24	06%
		Punjab	24	06%

Bihar	20	05%
Haryana	16	04%
Andhra Pradesh	12	03%
Jharkhand	08	02%
Rajasthan	08	02%
Madhya Pradesh	08	02%
Assam	04	01%
Orissa	04	01%
Himachal Pradesh	04	01%
Chhatisgarh	04	01%
Jammu and Kashmir	04	01%

Source: Field Survey

**Table 3: Observed Environmental Sustainability factors of Tourism Development**

Serial No.	Observed Environmental Sustainability factors of tourism development	Sources
01	Pollution free environment	Shelly, L. (1991), Seth, P. (1997).
02	Less crowded tourist spot	Saarinen, J. (2006), Ratti, M. (2007).
03	Eco-friendly products	Rao (2007)
04	Protection of Natural Vegetation and Marine life	Ramet, J. and Tolvanen, A. (2010). Rengannathan, R. (2004).
05	Eco-friendly transportations	Sharma, J. (2007), Punia, B. K. (1997), Ratti, M. (2007).
06	Tourist friendly environment	Pilot survey.

Source: Compiled by the Researcher

**Table 4: Factor analysis on the environmental sustainability factors of tourism development in Swaraj Dweep (n=400)**

SI.No	Environmental sustainability factors of tourism development in Swaraj Dweep	Factor Loading	Mean Deviation	Std
1)	Protection of Natural Vegetation and Marine life	.637	4.75	1.14
2)	Less crowded tourist spot	.756	3.87	1.27
3)	Pollution free environment	.694	3.75	1.28
4)	Tourist friendly environment	.539	3.65	1.29
5)	Eco-friendly transportations	.474	3.59	1.06
6)	Eco-friendly products	.774	3.25	1.10
	Eigenvalues	3.36		
	% of variance	30.43		
	Cumulative variance (%)	55.90		
	Cronbach's alpha	.74		

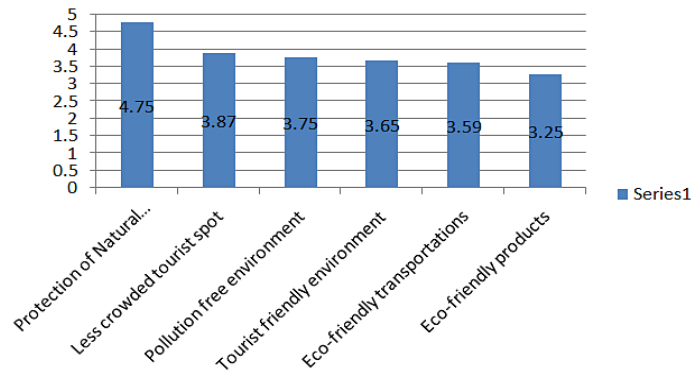
Source: Compiled by the Researcher

**Discussions**

The six environmental sustainability factors have been imperiled to exploratory factor analysis (EFA). The factor analysis (table: 4) has been carried out to identify the tourists (respondents) perception of the environmental sustainability factors for the development of tourism in Swaraj Dweep of Andaman & Nicobar Islands. Appropriateness of data for factor analysis has been evaluated through reliability analysis.

(Cronbach’s alpha) for reliability analysis has been premeditated to test reliability & internal consistency. 0.4 as the cut-off point has been used to include sub-factors in interpretation (table: 4), “Alpha coefficient” for all the sub-factors is shown as 0.74. The value is acceptable as it is above minimum value of 0.50, which is specified for reliability for fundamental research.<sup>56</sup>

**Table 5: Mean score of environmental sustainability factors in descending order of tourism development in Swaraj Dweep of Andaman and Nicobar Islands.**



Source: Compiled by the Researcher

**Table 6: Paired Comparison between factors “Protection of Natural Vegetation and Marine life” with other environmental sustainability factors.**

Sl.No	1 <sup>st</sup> factors	Mean score	Other factors	Mean score	t-value	p-value
01.	Protection of Natural Vegetation and Marine life	4.75	Less crowded tourist spot	3.87	1.074	0.29
			Pollution free environment	3.75	1.325	0.25
			Tourist friendly environment	3.65	1.582	0.18
			Eco-friendly transportations	3.59	2.481	0.01
			Eco-friendly products	3.25	4.996	0.00

Source: Compiled by the author

The paired samples t-test analyses (table: 3) indicate that there are differences in the mean score of factors “Protection of Natural Vegetation and Marine Life” with the other environmental sustainability factors.

