

# Environmental Carrying Capacity and Tourism Development in Maharashtra

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## Introduction

Tourism in the form of activity influences the regions in which it is developed and received with economic, social, cultural, and environmental dimensions (Arrow et al. 1993). In most of the development programmes and studies the focus is given only on economic and social dimensions where as environmental dimension is under estimated or ignored (Brown et al., 1997). Therefore, it is essential to maintain the balance between tourism and the environment which helps to develop the policy for the tourism development of an area and imposition of the special limits. Thus, the tourism does not lead to the degradation of the environment and in long terms to the tourist disdain of an area, but in its protection or its conservation (Bramwell and Lane 2000; Hall 2000). In other words, the environment influences the tourism and vice versa. The environment of region is negatively influenced most times by the increase of tourism, whereas the growth of tourism depends on the quality and characteristics of the environment (Bushell, 2002).

Maharashtra is the third state of India, both in area and population. It is located on the west coast line along the lush green konkan region. Nestled in the western ghats and the sahyadri mountain range are several hill stations and water reservoirs with semi-evergreen and deciduous forests. The vidharba region of Maharashtra, with its dense forests, is home to several life sanctuaries and nature parks. The state abounds in numerous tourists attractions ranging from ancient cave temples, unspoiled beaches, ancient forts and monuments, forests and wildlife, unique hill stations, pilgrimage centres and rich tradition of festivals, arts and culture.

Above all factors promoting the Ecotourism and hence ecotourism is growing more rapidly in Maharashtra. At present it is attracting lot of domestic and foreign tourists. Since more and more tourists arriving, the government is considering ecotourism as one of the main source to generate the income. If ecotourism grows more rapidly beyond certain extent several problems can emerge (Brown et al., 1997). These can be environmental problem, related cultural and social changes, distribution of traditional and economic activities etc. Even the local population may not be willing to tolerate visitors beyond the particular limit. When an area is used beyond its capacity, the character and the quality natural resources changes is downgraded and destroyed. The increased inflow of either local or foreign tourists beyond the carrying capacity of the area may deteriorate the area due to increase luxury hotels, shopping centres and fun plaza in ecotourism places (Lindberg, et al, 1997). Ecotourism has every threat to wipe out the plant and wildlife species and further it may lead to replace the entire ecosystem in artificial landscape. (Gossling, 1999).

There is a need to preserve and protect the fragile natural sites, wildlife and ecosystem, and at the same time there is a need to educate people and to create employment in order to fight poverty and misery (Bill, 2001). One way to deal with this problem is to find the carrying capacity. Any tourism beyond the acceptable carrying capacity should be strictly prohibited. The carrying capacity can be in relation to environment, social and economical (Trokolis, 2003). In the environmental approach it is defined as the ability of natural resources and ecosystem to support the tourism development. Shelby (1987) proposed more general definition for carrying capacity: The level of use of an area without exceeding the certain levels.

There are number of reasons why carrying capacity can be benefit to Maharashtra viz., 1) The tourist destinations absorb the tourism growth before the negative results become perceptibility by host community (Lane, 1994), 2) Visitors will experience the quality service in the form of food, accommodation and transport (Lindberg et al., 1997), 3) It helps to plan the tourism in such a way that it is not a burden to any part of the area, 4) Material and technical infrastructure help to save the energy, the guaranteed cleaning of waste and the taking of remedial measures for the protection of local environment and 5) It helps the management to plan the strategy which reflect a predetermined set of environmentally and socially desirable conditions (Williams and Gill 1991).

