CHAPTER-6

Heritage Sites and Ecotourism

India is a major Tourist destination. Tourism is one of the important sources of generation of funds with respect to maintenance of heritage sites. Tourists help in publicity of any site or monument. At the same time, tourists may create an adverse impact on the surrounding environment of the monument. Ecotourism can be defined as a responsible travel to any natural area that takes into account the conservation of the environment and improvement of the well-being of local people (TIES, 1990)¹.

The different sections of the present chapter intend to discuss the positive and negative impacts of Tourism on the studied Heritage zones and how the concept of Ecotourism can be applied to minimize the adverse effects. At the same time, comparative studies have been made with a few other Heritage sites of India and abroad to study the management policies adopted to reduce the human impact on such sites.

1.1. Heritage Sites And Tourists

The reason why a property is chosen for inscription on the World Heritage List is also the reason why millions of tourists flock to those sites year after year². In fact, the belief that World Heritage sites belong to everyone and should be preserved for future generations is the very principle on which the World Heritage Convention is based. Directing governments, site managers and visitors towards sustainable tourism and Ecotourism practices is the only way to ensure the safekeeping of our world’s natural and cultural heritage.

In 2002, the global focus was on Tourism. It started with the United Nations declaration of 2002 as the ‘Year for Cultural Heritage’. Then in May, Québec City hosted the first ever World Ecotourism Summit, whose Declaration on the development of Ecotourism in the context of sustainable development was later delivered at the Johannesburg World Summit. In November, “Heritage, Tourism
and Development" formed one of the focuses of the International Congress in Venice on the occasion of the 30th anniversary of the World Heritage Convention.

Tourism is now one of the world’s largest industries, with almost 700 million international tourists in 2002. Protected areas, particularly World Heritage sites, are some of tourist’s main attractions, and are subject to growing visitation. Maintaining such sites requires adequate practices to guarantee environmentally sound management of the park and at the same time to ensure that local communities benefit from the park’s existence.

We know that in the 1999 General Assembly, in Mexico, International Council of Monuments and Sites (ICOMOS) adopted the revised ICOMOS International Cultural Tourism Charter, been prepared by the Cultural Tourism Committee in the period since the 1996 General Assembly in Sofia. The specific aim of the Charter was to improve the relationship between conservation practitioners and the tourism industry. Previously the relationship primarily focused on minimizing the negative effects of tourism on sites and places of cultural significance.

The Charter recommends that one of the primary reasons for undertaking any conservation works is to make the significance of the place more accessible to visitors and members of the host community, in a well managed way. In the company of armed conflict, economic development and environmental pollution, tourism can be regarded as one of the major factors that place Heritage at Risk.

- **The Dynamic Interaction between Tourism and Conservation**

  Domestic and international tourism continues to be among the foremost vehicles for cultural exchange. It is increasingly appreciated as a positive force for natural and cultural conservation. Tourism can capture the economic characteristics of heritage and harness these for conservation by generating funding, educating the community and influencing policy. It is an essential part of many national and regional economies and can be an important factor in development, when and only if it can be managed successfully.
Tourism could bring benefits to host communities and provide an important means and motivation for them to care for and maintain their heritage and cultural practices. The involvement and co-operation of local and/or Indigenous community representatives, conservationists, tourism operators, property owners, policy makers, those preparing national development plans and site managers is necessary to achieve a sustainable tourism industry and enhance the protection of heritage resources for future generations.

Victoria Memorial Hall, Kolkata, India, being a Museum is visited by a large number of tourists throughout the year, although winter forms the peak tourist season. The lush greenery surrounding this architectural beauty creates attraction for the majority of populace. There are separate tickets for the Garden and Museum and it has been found that even if people do not visit the museum, they spend lots of time in the Garden.

For the Bishnupur Group of Temples and the Natural Heritage Site - Sundarbans, winter is the main period which receives a very large number of tourists. Local children and people loiter around the temples most of the time and unknowingly bring about long term deterioration. The Terracotta temples create a major attraction for the tourists. Bishnupur is a little isolated and the urge for purchasing local well-known products like conch shell products, Baluchari saree, terracotta objects often drive the tourists to these temples.