But the p-value suggests that there are no significant differences between the factors “Protection of Natural Vegetation and Marine Life” with the other factors like “Less crowded tourist spot”, “Pollution

free environment”, “Tourist friendly environment” as  $p > 0.05$ . However, the degree of similarity varies as the p-value differs among them. Whereas, there are significant differences between “Protection

of Natural Vegetation and Marine Life” with factors “Eco-friendly transportation” and “Eco-friendly products” as  $p < 0.05$ .

**Table 7: Paired Comparison between factors “Less crowded tourist spot” with other environmental sustainability factors.**

Sl.No	1 <sup>st</sup> factors	Mean score	Other factors	Mean score	t-value	p-value
01.	Less crowded tourist spot	3.87	Protection of Natural Vegetation and Marine life	4.75	-1.074	0.29
			Pollution free environment	3.75	0.153	0.57
			Tourist friendly environment	3.65	0.392	0.39
			Eco-friendly transportations	3.59	1.598	0.11
			Eco-friendly products	3.25	3.087	0.00

Source: Compiled by the author

The paired samples t-test analyses (table: 3) indicate that there are differences in the mean score of factors “Less crowded tourist spot” with the other environmental sustainability factors. But the p-value suggests that there are no significant differences between the factors “Less crowded tourist spot” with the factors like “Protection of Natural Vegetation

and Marine life”, “Pollution free environment”, “Tourist friendly environment” and “Eco-friendly transportation”, as  $p > 0.05$ . However the degree of similarity varies as the p-value differs among them. Whereas, there is a significant difference between “Less crowded tourist spots” with the factors “Eco-friendly products” as  $p < 0.05$ .

**Table 8: Paired Comparison between factors “Pollution free environment” with other environmental sustainability factors.**

Sl.No	1 <sup>st</sup> factors	Mean score	Other factors	Mean score	t-value	p-value
01.	Pollution free environment	3.75	Protection of Natural Vegetation and Marine life	4.75	-2.225	0.32
			Less crowded tourist spot	3.87	-0.153	0.57
			Tourist friendly environment	3.65	0.246	0.90
			Eco-friendly transportations	3.59	1.158	0.24
			Eco-friendly products	3.25	3.061	0.00

Source: Compiled by the author

The paired samples t-test analyses (table: 3) indicate that there are differences in the mean score of factors “Pollution free environment” with the other environmental sustainability factors. But the p-value suggests that there are no significant differences

between the factors “Pollution free environment”, with the factors like “Protection of Natural Vegetation and Marine life”, “Less crowded tourist spot”, “Tourist friendly environment” and “Eco-friendly transportation” as  $p > 0.05$ . However the degree of

similarity varies as the p-value differs among them. “Pollution free environment” with the factors “Eco-friendly products” as  $p < 0.05$ .  
Whereas, there is significant difference between

**Table 9: Paired Comparison between factors “Tourist friendly environment” with other environmental sustainability factors.**

SI.No	1 <sup>st</sup> factors	Mean score	Other factors	Mean score	t-value	p-value
01.	Tourist friendly environment	3.65	Protection of Natural Vegetation and Marine life	4.75	-3.225	0.42
			Less crowded tourist spot	3.87	-0.153	0.57
			Pollution free environment	3.75	-0.246	0.90
			Eco-friendly transportations	3.59	1.198	0.14
			Eco-friendly products	3.25	4.061	0.00

Source: Compiled by the author

The paired samples t-test analyses (table: 3) indicate that there are differences in the mean score of factors “Tourist friendly environment” with the other environmental sustainability factors. But the p-value suggest that there are no significant differences between the factors “Tourist friendly environment” with the factors like “Protection of Natural Vegetation and Marine life”, “Less crowded tourist spot”, “Pollution free environment” and “Eco-friendly transportations” as  $p > 0.05$ . However the degree of similarity varies as the p-value differs among them. Whereas, there is a significant difference between “Tourist friendly environment” and the factors “Eco-friendly products” as  $p < 0.05$ .

**Table 10: Paired Comparison between factors Eco-friendly transportations with other environmental sustainability factors.**

SI.No	1 <sup>st</sup> factors	Mean score	Other factors	Mean score	t-value	p-value
01.	Eco-friendly transportations	3.59	Protection of Natural Vegetation and Marine life	4.75	-4.225	0.02
			Less crowded tourist spot	3.87	-3.153	0.16
			Pollution free environment	3.75	-2.246	0.15
			Tourist friendly environment	3.65	-1.198	0.14
			Eco-friendly products	3.25	2.061	0.00

Source: Compiled by the author

The paired samples t-test analyses (table: 3) indicate that there are differences in the mean score of factors “eco-friendly transportation” with the other environmental sustainability factors. But the p-value, suggest that there are no significant differences between the factors “Eco-friendly transportation”, with the factors like “Protection of Natural Vegetation and Marine life”, “Less crowded tourist spot”, “Pollution free environment” and “Tourist friendly environment” as  $p > 0.05$ . However the degree



of similarity varies as the p-value differs among them. Whereas, there is significant difference between “Eco-friendly transportation” and the factors “Eco-friendly products” as  $p < 0.05$ .