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## Methodology

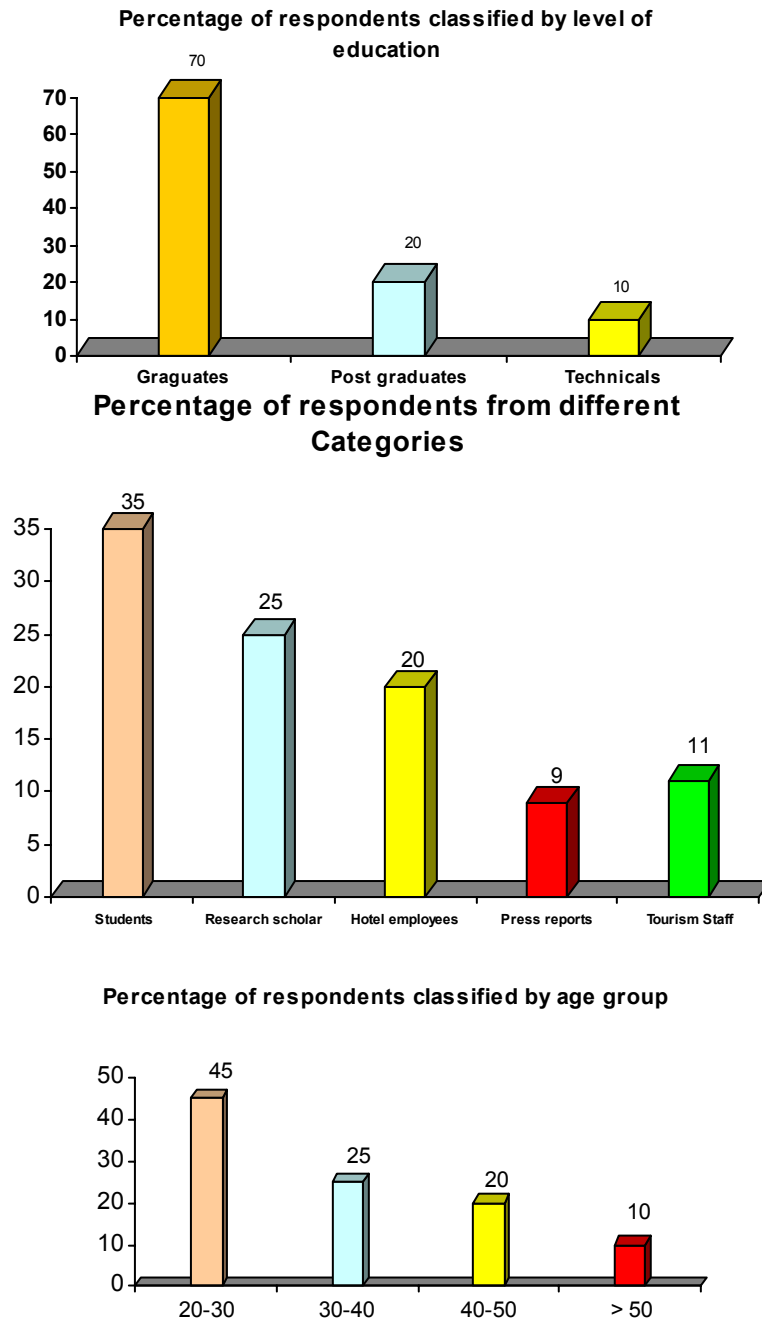
A detailed questionnaire was designed and developed with view to obtain the need to adopt the carrying capacity norms, background information, tourists experience, environmental impact and advantages of carrying capacity. During the survey all together 100 effective face-to-face interviews were made from different categories between the age group of 20 to 60 years such as Hotel and tourism management students, Research scholars, Press reporters , Staff of India Tourism Department , Hotel employees During the survey two tourists spots were selected one is the heritage fort site Raighad Fort another one is environment friendly hill station Matheran.

a).Raighad Fort : This is the centre of Maratha Kingdom and Shivaji's capital. This also where his coronation was held and where he breathed his last. Shivaji Maharaj stayed here for seven years. Raighad is situated at a height of 869 mts above the sea level and runs 12km from east to west and one kilo meter from north to south. What makes it the great Maratha's obvious choice is its formidable line of natural defences. The fort is perched on a detached hill belonging to the sahyadri range and the climb towards the fort is so dangerous that only wind could climb up and water could flow down. From the original entrance 1450 steps are there to reach the fort. In 1996 a ropeway was started by Jog Engineering .