Sundarbans National Park is nature's wonder. Tourists mainly visit the Park in winter season to catch a glimpse of the faunal diversity, especially the Bengal Tiger. During her survey, the researcher felt that the establishment of regional museums at these tourist sites will create added interest for enriching the minds of the tourists visiting these sites. Museums or Interpretation Centres have a great role to play in inculcating the significance of heritage sites to the visitors. Detailed survey has been made on the Interpretation Centres in various regions of Sundarbans namely Mangrove Interpretation Centre, Sajnekhali; Bhagbatpur Interpretation Centre, Interpretation Centre at Sundarikati, Bonnie Camp and Sundarbans Biosphere Resource Information Centre, Aranya Bhaban, Saltlake to evaluate their success in conservation and awareness regarding significance of the preservation of natural heritage of Sundarbans, West Bengal.

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6.1.1. Benefits Of Tourism

As per the observation and interaction of the researcher with the tourists during the course of her research work, she has observed that Tourism has both positive and negative impacts on Cultural and Natural Heritage sites which are discussed below:

a) Tourism brings recognition from the general public about these sites that would otherwise have been lost and forgotten.

b) It creates opportunity for the public to see and experience something that amazing.

c) Generates employment opportunities for local residents, especially in rural areas.

d) Feedback from Tourists may help in further development of the site.

6.1.2. Demerits Of Tourism

Excessive or poorly managed tourism and tourism-related development can threaten the physical nature, integrity and significant characteristics. The following points reflect the ill-effects of tourism:

1. It has been observed that human contact increases the deterioration of stones or other composing materials of the monument.

2. Tourism eventually leads to infrastructure development that in turn leads to an environmental impact on the region thus eventually affecting both the Cultural and Natural Heritage sites.

3. Lack of adequate or appropriate presentation and communication of the significance of a place to both the visitor and members of the local or host community can lead to a lack of understanding and appreciation of the culture and heritage of the place within the wider community.

4. Tourism activities that inadvertently encourage trade in stolen or illicit cultural property can have an adverse effect on the cultural resources of the host community.

5. Poorly planned, designed visitor facilities can have an adverse impact on the significant features or ecological characteristics of heritage places.

6. The use of guides and interpreters from outside a host community can minimize opportunities for the employment of local people in the
communication of the significance of the place to visitors. This can discourage local people from taking a direct interest in the care and conservation of their own heritage.

7. Promotion and management of heritage places or collections that do not minimize excessive numbers of visitors at any one time can adversely impact both the significance of the place and the visitor experience.

8. Litter may be dropped by tourists unknowingly and at times knowingly.

- **Impact of Tourism on Vegetation around a Site**
  
  i) **Impact on Soil**
  
  Excessive trampling of the sites by tourists may lead to compaction and erosion. Compaction packs soil particles together and reduces pore space, leading to a reduction in aeration and water infiltration. This increases water runoff from rain, causing reduced water absorption, a loss of vegetation cover and erosion. Erosion, on the other hand, is more serious and tends to spread. Soils most prone to compaction are fine-textured homogeneous soils such as clay and silt. Wet soils are more prone to compaction and more readily churned. Water impacts are associated with pathogens, organic waste and turbidity. Water turbidity from soil erosion is a frequent result of tourism infrastructure and recreation. Where soils are more prone to erosion, tourist activities and development are more likely to alter water quality to the detriment of aquatic flora and fauna.

  ii) **Vegetation impacts vary with type of use and botanical differences in structure**
  
  Resistant plants include the grasses and sedges. Plants susceptible to trampling impacts include those with slow growth rates, thorns and prickles, flexible stems and leaves, and small thick leaves that fold under pressure. Plant species found in open grassy habitats are generally more tolerant of trampling, while forest floor plants are less resistant.

  iii) **Disturbances caused by tourists viewing wildlife affect some species more than others**
  
  Tour operators sometimes put food out to attract animals to places where visitors can see them. Attraction can be a negative response, however:
habituated wildlife may become aggressive while begging for food, and can injure and even kill the unwary visitor. Nesting birds may tolerate the first few encounters with humans, but once their level of tolerance is exceeded they may abandon their nests. Some animals develop a tolerance for predictable disturbances, noise from passing cars for example, but cannot tolerate random disturbances. Larger game species tend to be more affected by direct contact with people, while smaller wildlife are more susceptible to indirect impacts on their habitat. More timid and sensitive species of animals become permanently displaced from recreation areas when confronted by humans, while other animals such as deer become habituated over time. Some animals get frightened more easily than others, a factor that affects feeding and reproductive patterns.

iv) Impact brought about by Adventure Sports/Activities

Visitors to monuments can cause abrasion through touching. Activities involving motor vehicles have negative impacts on many fragile environments. Noisy motorboats disrupt the feeding and breeding patterns of birds, and can injure other aquatic wildlife. Motorboat propellers repeatedly kill docile freshwater fishes. Motorboats are also highly polluting; one powerboat emits 70 times more hydrocarbons than an average car does. Beach vehicles disrupt the accumulation of seaweed that provides mulch for colonizing dune vegetation.