**Table 11: Paired Comparison between factorsEco-friendly products with other environmental sustainability factors.**

SI.No	1 <sup>st</sup> factors	Mean score	Other factors	Mean score	t-value	p-value
01.	Eco-friendly products	3.25	Protection of Natural Vegetation and Marine life	4.75	-4.696	0.00
			Less crowded tourist spot	3.87	-3.087	0.00
			Pollution free environment	3.75	-3.061	0.00
			Tourist friendly environment	3.65	-3.097	0.00
			Eco-friendly transportations	3.59	-2.062	0.04

Source: Compiled by the author

The paired samples t-test analyses (table: 3) indicate that there are differences in the mean score of factors “Eco-friendly products” with the other environmental sustainability factors and the p-value suggest that there are significant differences between the factors “Eco-friendly products” with the factors like “Protection of Natural Vegetation and Marine life”, “Less crowded tourist spot”, “Pollution free environment”, “Tourist friendly environment” and “Eco-friendly transportation” as  $p < 0.05$ .

**Table 12: Summary table of environmental sustainability factors with regard to “degree of influence on Tourism Development in Swaraj Dweep of Andaman & Nicobar Islands” as per paired sample “T analysis” (table: 6 to 11) and as per mean score ( table:5)**

SI.No	Environmental Sustainability factors	“Degree of influence on tourism development in Swaraj Dweep of Andaman& Nicobar Islands”.
1)	Protection of Natural Vegetation and Marine life	High
2)	Less crowded tourist spots	
3)	Pollution free environment	
4)	Tourist friendly environment	
5)	Eco-friendly transportations	
6)	Eco-friendly products	Low

Source: Compiled by the author

### Conclusion and Further Scope of Study

As the term “environmental sustainability” in today’s context has been a central point among the policy makers of the tourism industry, hence there is an urgency need of dialogue and condemnation in order to understand or fix the limits of tourism development. The concept of resource-based environmental sustainability is becoming a global

concern and it is relevant to the fragile environment on islands too. The discourse about it has received a lot of attention as the tourism industry has a wide range of negative impacts on destination areas, as well as a lot because of the fact that a destination’s attractiveness is strongly dependent upon well preserved environmental resources.<sup>51</sup> The tourism on the islands always develops a

portrait of imagination for the tourist about the picturesque landscape, adventure activities and the indigenous culture of the populace in order to remove their regular tense times of the cities.<sup>6</sup> In practice, it is normally seen that the development of island tourism is mainly intense to its economic facet by ignoring the socio-cultural, political and environmental issues, thus demoralizing the basic concept of sustainable tourism.<sup>40,16,9,47,33,67,25</sup> Compared to the mainland, the islands are more prone to environmental degradation due to mass tourism activities because of their fragility nature. Therefore, tourism development in the islands must adopt strategies of environmental sustainability. It is seen that, in comparison to other provinces in India, the Andaman and Nicobar Islands are facing serious developmental problems due to their geographical isolation. Limited accessibility resources with underdeveloped infrastructural facilities, unlike the mainland, compel a grave restraint in the development of island tourism. Moreover, with high quality and striking environmental resources, the islands have the prospect of developing into a premium destination for tourists. In other words, it could be said that tourism development may become an effectual substitute choice for the economic development of the islands. It is also noticed that seasonality is one of the important challenging factors affecting the economic sustainability in an islands thereby impacting the quality of life of the host populace.<sup>53</sup> The approaches relating to environmental sustainability so far are beneficial in limiting the harmful effect of mass tourism activities on islands. This approach may be adjoined with the concept of economic sustainability in the

process of development of tourism in the islands. Further scope of studies could be carried out in this regard. The different environmental sustainability factors discussed in this paper are a meticulous outcome for the long-standing environmental sustainability of tourism development in Swaraj Dweep (Havelock Island) of the Andaman and Nicobar Islands. Policy makers should think and realize that a slow and protected overall development surrounding the environment with economic and socio-cultural sustainability is possibly more desirable in an island tourist destination.

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#### Conflict of Interest

The authors/researchers declare no conflict of interest.

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