The majestic Maha Darwaja, Palki Darwaja, Mena Darwaja, Chor (Wagh) Darwaja are awe inspiring. The Darbar or audience hall where the throne was placed is reputed to be so acoustically designed that one can here even whisper from the Maha Darwaja. There are remnants of foundations of the Queen's (stambh), chieftains and ministers' wadas (Bunglows). There is Jagdishwara temple with Hanuman idol and a Shivaling. It is said that Shivaji met Kavi Bhushan Here for the first time. Of the rooms, Nagarkhana which is still intact lies in a straight line with the Meghdambari where once the famous golden throne of shivaji weighing 22 tonnes stood. Around the fort there are number of interesting places. One of these Hirkani point, named to serve as a memory of the courageous hirkani, milk seller who scaled down this steep mountain to join her child back when the gates of the fort were closed for the evening. Another is Takmak Tok , the point where prisoners were thrown down. A visit to Shivaji's revered tomb and his faithful dog Waghya completes one's pilgrimage of shivteerth.

b).Matheran: Matheran was discovered by the Hug Malet , collector of Thane in 1850. At an elevation of 800m (2,625ft) above the sea level the hill station matheran is located. It is 100km away from Mumbai. Matheran literally means jungle or forest on top. All motorized vehicles are banned here. The road are not tarred are made of red laterite earth. The only modes of transport is toy train or horseback , man pulled rikshaw or on foot. It is declared as eco sensitive region by Union Environment Ministry. In matheran several parts of the mountain s have eroded, creating good look out points all names after the British who discovered them.

The climate is mostly moderate. The temperature in summer averages 20-30 degree centigrade. In winter it fluctuates between 15-20 degree centigrade. The best time to visit matheran is Sept to March. There are over 150 types of trees and several medical plants to be found in these evergreen forests. The places of interest are charlotte lake, panorama point which is known as ' King ' of all points, sunset point, housia point which is special for resounding echo, chowk point which is known for one tree hill point, Dasturi and mount berry which stop all motorized vehicles, Mallet's spring which does not dry up even in summer. The most commonly found animal in matheran is monkey. At times wild cats, spotted deer and hares also abound here. A large variety of birds, including larks, kingfishers, robins etc can be found. The local depend mainly on tourism for livelihood. There are several handicrafts stores catering to large tourist population. Deerskin shoes and chapels are a specialty.



**Fig.1: Graphical representation of respondents interviewed for the study.**

### Results and Discussions

The significance of tourists carrying capacity of an area which is associated with a) the ability of tourism destination to absorb the tourism growth before the negative results become perceptible by the host community b) the level of tourism growth beyond which the particular destination ceases to attract and to satisfy the tourists (Arbatizs.et al )

Most of the interviewed respondents were in the higher middle income group or in the upper income group. Only 5% of the interviewed tourists were in the lower income group. From the surveyed tourists it was

found that (fig 1) the largest group of individual between 20-35 years. The average education level of the tourists was literate. Majority of the respondents (70%) were graduates followed by post graduated (20%) and remaining 10% were technical diploma holders. Thus, the socio economic characteristics of the surveyed tourists appeared to be consistent with the hypothesis that carrying capacity may be associated with the young, better educated (WWF, 1995 and Miller and Malek,1996.)

During the survey it is observed that all the respondents enjoyed visiting different tourist's destinations in Maharashtra. Only 50% of the surveyed respondents had been to all the famous tourist places, All the respondents had been to Matheran and Raighad Fort. Tourists places are visited by the tourists were during weekends and vacation. Only few tourists had been during weekdays. During the survey it was observed that majority of the respondents (98%) were booked the accommodation in advance as both the places were popular and crowded during the vacation and weekends. Though the accommodation was booked in advance majority of the respondents were unhappy with the guest room layout. They complain that to accommodate more number of tourists the hotel owners have given less amenities. This is due carrying more number of tourists at a particular time which in turn makes area more congested and overcrowded. Only few (14%) respondents were quiet happy with their accommodation facilities as they were belonging to higher income group and stayed in their own or farm houses and bungalows.