6.1.3. Practices For Proper Tourist Management

Based on intensive study and observation, the researcher feels that the following strategies may be adopted for proper tourist management:

a) Develop a list of existing impacts and threats at the site.

b) Determine whether impacts are tourism-related; use the advice of site staff, local guides, community leaders, hotel owners and tour operators and identify the groups connected with the impacts.

c) Examine the cause-and-effect relationship of the identified impacts and make a detailed analysis identifying causal factors and describing long-term effects.
• **Principle for Management Strategies**

In order to reduce the negative impacts of visitation, the researcher has felt the need for proper monitoring of the strategies that need to be taken at the heritage zones keeping in mind the fulfillment of visitor needs as well as the ecological balance of that area. Factors, or variables that can be affected or controlled, include the number of visitors, the types of activity, visitors’ behaviour and the environment’s physical and social resistance and resilience. A number of strategies address these variables. According to the study, the researcher feels that the management strategies to be adopted should follow the following principles as adopted by ICOMOS based on the *Principles of the ICOMOS International Cultural Tourism Charter* (8th Draft, for Adoption by ICOMOS at the 12th General Assembly, Mexico, October 1999)\(^6\).

- **Principle 1**
  Since domestic and international tourism is among the foremost vehicles for cultural exchange, conservation should provide responsible and well managed opportunities for members of the host community and visitors to experience and understand that community's heritage and culture at first hand.

- **Principle 2**
  The relationship between Heritage Places and Tourism is dynamic and may involve conflicting values. It should be managed in a sustainable way for present and future generations.

- **Principle 3**
  Conservation and Tourism Planning for Heritage Places should ensure that the Visitor Experience will be worthwhile, satisfying and enjoyable.

- **Principle 4**
  Host communities and indigenous peoples should be involved in planning for conservation and tourism.

- **Principle 5**
  Tourism and conservation activities should benefit the host community.
• **Principle 6**
  
  Tourism promotion programmes should protect and enhance Natural and Cultural Heritage characteristics.

Considering all the above factors, the researcher feels that the following indicators are to be monitored in any heritage site:

- Abrasion of monuments
- Status of vegetation
- Number of human encounters while travelling per day, by number of groups and their sizes
- Signs of pollution from humans, litter, food in streams
- Number of disturbances.
- Erosion of soil
- Disturbance of wildlife populations
- Graffiti
- Complaints from community members on deteriorating community values
- Increase in the number of crime reports

Now we can discuss each point individually as to how to deal with the management strategies:

**• Management Strategies**

i. Reducing the number of people who enter an area:

The management options for reducing the number of visitors to a site can include:

- restricting entry or closing an area;
- limiting group sizes;
- implementing permit system;
- increasing fees.

ii. Options for dispersing or concentrating people to reduce use in a particular area can include:

- restricting the number of people who can enter the threatened area;
- limiting the permissible length of stay in the threatened area;
- raising the entrance fee for the threatened area only;
• not providing facilities in the threatened area;
• zoning an area for a particular activity and not permitting the activity in the threatened area;
• directing tourists to more resilient areas through zoning, visitor education and offering more facilities or fewer facilities;
• using a promotion and interpretation campaign to influence the use of one area over another.

iii. Changing the general attitude of the Visitors:
• Education programmes teaching low-impact ways to visit a site, e.g., techniques for observing wildlife without disturbing it;
• Interpretation programmes teaching respect for a site’s resources and protection issues.

iv. A site’s physical environment can be made more resistant to impacts by:
• using infrastructure to “harden” a site, e.g., hardening a trail with a wooden boardwalk or installing permanent moorings;
• relocating infrastructure to more resilient areas, e.g., moving a mountain refuge to an area less prone to erosion.

6.2. Impact Of Visitors On Victoria Memorial Hall, Kolkata
The researcher has studied in detail the impact of visitors while they visit Victoria Memorial Hall. Victoria Memorial itself is a Memorial Museum which is unique for its collection. The surrounding garden also forms a source of attraction. As already discussed in the previous chapters, it is suffering from various factors leading to its deterioration. Of the various factors, the impact of visitors is very significant. Victoria Memorial Hall receives more than one lakh Tourists in a year. The visitation is not only having an impact on the monument, but on the surrounding vegetation pattern as well. (Plate 69)

6.2.1. Visitor Statistics

The impact of Visitors and tourists depends upon the population visiting the magnificent monument. Before that, let us see the facilities Victoria Memorial Hall puts forward for its visitors.

