Importance of Lakes Potential for Development of Ecotourism in Pune District

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ABSTRACT

Tourism or ecotourism is inherent desire of human beings, which developed with the progress of human civilization. Every man on this planet earth is very fond of tourism, hence always attracted towards nature. The mountains, hills, valleys, oceans, rivers, lakes, islands, waterfalls, forests, wild animals, birds, butterflies etc. have become important attractions for ecotourists. The improved standard of life and economic status of middle class society has brought ecotourism within their reach. At present there is pressing demand for planned, well-developed and perfectly managed ecotourism.

India is truly famous for hospitality. "Atithi Deo Bhav", means the visitors or guests are equal to God in Indian culture due to which India become the top most place for ecotourism in the world. The diverse culture, rich bio diversity, conductive climate, greenery and the peaceful as well as spiritual mind of the Indian people have become the main attractions for ecotourism.

The pleasant weather, natural lakes, green hills, beautiful valleys, enriched caves, forts and sanctuaries are the main attractions for ecotourists in and around Pune district.

The IT –BT intellectuals, industrial talents as well as students from abroad in Pune will be highly promising ecotourists in future. Hence there is an urgent need to investigate the hidden potential of ecotourism management and sustainable development. Collection of revenue from ecotourism will become the lion's share of Pune Municipal Corporation. Not only this, but it also become the potential area of employment to rural people and youth. Ecotourism development may become pivotal for socioeconomic transformation of villages with natural ecotourism sites.

This research incorporates the different parameters of Environmental Impact Assessment of human development and mainly deals with relationship between environmental parameters like frequency and attendance alternations, location and distance parameters. In this research seven impacts and seventeen present potential for six sites were analyzed.

INTRODUCTION

In 1980s, alternative forms of tourism have attracted the interest of governments, communities and scholars. These were given different names like nature tourism, soft tourism, responsible tourism, green tourism, ecotourism (Schaller, 1999). Among these, the term ecotourism has become prominent, although a consistent definition is by no means found. Most definitions do, however, incorporate concepts associated with sustainable development.

Under Sustainable development, attempts were made to integrate economic development with ecological sustainability (Redcliff, 1987). The researchers like Zurick (1992), Dearden (1991) and Hunter and Green (1995) accepted the definition of ecotourism given by World Commission on Environment and Development. According to them development that meets the needs of the present, without compromising the ability of future generations to meet their own needs (WCED, 1987) is known as ecotourism.

Many research workers now agreed that ecotourism is a two-way link between tourism and environmental conservation (Valentine, 1993; Cater, 1994). As the understanding of the close relationships between tourism and environmental conservation increased, the researchers are now calling on ecotourism industry to incorporate economic development as a fundamental element of conservation (West and Brechin, 1991).

Ecotourism involves travel for the discovery of learning about wild natural environments. Wilderness travel is the personal re-creation through traveling in natural environments that are devoid of human disturbances. While the adventure travel is personal accomplishment through the thrills of dominating dangerous environments.
Ecotourism in Pune District

Pune, earlier famous as Poona is one of the most important cities of Western India, aptly called as Queen of Deccan. The city is nicknamed variously such as Pensioners’ paradise, the Oxford of East, Detroit of India, the Cultural Capital of Maharashtra, once the Cycle City and now the Two Wheelers’ City of India and upcoming as IT-BT Center of India. Pune is said to be the fourth greenest city in India. Currently it has more than thirty-four lakh trees. The major-forested areas of the city include Katraj, Sinhagad valley, Lonavala, Kandrala, Mulshi, Bhimashankar and Ane-malsi Ghats. Beautiful natural green areas are surrounding the city, the Queen of Deccan. These natural attractions consist of some hills, green areas and specially some lakes like Mulshi, Khadakwasala, Lonavla, Katraj, Valvan, Pashan, Bhugaon etc. which have become the famous natural eco-tourism view points of Pune district. A total of 102 flowering plant species, 130 bird species, 15 mollusks and uncountable forms of insects have been recorded in and around the Pune district.