As mentioned earlier popularity of the place and attracting more number of tourists at a time especially during weekends and it lead to heavy traffic jam on the road. At the fort tourists spent four to five hours in a queue to get an entry to the fort through rope way. On an average 2000 thousand tourists visit the fort during the weekends

Data collected from the survey at both (Raighad fort and Matheran) revealed that the majority of the respondents were convinced that adopting carrying capacity norms at these places is must as they produce maximum level of comfort to the tourists at tourist places. Only 12% of the tourists stated that they didn't understand the concept of carrying capacity. The perceptions of the sampled respondents were high to enjoy the tourist's places. They feel that they should spend less time for waiting to get an entry at sites especially in the fort area. The carrying capacity norms determine maximum capacity or maximum number of individuals in the unit of surface per day and season, so that the sustainable development can be achieved. As mentioned earlier in the methodology, the questionnaire was designed to collect the information with respect to tourism experience, environmental impact and need of carrying capacity (Gossling, 2000). The findings are explained below:

A. Tourism Experience: It is observed that most of the respondents enjoyed visiting all the different tourists' destinations of Maharashtra (Table 2). They have visited these places during weekends and vacations. Some respondents had been to these places during weekdays also. Tourist's places are always crowded as they are more popular.

B. Accommodation Facilities: Since the entire tourist places are so popular that they are always crowded. So it is difficult to get accommodation during the peak season. During the survey it was found that most of the tourists (98%) book the accommodation well in advance. Though it is done in advance but the tourists are not happy with the room layout of the hotel. To accommodate more people in a limited place the hotel owners have provided less amenities as compared to the required standards. So it makes the place congested and crowded causing inconvenience to the tourists. Due to this majority o the tourists (86%) are unhappy about it where as only few people are happy with accommodation as the stay in the bungalows or farm houses (Table 3).

C. Transport problems: During the survey it was found that all the buses and trains were crowded (79%) especially during weekends and majority of the tourists arrange their own vehicles to reach the sites, so this creates the traffic problem at the tourist places and they do not get enough place to park their vehicles (Table 3).

D. Environmental Impact: Most of the surveyed respondents(89%) experienced that there would be maximum negative impact on the environment as a result of developing tourism, they experience that more forests degradation might take place in and around the area because of tremendous demands for area by encroachment of hotels and restaurants

(Table 4). The degradation of surrounding environment and forests might lead to the loss of energy, wild life and beauty of the area. They further emphasized that ignorance and lack of awareness at these sites may lead to increase accumulation of solid waste, increase level of air and water pollution etc. At the same time heavy rain fall at these sites (Raighad and Matheran) have swept away the soil from top towards the down and made an area more fragile and unstable at the foundation level (Prohaska, 1999).

In Raighad already certain parts of the fort is falling off and destroying the landscape of the fort and pedestrian path (Table 4). It was also noticed that local microenvironment is also disturbed by the continuous visit at these places. In Matheran, on the name of developmental projects, certain negative impact is occurring which is destruction of natural resources, loss of traditional knowledge of indigenous tribal people etc. These people are becoming increasing vulnerable to exploitation on the name of development activities, where tradition wisdom and knowledge and natural resources have been expropriated for business interests. These are serious concern for the survival of present world communities. (Battacharya and Smrithi kumari 2004). According to PATA (Pacific Asia Travel Association) focuses on organizing environment friendly tourism can contribute to the development of areas worthy of conservation as well as determine the level of development. It is not the tourists volume which causes ecological and cultural damage but the absence of adequate thought- out policies to handle any form of growth. The environmental carrying capacity is quiet ecstatic and can withstand considerable tourism growth provided it is carefully planned and managed. Thus environmental impact assessment becomes an integral step in the consideration of any site for a tourism project (Bhattacharya and Smriti Kumari, 2004).

E. Consideration of carrying capacity: In every case it has become necessary to do a detail study about the carrying capacity of any tourist location .The carrying capacity defines the determining the maximum number of people that a location could tolerate without beginning to deteriorate (Brown et al 1997). It further determines the optimal number of people required so as to sustain it both economically as well as environmentally. Maharashtra should adopt a model development that suits the need of its people and is compatible with its socio-cultural milieu (Table 1 and Table 5).