1. Son-n-et Lumiere shows: Pride & Glory- The Story of Calcutta:
March to June, 6:45 to 7:30 pm (Bengali) and 7:45 to 8:30 pm (English)
held during the following seasons in a year:

**October to February:**
- 6.15 p.m. to 7.00 p.m. (Bengali)
- 7.15 p.m. to 8.00 p.m. (English)

**March to June:**
- 6.45 p.m. to 7.30 p.m. (Bengali)
- 7.45 p.m. to 8.30 p.m. (English)

2. Victoria Memorial Hall Garden remains open to visitors all throughout the year (even on holidays) from 5:30 a.m. to 7:00 p.m. The entry fee to Garden is Rs. 4/- per head per entry, Monthly ticket: Rs. 100/- per head; Yearly ticket: Rs. 1000/- per month.

Initially, as per the study conducted by WBPCB\(^7\) in the year 2001-2002, there was no such fee for entry to the Victoria Memorial Hall garden. The Committee felt that introduction of an entry fee would not only control visitors to the compound, but also generate funds for better maintenance of the premises.

The Museum of the Hall opens at 10 am and closes at 5 pm. Thus, the monumental structure and the garden remain exposed to the visitors for about 14 long hours and there is an imbalance in the gap between opening of the museum and opening of the compound in the morning hours when compared with those in the afternoon hours.

3. Morning walkers are allowed to stroll in the Museum Garden. Even Evening walkers are allowed to walk.

4. There is regular seating arrangement for visitors within the Park at all the four corners- North, South, East and West.

5. Regular programmes like Lectures, Screening of Films, Exhibitions, Talks, Activity based programme are organized on important occasions within the Museum. *(Plate:70)*

So, we see how the Museum is Visitor friendly and gives access to the large number of population. Due to the lush greenery, winter season is very much soothing and invites innumerable visitors within the Garden only. People are allowed to carry food inside and garbage collecting bins are placed at regular intervals to collect the waste.
After consulting the Annual Reports of Victoria Memorial Hall, the findings of the researcher reveal that the Visitor Statistics of Victoria Memorial Hall during 2012-2013 are as follows:

Table 6.1: Visitor Statistics at Victoria Memorial Hall, Kolkata during 2012-2013

<table>
<thead>
<tr>
<th>VISITORS’ FIGURE</th>
<th>YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ONLY GARDEN</td>
<td>APRIL 2012 - MARCH 2013</td>
</tr>
<tr>
<td>MONTH</td>
<td>NOS.</td>
</tr>
<tr>
<td>April</td>
<td>101894</td>
</tr>
<tr>
<td>May</td>
<td>100878</td>
</tr>
<tr>
<td>June</td>
<td>88674</td>
</tr>
<tr>
<td>July</td>
<td>97188</td>
</tr>
<tr>
<td>August</td>
<td>106240</td>
</tr>
<tr>
<td>September</td>
<td>84018</td>
</tr>
<tr>
<td>October</td>
<td>134637</td>
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<tr>
<td>November</td>
<td>84883</td>
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<tr>
<td>December</td>
<td>172459</td>
</tr>
<tr>
<td>January</td>
<td>146083</td>
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<tr>
<td>February</td>
<td>97112</td>
</tr>
<tr>
<td>March</td>
<td>113861</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1327927</strong></td>
</tr>
<tr>
<td>2) GALLERY &amp; GARDEN (INDIAN NATIONALS)</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>125614</td>
</tr>
<tr>
<td>May</td>
<td>144959</td>
</tr>
<tr>
<td>June</td>
<td>125239</td>
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<tr>
<td>July</td>
<td>136416</td>
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<tr>
<td>August</td>
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<tr>
<td>September</td>
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<tr>
<td>October</td>
<td>141151</td>
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<td>November</td>
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<td>269169</td>
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<tr>
<td>February</td>
<td>141254</td>
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<tr>
<td>March</td>
<td>138172</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1820830</strong></td>
</tr>
<tr>
<td>3) GALLERY &amp; GARDEN (FOREIGN NATIONALS)</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>2300</td>
</tr>
<tr>
<td>May</td>
<td>1238</td>
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</table>