OBJECTIVES

Considering the above mentioned aspects of ecotourism, the present investigation was undertaken with following objectives.

i) To study natural attractions at different lakes as ecotourism sites in Pune district.

ii) To investigate positive and negative impacts of ecotourists on ecotourism sites.

iii) Long term planning and models for sustainable development and management of ecotourism potential at Bhugaon Lake.

Assessment of Ecotourism Potential in Pune District

The environmental assessment for ecotourism potential its sustainable development, management and strategies for future planning are the crucial factors in ecotourism development. There are many parameters for assaying the environmental impact of ecotourism development e.g. frequency and attendance, location, distance etc. The assessment of ecotourism potential in Pune district was done with seven different parameters of ecotourism potential. The formal and informal assessment and standard tests were used for knowing the ecotourism potential of Pune district.

Environmental assessment, in any form, is a necessary component of effective ecotourism development. This assessment should be manageable and used as a guide for instructions, planning and development of ecotourism sites. The assessments should also provide data to measure environmental performance and the effectiveness of planning. Both daily formal and informal assessment and standardized tests must correlate with the standards of development and ecotourism potential.

The geographical diversity of Maharashtra state and Pune district provides many opportunities for ecotourism activities. The district like Pune has a very high ecotourism potential.

Pune is one of the most important cities of Maharashtra which is aptly called as the Queen of
Deccan. Its climate and surrounding natural sites made it as the best district for providing ecotourism facilities. Along with many natural ecotourism sites Pune is surround by several beautiful lakes like Mulshi, Khadakwasala, Katraj, Bhushi, Valvan, Pashan, Bhougaon etc. These lakes are the best ecotourism sites of Pune district.

Hence in this research, six ecotourism sites were surveyed in detail. These sites were located in different directions e.g. west and south of Pune city. Most of the ecotourism potential in Pune district is in west and south of Pune which have the best attractions as the green area, hills and rivers.

Mulshi lake, Bhugaon lake, Bhushi lake and Valvan lake are in west direction of Pune and Katraj lake and Khadakwasala lake are in south direction of Pune district. The six different ecotourism sites (lakes) were assessed and compared on the basis of different parameters for finding their potential for ecotourism.

The assessment was done on the basis of following parameters: frequency of visitors coming to these sites with family, with friends, with guests and with colleagues, the distance of each lake from Pune station, and present facilities at each site.

The best ecotourism potential of these six lakes was investigated through sample based survey and by using questionnaire and different statistical tests and methods for their development were also suggested.

MATERIALS AND METHODS

Basic information about present situation was collected by surveying the six ecotourism potential lakes of Pune district located in west and south of Pune city.

The Mulshi lake, Bhugaon lake, Bhushi lake and Valvan lake are located to the west side of Pune while the lakes like katraj and Khadakwasala are situated toward southern site of Pune city.

Selected Questionnaire

Following questionnaire was used to analyze the ecotourism potential of six different lakes. The answers given by the visitors to this questionnaire were statistically analyzed and used to determine the ecotourism potential.

1. Sex, Age, income group
2. When you visit the lake? (Sunday, Tuesday, Holiday)
3. What is your frequency of visit? (Weekly, Fortnightly, Monthly, Yearly)
4. Along with whom you visit the lake? (Family, friends, guests, colleagues)
5. What you feel when you visit this place?
6. How much distance you have to travel to come to this site?
7. What activities you prefer when you come here?
8. Do you know what the Eco-Tourism is?
9. Whether you need some facilities for dumping junk?
10. How the Eco-Tourism development will help to local people?
11. Whether you want jogging/walking facility around the lake?
12. Whether you like yoga and meditation facility to be here?
13. What kind of facilities you require here for children?
14. What type of garden/plantation you suggest for this area?
15. Whether you will pay any entry ticket fees, after developing good Eco-Tourism facility?
16. What kind of food you prefer? (traditional, village food, self host group (SHG))
17. Any new suggestions for maintenance and development of the lake?

Present Potential of Eco Tourism Activities

For using the Ecotourism EIA of six lakes (sites) present potential of ecotourism activities have been used for assessment of impacts on the ecotourism sites. Approximately seventeen criteria were used to analyze the ecotourism potential of all the six different lakes which are given below.