Tourist impacts on the environment, society, and economy are complex. The IUCN (1992) lists tourism as the second major threat to protected areas. If ecotourism grows rapidly beyond a certain extent several problems can emerge. These can be environmental problems, related cultural and social changes, disruption of the traditional economic activities etc. Even the local population may not be willing to tolerate visitor's beyond a particular limit. One way to deal with this problem is to find the carrying capacity of the region. Any tourism beyond the acceptable carrying capacity should be strictly prohibited. The carrying capacity can be physical, social and economic (Walker, 1995 and Prohaska, 1999).

**Table 1: An approximate estimate of tourist capacity per day of the selected tourist spots of Maharashtra as perceived by the experts, urban planners and local people.**

Sl. No.	Name of the eco-spot	Carrying capacity
1.	Ajanta	200
2.	Ellora	200
3.	Raighad fort	200
4.	Elephanta	100
5.	Muradjanjeera	250

The study reveals that there are different approaches of carrying capacity. The main approaches of carrying capacity which are physical, environmental, economical and social. In the physical approach it is defined as allowing optimum number of tourists at the sites, in environmental approach tolerance of tourists at the certain level, the economic approach is that accommodating the tourists function without the loss of local activities and finally socio-cultural approach defines the participation should keep the local social-culture as original (Taylor, 2003).

The above said approach concept found only in few respondents (55%). However most of the respondents (80%) express that determination of carrying capacity at these sites bring lot of positive changes to the environment as well as tourists. Optimum number of tourists, good quality service, less pollution, proper security arrangement and enough time to explore the beauty of the site.

Results of the 100 respondents surveyed in Maharashtra on Carrying Capacity  
Tourism Experience

**Table 2: Visit to different tourists places**

Tourist destinations	Percentage of response
1.Heritage Sites	18
2.Pilgrims	42
3.Beaches	23
4.Hill stations	28
5.National Parks	73
6.Near by famous sites	21
7.Wild life sanctuaries	75

**Table 3 : Tourists problems**

Problems Faced	Percentage of response
Accommodation	86
Food	78
Transport	79
Prolonged queue	82

#### B. Environmental Impact

**Table 4 : Problems due to exceeding capacity**

Problems	Percentage of response
Deforestation	85
Land slides	20
Soil Erosion	50
Pollution	92
Sewage	95

#### C. Importance of Carrying Capacity

**Table 5 : Benefits of carrying capacity**

Benefits	Percentage of response
Protection of originality of sites	95
Hygiene maintenance	75
Good quality service	90
Time saving	77
Less damage to the environment	87
Ensure the security	89
Well Planned infrastructure	78

Challenges of Carrying Capacity: Although there is need of carrying capacity to protect the tourism environment, but there are challenges which are 1)It is difficult to calculate the maximum number of visitors as the tourists visits vary during peak season, daily, weekly yearly. 2) Carrying capacity is the blunt instrument which does not answer the question “how much is too much”. 3) It may discourage the tourists to visits the sites.

4) Well planned infrastructure might help the problem of over crowding tourist sites.

#### Conclusion

Tourism, if it is to be a vehicle of culture, prosperity and peace, must conserve without damaging, protect without plundering, and create without destroying. Carrying capacity in eco-tourism provides local benefits - environmentally, culturally and economically. Ecotourism is "responsible travel to natural areas that conserves the environment and sustains the well-being of local people." Our goal is to enable people to enjoy and learn about the natural, historical and cultural characteristics of unique environments while preserving the integrity of those sites and stimulating the economic development opportunities in local communities. Ecotourism can have an adverse impact on natural resources and environment, if sufficient safeguards are not adopted. The over all long term success of nature-based tourism depends on how well

the natural resources like forest, wildlife, etc., are managed. A harmonious combination of natural and cultural and historic heritage components in eco-tours adds value to them and makes them more attractive. Maharashtra may occupy a worthy niche in the international tourism market, providing sustainable development of both protected areas and under-exploited regions.

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