<table>
<thead>
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<th>VISITORS’ FIGURE</th>
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<tr>
<td>June</td>
<td>1231</td>
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<tr>
<td>July</td>
<td>1928</td>
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<tr>
<td>August</td>
<td>2033</td>
</tr>
<tr>
<td>September</td>
<td>1753</td>
</tr>
<tr>
<td>October</td>
<td>1246</td>
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<tr>
<td>November</td>
<td>3788</td>
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</tr>
<tr>
<td>March</td>
<td>3339</td>
</tr>
<tr>
<td><strong>31602</strong></td>
<td></td>
</tr>
</tbody>
</table>

(Fig. 6.1, 6.2, 6.3)

- **Observation:**

  The table indicates that -

  a. the number of visitors to the Victoria Memorial Hall Garden exceeds one lakh per month, especially in the months of October till January and March, April, May and decreases, that to around thousand in the rainy season.

  b. visit to garden as well as Museum also remains to around one lakh in a month and exceeds to two lakhs in the months of December and January.

  c. visit to garden as well as Museum by Foreigners is found to be more than three thousand in the months of December, January and more than four thousand in the month of February.

Now let us see the effects of human intervention on the Heritage site.

**6.2.2. Direct And Indirect Effects Of Tourists On The Site**

Repeated field works and interaction with the staff led to observation of the following effects of human intervention on the Heritage zones:

- **On Garden**

  1. Litters are found here and there, even below the notice board mentioning ban on usage of plastic bags.

  2. Plastic bottles have been found floating on the water-bodies.

  3. Graffiti or scribbling on trunks of trees, causing a visual pollution.

  4. Within the campus, on the North Eastern side, there is a lot of garbage accumulation which disturbs the biodiversity of the site. It also causes a visual pollution in the heritage zone.

  5. During the winter season, too many people for picnic purpose assemble in the garden. This not only creates pollution but also affects the tranquility of the place.
\textbf{Indirect effects}

1. The scribbling on branches of trees (graffiti) indirectly affects the trees.
2. Accumulation of plastic bottles on the water bodies, may create pollution in the long run and suffocation for aquatic life.
3. The garbage accumulation causes soil pollution in the long run.
4. Hawkers around Victoria Memorial Hall compound contribute to the generation of additional garbage in form of plastic carry bags, plastic pouches, containers, discarded containers made of old newspapers, etc.
5. Littering/ Spitting: The visitors are seen littering, spitting, smoking, consuming food stuff and using plastic carry bags inside the premises.

\textbf{On the Museum}

1. Continuous trampling affects the marble.
2. Touching the marble with hands often spoil the marble lustre.

\subsubsection*{6.2.3. Management Strategy And Awareness Programmes}

There have been many efforts to conserve the surrounding garden of Victoria Memorial Hall undertaken by Archaeological Survey of India and the Horticulture department. These are enlisted below:

1. Signage: Placing of Notice Boards at different corners of the Garden:
   Wooden boards have been placed at regular intervals indicating various rules and regulations to be maintained in the garden:
   a) Not permitting plucking of flowers, etc, not permitting usage of plastics, etc.
   Impact: Visitors hardly pay heed to the instructions, as evident from the photographs taken during 2008-2012. This observation was also reported by WBPCB\textsuperscript{9} during its survey in the year 2001-2002.

2. Organization of Educational Programmes centering on the Environment and Garden: Survey of the last ten years showed that little was done on part of Victoria Memorial Hall to conduct awareness programme based only on the Garden. However, during the 2011-2013, some programmes have been conducted based on the floral entities of Victoria Memorial Hall Garden. These are:
   \begin{itemize}
   \item \textbf{World Environment Day (June 5, 2012)}
   Victoria Memorial Hall regularly observes various activities and events on the occasion of World Environment Day which falls on 5\textsuperscript{th}
June every year. Film screening, lectures etc. on issues related to environment, are organized on the day based on the year’s theme as declared by United Nations. The Activity Club for the Young Friends of Victoria Memorial Hall observes the day by organizing some knowledge-oriented activities with the members. Green activities like sapling plantation, special craft workshop with waste materials, cleaning the Victoria Memorial Hall garden premises are regularly held with club members. The staff of Victoria Memorial Hall also participates in plantation of saplings in the garden.

In the year 2012, a programme for school children, i.e. from the members of Activity Club- club of Young Friends of Victoria Memorial Hall was conducted within the garden premises of Victoria Memorial Hall. Most importantly a Tree Quiz was conducted, the questions of which were spot based and based on the familiar trees in and around the Garden.