Tourist camping area, Walking way on hill, Children park, Yoga centre, Wild life, Green area planning, Water park, Dump junk and disposal waste, Boating, Swimming, Fishing, Spiritual and meditation centre, Traditional activities, Traveling and parking, Weather, temperature, humidity, Season and rainfall etc. Each of these factors in each of lakes has one number, 1: strongly positive, 2: slightly positive, 3: ambivalent, 4: slightly negative, and 5: strongly negative.

CRITERIA AND DATA ANALYSIS

The ecotourism impact criteria represent seven important factors that may be affected by the tourism in all ecotourism sites. Each of the seven criteria used in the present study was objectively scored after revision of the entire study sites. These seven criteria were subsequently numerically coded for the analysis. This table lists the properties of each criterion with its coding scheme and number of studies, which fall into each category. Detailed information on each criterion and relevant references are given below.
Ecotourism Attractions, (Criteria A)

Criterion A is for natural support for protection and management of natural areas, it assesses the amount of monetary support that tourism directly contributes to conservation of the area in which the tourism takes place.

Criterion A contains five categories of strongly positive, slightly positive, ambivalent, slightly negative, and strongly negative.

Environmental Quality, (Criterion B)

It deals with the quality of environment. Environmental status of the ecotourism potential of the particular site is assessed by this criterion.

Criterion B includes five categories like perfect protection, slight or infrequent intrusion, frequent intrusion, blatant abuse, no protection.

Amazing Area and Views, (Criterion C)

Amazing area and views rates are determined by this criterion. It also including five categories of: pristine, slight effects, moderate negative effects, tremendous negative effects, strongly negative.

Frequency and Attendance Alteration, (Criterion D)

Favorable local attitudes towards ecotourism, follows closely with frequency and attendance alteration and may be associated with the stage of tourism development at the site.

Criterion D contains five categories like >85% support, 45-85% support, <45% support, some potential support or no support.

Compression on Places, (Criterion E)

This criterion measures how much, if any, loss of nature occur due to the presence of tourism in the area.

Criterion E contains five categories like >85% support, 45-85% support, <45% support, some or potential support, no support.

Native Economic, (Criterion F)

Economic benefits for local residents, rates the direct employment of locals in the tourism industry, including hotels, lodges, tourist restaurants, etc.

Criterion F contains five categories like strongly positive, slightly positive, and ambivalent slightly negative, strongly negative.

Flora and Fauna, (Criterion G)

This criterion analyzes the effects that have arisen specifically because of ecotourism. For example, an area disturbed by traveling frequency or parking region would still be considered pristine by this rating scale, unless the effect was because of tourism (directly or indirectly).

Criterion G contains five categories like perfect protection, slight or infrequent intrusion, frequent intrusion, blatant abuse, no protection.

The table 1. mentioned seven criteria of impact of ecotourism were given five different scales like.

Table 1: Ecotourism impact criteria

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Scaling</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Ecotourism Attractions</td>
<td>Strongly positive</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Slightly positive</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Ambivalent</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Slightly negative</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Strongly negative</td>
<td>5</td>
</tr>
<tr>
<td>B) Environmental Quality</td>
<td>Perfect protection</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Slight or infrequent intrusion</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Frequent intrusion</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Blatant abuse</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>No protection</td>
<td>5</td>
</tr>
<tr>
<td>C) Amazing Area and Views</td>
<td>Pristine</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Slight effects</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Moderate negative effects</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Tremendous negative effects</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Strongly negative</td>
<td>5</td>
</tr>
<tr>
<td>D) Frequency and Attendance Alteration</td>
<td>&gt;85% support</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>45-85% support</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>&lt;45% support</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Some or potential support</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>No support</td>
<td>5</td>
</tr>
<tr>
<td>E) Compression on Places</td>
<td>&gt;85% support</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>45-85% support</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>&lt;45% support</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Some or potential support</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>No support</td>
<td>5</td>
</tr>
<tr>
<td>F) Native Economic</td>
<td>Strongly positive</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Slightly positive</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Ambivalent</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Slightly negative</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Strongly negative</td>
<td>5</td>
</tr>
<tr>
<td>G) Flora and Fauna</td>
<td>Perfect protection</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Slight or infrequent intrusion</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Frequent intrusion</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Blatant abuse</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>No protection</td>
<td>5</td>
</tr>
</tbody>
</table>

1-Strongly positive 2- Slightly positive 3- Ambivalent 4- Slightly negative 5- Strongly negative .These scales were used with seventeen characters of potential of ecotourism activities.

To carry out Environmental Impact Assessment (EIA) these were reduced into three category, consisting of: Positive, Ambivalent and
negative. The characters of six selected lake and third column gave 95% confidence internal for each proportion.

RESULTS AND DISCUSSION

Most Common Plant Species at Selected Ecotourism Sites

During the surveying in ecotourism potential in Pune district. The different plants have been investigated. The list of common trees and green area in pune city is given in table 2.

Ecotourism Potential of Selected Lakes

The various lakes of Pune district have a great potential of ecotourism. If this potential is developed and managed efficiently these lakes will become very soon the best ecotourism sites in Pune district. This development will bring socioeconomic transformation in people of the nearby villages. With this view about six different lakes were surveyed and assessed with different analysis to find out their ecotourism potential. The list of selected lakes is given below.

1) Mulshi lake
2) Khadakwasala lake
3) Katraj lake
4) Bhushi lake
5) Bhugaon lake
6) Valvan lake

Table 2. Plant Species of Visitors Attraction of Pune District

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Botanical Name</th>
<th>Family</th>
<th>Vernacular Name / Local name</th>
<th>Flowering fruiring</th>
<th>Attraction for Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bombax Ceiba L.</td>
<td>Bombacaceae</td>
<td>Sawar Jan to Jun</td>
<td>Tall deciduous tree, Scarlet red attractive flowers</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Phyllanthes emblica</td>
<td>Euphorbiaceae</td>
<td>Awala Jun to Dec</td>
<td>Fruits are edible and medicinal.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Impatiens balsamina Linn.</td>
<td>Balsaminaceae</td>
<td>Terda Mar to Oct</td>
<td>Pink rosy coloured flowers.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Boswellia serrata Roxb.</td>
<td>Burseraceae</td>
<td>Salilgugul Jan to Jun</td>
<td>Resin from bark is used in Ayurvedic medicines</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Azadirachta indica Juss.</td>
<td>Euphorbiaceae</td>
<td>Kadlilimb, Neem. Feb to Sep</td>
<td>Bark, gum, leaves, flowers and fruits used in medicines.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Gliricidia sepium Kunth.</td>
<td>Fabaceae</td>
<td>Giripushpa Feb to Jun</td>
<td>Planted in graders and along roadsides as ornamental.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pongarnia Pinnata Linn.</td>
<td>Fabaceae</td>
<td>Karanja Mar to Aug</td>
<td>Common along streams and river banks</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Cassia fistula Linn.</td>
<td>Fabaceae</td>
<td>Bahava, Analtas. Mar to Aug</td>
<td>Pendant golden yellow coloured flowers. It is also medicinal.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Delonix regia Hook.</td>
<td>Fabaceae</td>
<td>Gulmohor Feb to Nov</td>
<td>Cultivated for orange coloured flowers.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Acaciaconcinna DC.</td>
<td>Fabaceae</td>
<td>Shikekai Mar to July</td>
<td>Pods used in shampoo.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Acacia nilotica (L) wild.</td>
<td>Fabaceae</td>
<td>Babhul Jun to Feb</td>
<td>Very common around fields</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Albizia lebbeck L.</td>
<td>Fabaceae</td>
<td>Shurish Apr to Aug</td>
<td>Avenue tree</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Leucaena glauca L.</td>
<td>Fabaceae</td>
<td>Subabhlul Jul to Oct</td>
<td>Planted as avenue tree, leaves used as folder.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Terminalia bellirica Roxb.</td>
<td>Combretaceae</td>
<td>Behda May to Nov</td>
<td>Fruits used in 'Triphala' churna.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Terminalia chebula Retz.</td>
<td>Combretaceae</td>
<td>Hirda Mar to Nov</td>
<td>Fruits used in 'Triphala' churna.</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Terminalia cuneata Roth.</td>
<td>Combretaceae</td>
<td>Arjuna Apr to Nov</td>