6.3. Impact Of Visitors On Bishnupur Temple Complex

As already discussed in the previous chapters, we know that Bishnupur, the ancient Mallabhum (Lat 23°05' N Long 87°19' E), a sub divisional headquarters of Bankura district in West Bengal in the Bankura district of West Bengal is known for its awesome terracotta motifs carved on the temples. Every year, hundreds of tourists, both Indians and Foreigners flock to Bishnupur to get a glimpse of these temples. The temples are under the jurisdiction of Archaeological Survey of India.

The architectural features of all the temples have already been discussed in the previous chapters. Of the laterite and terracotta temples, the later are a main attraction for the tourists especially in the winter season.

It has been observed that maximum number of visitors is seen to be between October and March. Each of these terracotta temples are surrounded by well-laid out gardens. So the increase in visitation may lead to negative effects on the surrounding garden as well.
6.3.1. Visitor Statistics

The impact of tourists depends upon the population visiting each of the beautiful temples. Before the discussion, let us see the facilities the temples place before its visitors:

- **Access to Temples**
  The temples are open daily from sunrise to sunset, like all other archaeological sites and closed on Fridays. There are no separate entry fees for the garden and Temple. A common ticket of Rs. 5/- is to be purchased from the ticket booking counter outside premises of Rasa-Mancha that gives entry to Syama Raya, Jor Mandir, Madana Mohana and Jor Bangla besides Rasa Mancha. The other temples do not need any tickets.

- **Tune of Bishnupur Gharana**
  Recently, speakers have been fitted within these temples in a concealed way, i.e. within medium irregular terracotta structures mingled in the garden, which plays songs of Bishnupur Gharana, thus bringing the cultural spirit of Bishnupur into limelight. *(Plate 72a)*

- **Popularization of Bishnupur Heritage by organisaton of Annual Fairs**
  Since the year 1988 till date, during the months of December-January, the sub-divisional administration of Bishnupur, has been organizing with the help of Bankura district administration and Zilla Parishad a 5-day long Bishnupur Mela in the months of December-January. Around 3-4 lakhs of people at that time visit this Mela and in turn all the terracotta temples. Classical programmes are being organized by the West Bengal Tourism Department since the year 2008. This classical programme includes songs and dance, keeping the Rasa Mancha at background. During the Mela, local artisans come with their product and handicraft items. It is mainly organized to promote the tourist interests showcasing the rich cultural heritage of Bishnupur.

- **Lighting at Evening**
  To make the temples visible even at night, special lighting arrangement has been made.
The researcher during her study period had consulted the Visitor Records from Archaeological Survey of India (ASI) headoffice in Kolkata and in Bishnupur, Bankura, to get an account of the daily visitor statistics at the various temples 2006-2013\textsuperscript{10}.

The data as obtained is represented below:

**Table 6.2: Day-Wise Record of Visitors To Bishnupur Group Of Temples**

*(Fig 6.4)*

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<thead>
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<th>Sl. No.</th>
<th>Date</th>
<th>No. of Indians</th>
<th>No. of Foreigners</th>
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<tr>
<td>1</td>
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A Comparative account of Visitors (both Indian and Foreigners) as on 31\textsuperscript{st} December and 1\textsuperscript{st} January is given below:

**2006:**

18.05.2006: Indian: 50

2007:
1.01.2007-: Indian 1645
31.01.2007-: Indian: 220
18.05.2007-: Indian: 120
31.12.07: Indian: 940, Foreigner: 2

2008:
1.01.08: Indian: 885
31.01.08: Indian: 200, Foreigner: 17
18.05.08: Indian: 160, Foreigner: 6
31.12.08: Indian: 700, Foreigner: 2

2009:
1.01.109: Indian: 1174, Foreigner: 5
31.01.09: Indian: 60, Foreigner: F: 2
18.05.09: Indian: 60

2010:
1.01.10-: Indian: 1000, Foreigner: 1
31.01.10-: Indian: 220, Foreigner: 3
18.05.10-: Indian: 90, Foreigner: 4
31.12.10-: Indian: 780, Foreigner: 2

2011:
1.01.11-: Indian: 1125
31.01.11-: Indian: 320
18.05.11-: Indian: 60
31.12.11-: Indian: 1290

2012:
01.01.12-: Indian: 1940, Foreigner: 01
31.01.12-: Indian: 390
18.05.12-: Indian: 30
31.12.12-: Indian: 1173, Foreigner: 2

2013:
Jan 2013- 1.01.13: Indian: 970
31.01.13: Indian: 384, Foreigner: 07
Observation

The above records show that maximum visitation occurs during month of January, followed by December. The number of Indian tourists is much higher than that of Foreigners. The reasons may be attributed to the fact that a) Extreme heat in summer which prevents visitors from the visit b) Organisation of Bishnupur Mela in winter that pulls in a massive crowd.