<td>Back and gum used in Ayurvedic medicines</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Eucalyphus globulus Labill.</td>
<td>Myrtaceae</td>
<td>Nilgin Feb to May</td>
<td>Planted as avenue tree.</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Syzgium cumini Linn.</td>
<td>Myrtaceae</td>
<td>Jambhul Mar to Jul</td>
<td>Berries (Fruits) are edible</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Memecylon umbellatum Brand</td>
<td>Melastomaceae</td>
<td>Arjuna Mar to Jul</td>
<td>Flowers Fragrant</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Isora coccinea Linn.</td>
<td>Rubiaceae</td>
<td>- Jan to Nov</td>
<td>Scarlet red coloured flowers</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Mimusops elenghi Linn.</td>
<td>Sapotaceae</td>
<td>Bakul Dec to Apr</td>
<td>Fragrant Flowers</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Tectona granda Linn.</td>
<td>Verbenaceae</td>
<td>Saag Jun to Dec</td>
<td>Cultivated on large scale for furniture.</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Carvia callosa Bremek</td>
<td>Acanthaceae</td>
<td>Karvee Feb to July</td>
<td>Common along roadsides Flowers are attractive</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Euphorbia antiquorum Linn.</td>
<td>Euphorbiaceae</td>
<td>- Feb to May</td>
<td>Native of south Africa but frequent on hill slopes.</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Mallotus philipinensis Linn.</td>
<td>Euphorbiaceae</td>
<td>Kunkuphal Nov to Feb</td>
<td>Fruits are used in Ayurvedic preparations</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Ficus benghalensis Linn.</td>
<td>Moraceae</td>
<td>Wad Apr to Jun</td>
<td>Planted along roadsides near villages.</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Ficus religiosa Linn.</td>
<td>Moraceae</td>
<td>Pimpal Apr to Aug</td>
<td>Religious tree</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Mangifera indica Linn.</td>
<td>Anacardiaceae</td>
<td>Amba. Sep to Aug</td>
<td>Fruits are edible</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Butea frondosa Linn.</td>
<td>Combretaceae</td>
<td>Palas Feb to Jun</td>
<td>&quot;Flame of the forest&quot; Orange coloured flowers.</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Tamarindus indica Linn.</td>
<td>Myrtaceae</td>
<td>Chinch Oct to Jun</td>
<td>Fruits are edible.</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Carissa carandas Roxb.</td>
<td>Apocynaceae</td>
<td>Karvand Jan to Jun</td>
<td>Fruits are edible</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Michelia champaka Linn.</td>
<td>Magnoliaceae</td>
<td>Sonchaphe Dec to Jun</td>
<td>Sweet scented flowers.</td>
<td></td>
</tr>
</tbody>
</table>
Importance of Bhugaon Lake as a Sample For Strategic Planning

During the survey of six different lakes around Pune city, it was noted that Bhugaon lake was the best ecotourism site for development of ecotourism because of its two highly positive factors.

1. Distance to travel for the visitors to visit Bhugaon lake, (68% of tourists come there from less than 10 kilometers around)
2. Frequency and attendance alternations of visitors. More than 61% of the visitors are visiting Bhugaon lake weekly.

Frequency of Visitors to Bhugaon Lake

The data collected indicate that about 200 ecotourists visit Bhugaon lake regularly per day. The number of visitors and their frequency was depending on the holidays, particular auspicious days, temperature, season, rain fall and many other factors.

Road to Bhugaon Lake

The nine km road to Bhugaon lake is a narrow road with uneven surface and has at least five sharp turns at a steep gradient. These locations are potentially accident-prone and require adequate warnings, signage, and retaining walls for erosion control, protective walls and ideally manned check posts.

The approach road faces unsafe conditions from its both sides. On the mountain side there is cracking rock and fast eroding soil, and on the valley side there are no protective walls. The road width is too narrow, occasionally quickly causing traffic jams at the peak holiday times.

Mode of Transport to Bhugaon Lake

At present mainly private cars, two wheelers and hired tourist vehicles are the only modes of transport for the tourists to visit Bhugaon lake. The charges per person from Pune to Bhugaon lake are approximately Rs.50/- for a round trip. These vehicles do not operate unless they run full and therefore the travel time is uncertain. There are no buses or minibus following an organized schedule. There is no suitable public transport at present for visiting this lake.

In addition to the road, there exist alternative hilly routes for visiting the Bhugaon lake. But these are popular only among the hikers and fitness enthusiasts; these roads also lack adequate signage.

Parking Facility

The present parking facility is not enough to accommodate sufficient number of vehicles on a holiday or in the peak season of visitors. As a result, parking and pulling out of vehicles becomes a clumsy function, causing delays, noise and air pollution. On holidays due to inadequate parking space, vehicles are parked far away from entrance on the approach road. This blocks the road and causes bottlenecks. The entrance and exit to the parking area are informal. There is also no any type of controlling for parking of vehicles.

Main Entrance

The main entrance to Bhugaon lake is known as Pune darwaja. But, this entrance lacks a proper gate and hence the new visitors get puzzled. For monitoring the entries of sites, this entrance gate needs to be well designed with entry. Ticketing windows and information guide windows will help the visitors.

Guideline to Visitors

There is a lack of directional, informative and instructional signage at Bhugaon lake, there is no guiding map to guide the visitors, about the places of interest and places of visits to Bhugaon lake. As a result of this visitors are not able to enjoy all the sites of Bhugaon lake.

The internal paths are not of good quality, they are very narrow and do not necessarily lead to all the important locations. The road surfaces are worn out and uneven, thereby presenting risks of falls and slippages of pedestrians. This condition becomes very serious in monsoon, when the visitor number actually tends to be high, for experiencing the beautiful fogs, torrential rains and greenery on hills. The road linkages to each other and to different points need to be identified by a distinctly visible location map. Certain important areas such as the south of lake have no access presently. If it is made accessible visitors can enjoy this beautiful site of the lake.

View Points

Several viewpoints are existing at Bhugaon lake for ecotourism. But they need further development and improvement. These view points require prominent directional and informative signs. Some of the viewpoints exist at the tip of cliff and are potentially adventurous thrilling as well as risky spots. They need large warning signs, manned check posts as well as very sturdy and safety railings.

The view points need facility to sit and walk around them. The visitors should enjoy the beauty of nature from these view points.

The viewpoints should have same specific features e.g. facility to watch sunrise or sunset, birds, lake view, clear sky etc.
Night Time Visitors

Because of the specific altitude and the geographic location of Bhugaon lake, fog prevails during rainy and winter months of the year. The visitors come to enjoy the fog during night time. But at present there are no adequate streetlights and path lights. Lighting at the viewing spots during night-time is not made available. As a result of this the place is virtually impossible to visit and use for night walk. The visitors are therefore limited to daytime only.

In fact the nature is more enjoyable during night e.g. movement of wild animals, night hunting, fighting of animals for food etc. could be seen during night time. But presently it is completely impossible for the visitors

Existing Vegetation

The existing vegetation as well as plant biodiversity is very rich around the lake and on the surrounding the hills. Tree species are highly dominant, which will attract the ecotourists because of their beautiful flowers, green foliage shade hugeness fruits, etc. Deforestation has caused soil erosion, and hence there is heavy silting in lake every year during rainy season. These hills require thick plantation to protect soil erosion. The catchments area, the bunds and surrounding sides of the lake require systematic tree plantation. In future the dark green thick forest will attract the visitors, nature walking persons, as well as many birds, wild animals, reptiles, tigers and deer’s. Existing tree and shrubs species include Jambhool, Hirda, Fig, Rameta, Gela, Karanj, Silver oak, Palas, Mango, Gulmohar, Suru, Nigudi and Karwand. All the trees are in healthy condition.