6.3.2. Direct And Indirect Effects Of Tourists And Visitors

The researcher has conducted an in-depth study on the direct and indirect effects of Tourists and Visitors on the different temples of Bishnupur. The observations are:

- **On Garden surrounding Temples:**
  1. Inspite of the signage mentioning Rules and Regulations to be observed in the Garden, at some temple gardens, plastic bags are noticed thrown here and there, especially in the tourist season. This causes a visual as well as soil pollution within the beautiful temple complex.
  2. Graffiti or scribbling on trunks of trees, causing a visual pollution.
  3. Littering/ Spitting: The visitors are seen littering, spitting, smoking, consuming food stuff and using plastic carry bags inside the premises. This in-turn may lead to the following indirect effects:
     a) The scribbling on branches of trees indirectly affects the trees.
     b) The Plastic accumulation causes soil pollution in the long run.

It has been studied that Vehicular Pollution is not that prominent, since Rickshaws form important means of transport to various temples. However, during the tourist season, use of private cars is prevalent, creating some amount of atmospheric pollution.

- **On the Temples:**
  1. Although there is 24 hour security recruited by ASI in their shifting duty, they have been found to be either sitting at one corner or chatting with their colleagues. They are not at all alert when visitors survey the temples. As such, many a times, visitors lay their palms on the terracotta plaques on the temples, may be not with the purpose of causing damage,
but with a sense of wonder and admiration. However, the salt from their hands does bring about damage to terracotta in the long run.

2. In *Rasa Mancha*, the village children lie around within the corridors and continuously touch the terracotta plaques, which once again can bring about long term damage due to salt.

3. Within the *Rasa Mancha*, between the terracotta panels, the researcher has come across burnt pieces of *bidis/ cigarettes* stacked inside. This indeed causes visual pollution.

4. Graffiti- on inner walls of *Rasa Mancha* and others. The walls bear lots of scribbling of names which have been caused due to negligence on part of the security staff. (Plate 71)

5. The surrounding vegetation not so hampered, as definite paths have been laid out for the people.

### 6.3.3. Management Strategy And Awareness Programmes

Most of the local people including school and college students at Bishnupur are unaware about their own cultural heritage. This was evident during the scholar’s participation in a Seminar at Ramananda College, Bishnupur in 2009. The theme for the conference was *Heritage of Bishnupur*. During an interactive session, the researcher questioned the students regarding the significant terracotta temples. But to her surprise, she found that none of the college students of History department could properly identify the temples nor they could say anything about the temple’s location, even the famous three temples, i.e. *Syama-Raya, Rasa Mancha, Jor Bangla* and *Madana Mohana*. This shows their lack of awareness. But, they were keen to know about its details of each and every temple and we are to sensitize them.

In smaller towns, historical monuments may be located at remote places. The importance of monuments is communicated only through somewhat *technical writings* on Display Boards which often fail to captivate the inquisitive minds of tourists, as in the case of Bishnupur, Bankura district, West Bengal.

Each of the temples under the present study are enclosed on four sides by a boundary wall as a symbol of it being a ‘Protected Site’ under *Archaeological Survey of India*. However, this physical barrier around the temple perhaps
serves as a *mental barrier* for visitors creating a restricted approach. In one way, this helps in preventing the nuances of human vandalism and is essential for safety of the temple, but on the other hand, it compels visitors to view the temple from a certain distance. Thus it puts major constrains on the visitors in developing full understanding of the significant carvings of the temples. In this particular temple, the inner walls also bear notable artistic decorations details. Due to restrictions imposed, the curiosity about ‘what is inside’ or what decorations are there on the other side of temple remains.

The Bilingual notice boards implemented by *Archaeological Survey of India* near the temple seek to convey the following information:

1. Year of construction of the monument and its builder
2. Short description of the monument
3. Most prominent terracotta carving on the panels

Another board displays its recognition as a Protected Monument. *(Plate:73b)*

Tourists may also avail guides who can give a detailed description of the historical aspects of the monument. Communicating such information in the form of Display Boards usually does not stimulate learning or curiosity.