Facilities for Visitors

Some private owners offer lodging facilities, but these are of very low standard. Lack of other basic amenities including safety, security, night time movement ease and lack of recreation facilities are main constraints in the development of this ecotourism center. The catering available

Food Stalls and Vendors

There are 33 small food stalls at present, run by the villagers around the lake. About 100 casual vendors of food items such as pot curd, buttermilk etc. are in business. Most of the stalls are semi-permanent nature and hence, the vendors operate in open. The stall operation does not follow any laws or code, hence these cannot be counted as a standard food service for visitors. No proper drinking water facility. These food stalls and vendors create plastic pollution, the dump the garbage and food wastes on the roads.

Sanitary and Waste Management Facility

Lots of wastes and garbage is generally collected, which is not properly disposed. Proper drainage and garbage disposal systems are totally absent. The visitors throw the empty drinking water bottles, plastic bags and generate plastic of pollution. The waste products created by visitors are up to 50 g. per day per person. Presently this lake is under major threat of noise and plastic pollution.

The environmental degradation rate at Bhugaon lake is very high. The village women are washing the clothes and utensils directly in the lake as well as the milkmen was their daily animals like buffalos and cows in the lake water directly.

Management and Revenues

This lake is managed by forest department, government of Maharashtra. At present the maintenance is totally dependent on the financial support of forest department which is very inadequate. Due to lack of financial support there is no maintance of the lake. The present staff to look after the activities of lake is also very insufficient. The staff includes one forest officer ranger, one forest guard and sixteen labors. It is beyond their reach to maintenance the lake at satisfactory level. Hence many unlawful activities are going at the lake site. Encroachment on government-land by the local people is most important threat to this ecotourism site. Many illegal constructions are coming up at the lake site.

Socio-Economic Activities

At present approximately 57 persons are making their living through self-employment at the lake site. Additionally, there are approximately 150 indirect employments supported by the Bhugaon lake ecotourism activities.

Majority of these are in the food vending area. Almost all the above persons live in the villages. The present average earning is approximately Rs.4,000/- per month.

Statistical Methods for Analysis

The six different ecotourism lake sites like Katraj, Khadakwasala, Mulshi, Valvan, Lonavala and Bhugaon in and around Pune were statistically analysed on matrix based proportion for various parameters like ecotourism attraction, environmental quality, amazing area and views, frequency and attendance alternation, compression on places, native economics and flora and fauna.

The results clearly revealed that one of the six ecotourism lake sites, Bhugaon lake has best potential and rank. The impact assessment results
clearly indicated the ecotourism potential of this lake. It was followed by Bhushi lake.

The ecotourism quality percentage indicated the best ecotourism quality of Bhugaon lake.

The results of confidence interval of positive proportion revealed that Bhugaon lake and Mulshi lake had highest positive proportion of confidence interval. This very clearly pointed at that these two sites have highest ecotourism potential amongst the other lakes.

The ecotourism potential of lakes situated toward west direction of Pune had higher proportion as compared to ecotourism sites on the south direction. However Bhushi lake in west is exception. To propose significant difference between six sites Kruskal-Wallis test was applied.

The Kruskal-Wallis test revealed that the six ecotourism lake sites had significant difference on ecotourism attraction, frequency attendance alternation, and compression on places, with following statistical character respectively:

(N=17, $x^2$ =32.892, df=7, p_value=0.000)
(N=17, $x^2$ =24.496, df=7, p_value=0.000)
(N=17, $x^2$ =25.837, df=7, p_value=0.000)

Moreover these results indicated that Bhugaon lake and Mulshi are the best sites for ecotourism development as compared to other lakes.

The Mann-Whitney test conducted to compare the ecotourism sites on south and west direction of Pune showed that sites on two directions had significant difference on ecotourism attraction (U=764.500, P=0.003) and comparison on places (U=526.000, P=. 000).

The ecotourism sites situated towards west direction of Pune had the best rank rather than south. Second part of this study was to analyze multivariate factor to know the effect of combination of seven factors in six sites. The results indicated that seven impact variations reduced to two factors with corresponding multiplayer. The first factor is Linear combination of all impact variables with high weight ecotourism attraction, frequency alternations, native economic, respectively (0.847, 0.756, 0.669) and other variables had approximately same weight. Therefore this factor can be considered as weighted average of all different impact.

Second factor is weighted average of environmental quality and flora and fauna with Multiplayer respectively (0.792, 0.854) contract of Linear combination of ecotourism attraction and native ecotourism multiplier respectively (0.140,-0.341).

The six sites were compared on the basis of these factors. Kruskal-Wallis test revealed that there was significant difference among six sites. Bhugaon lake had the highest rank as compared to other sites. But there was no significant difference among different lakes, when the second factor was considered.

Kruskal-Wallis test was indicated that there was significant difference among six sites on factor one such that Bhugaon lake had the highest rank as a compared to other lakes like Mulshi, Lonavala, Bhushi, Valvan, Khadakwasala and Katraj.

The six different sites selected for analysis of comparison had shown potential for ecotourism. However these sites differ in their potential. According to the results of capabilities, various economical and social aspects will be the most important goals for development of tourism industry and internal promenade in each of site selected for the study.

Pune the densely populated metropolitan city is almost very close to all the ecotourism sites selected, many local visitors are expected to visit these sites on holidays, and hence the number of visitors will increase significantly.

Due to closeness of all six ecotourism sites to Pune city the local as well as foreign visitors will frequently visit these sites. The Bhugaon lake has great potential to accept local as well as foreign visitors.

Present investigation has highlighted the trends of the impacts of ecotourism and has attempted to produce a synthesis of a large number of ecotourism studies to identify the factors that affect the sustainability and success of ecotourism plans and models. However further work is necessary for under standing the impacts of ecotourism. The seven ecotourism effect criteria and proportion criterion scores used in this study may be useful to measure the state of other ecotourism projects. The analysis of the effects of ecotourism lacks the broad-spectrum quantitative analysis. The ecotourism planners may compare their projects by using the above criteria.

Kruskal-Wallis, Mann-Whitney Test, Positive Proportion comparison, based on questionnaire.

The study of environmental effects of ecotourism should couple with the biological effects, including ecological, behavioral, and diversity effects. Standard methodologies need to be developed to assess the effects of ecotourism activities on sites’ ecosystems. Until such precautions are not taken, forecasting the long-term effects of ecotourism will be only guesswork.

CONCLUSION

Bhugaon lake has the best ecotourism potential for development and management amongst the six sites investigated.

The three approaches that will enhance the restoring of Bhugaon lake will be:
1. Planning for Eco-tourism.
2. Orienting the site to receive out of state and international tourists.

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3. Launching a new well planned strategy for the management and revenue collection.

The long term environmental strategic management in this research consists of increasing recreational places for ecotourists, increasing the environmental viewpoints and amazing areas, planning of environmental long term strategies with attention towards occupation of local people, and increasing their life standards.

For development of ecotourism in Pune district following main recommendations are given: protection and conservation of native flora preparation of jogging tracks, children parks, yoga and meditation centre, cultural and traditional centers, amusement parks.

To develop ecotourism potential of Bhugaon lakes following ecotourism activities are recommended:

- Children and young promenade,
- Management of ecotourism area, proper disposal and reduction of wastes,
- Hosting –serving –cultural and coastal establishment,
- Green space and natural exhibition,
- Concentrated promenade-ecotourism projects,
- Estimation of expenditure promenade projects and ecotourism developments,
- Similarly following main plans and models are suggested to develop ecotourism activities at Bhugaon lake.
- Creation of forest parks and zoos,
- Protection of native plant species,
- Conservation of natural sites,
- Management of environmental activities,
- Water park and boating,
- Jogging track and walking roads on hills at south east of Bhugaon lake,
- Yoga and meditation centre,
- Children parks,
- Amusement and children ecopark,
- Water park,
- Ecotourists camp, service centers and ecotourism facilities,
- Establishment of restaurants and residences for ecotourists.

All these developments will be undertaken by involving local people. In almost all the projects proposed for development of Bhugaon lake high priority will be given for the jobs and employment of local people. The suggested proposals and plannings will not disturb the nature and interfere the life of villagers in the vicinity of lake. Highest priority will be given to improve the economics and social standard of villagers. Where ever possible women self-help groups will be involved to empower the village women.

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