- **Present scenario as studied during Field Work**
  
Preliminary conversations with the local people and the college students as well as field observations reveal the following facts:

1. People hardly take note of the information boards. For them written information, that too in plain display boards, causes *repulsion* instead of attraction.
2. Most visitors have no patience to read elaborate historical information displayed on the display boards. They tend to have a very limited attention span. The time spent reading labels interrupts the pace of the experience and requires a shift of attention from observing and contemplating to reading and understanding.
With the advancement of modern technology, the monuments can be presented in a more appealing way to keep a lasting impression on the visitors.

- **Application of High Technology for expression of relevance & significance of Monuments**

New technological developments emphasizing on multisensory approach stimulates active response in the visitors. The following discussion suggests the effectiveness of application of the Touch Screen Kiosk in highlighting the importance and value of a Terracotta temple. The kiosk software seeks to raise the level of appreciation of the monument by the visitors through trilingual interactive communications of 15-20 minutes duration. Of the various technological developments, application of Touch screen can be incorporated in this group of temples. The researcher suggests the following idea:

- **Sequential Layout of the Temple through Kiosk software:**
  - **Locational data**
    1. Map of Bankura district highlighting Bishnupur, zooming out from Map of West Bengal.
    2. Zooming in the location of the particular temple from locality within Bishnupur with geographical coordinates.
  - **Historical & Architectural data**
    1. Diagnostic features of the temple that includes historical, architectural, notable decorations of the temple through images, photographs and audible explanations.
    2. Interesting stories associated with prominent terracotta panels may be highlighted pictorially by use of animation.
    3. Photographs of the monument at different historical times may be displayed so that the visitors come to know about the stages of development and repairing.
Environmental Data

1. The surrounding biodiversity of the temple could be highlighted along with ecologically important trees. For the remote location of these temples have favoured sighting various species of birds and vegetation.

2. The agents of deterioration need to be highlighted so that people become aware of the present status of the temple. Of the various factors, effect of human vandalism (through photographs) must be highlighted and its future impact can be shown through multimedia technology and animation.

Data related to Visitor Feedback

1. Provision of quizzes and games, targeting children as well as adults. This can be based on testing their observation by:
   i) asking for the incidents showing terracotta panels through photographs
   ii) matching the terracotta panels with different directions of the temple
   iii) asking about type of temple, with pictorial options about the different temples existing in Bishnupur, and so on.

2. Tourist's or visitors contribution for protecting this monument may be placed forward in an interactive way in which visitors can have the option of putting forward their suggestions by self-operation or through computer literate guides. This part is to be considered after the visit.

Successful implementation of Touch Screen Kiosk in Indian Monuments

Some of the important protected monuments within India have already equipped themselves with Touch screen kiosks. This includes Badami Museum, Hazarduari Palace Museum, Sarnath Museum, Nalanda Museum and Nagarjunakonda Museum. Recently in November 2012, Archaeological Survey of India has installed a Kiosk at the Big temple at Thanjavur on the occasion of World Heritage Week. The unit will provide visitors information and details on the history of the Big
Temple, its sculptures and paintings. Another kiosk is being put in the interpretation centre inside the temple. All displayed information will be narrated in English, Tamil, Hindi and French. This reflects on the technological usage within and around historically significant sites across different states in India. This can serve as a model for development of such kiosks at Bishnupur group of temples in the near future. (Plate: 73d)

- **Awareness through Museum**
  
  The small town of Bishnupur has only one reputed Museum, i.e. Acharya Jogesh Chandra Purakirti Bhawan, under ASI. The Museum is located close to Ramananda College. The researcher has surveyed the entire Museum for any relevant information about the temples. However, although there are art, archaeological objects including terracotta sculptures, no mention has been made about the temples and their relevance.

  Its location been adjacent to the college and being frequented by college students as well as tourists, the Museum needs to incorporate objects or audio-visuals about the temples.

  So, creating awareness through this Museum is of necessity. In fact, the Museum itself can guide the visitors to visit the temples and emphasize the need for their conservation.

- **Edutainment Programmes for the local students of School and College**

  Government Organizations like Archaeological Survey of India, Museology Department of Calcutta University and other organizations can organize educational programmes in collaboration with the local schools and colleges to create awareness about the temples and the surroundings of Bishnupur. Field trips can be organized in the winter months to each of the temples and an expert would be there to explain the details of the temples to the students. (Plate: 73a-c)
• Issuing Popular publications from the Temple Premises
  When one visits Bishnupur, various types of Guide books are found to be available from the Tourism department or the local shops mentioning briefly the various temples of the town. However, if the publication materials, specially Guidebooks with good photographs can be made available either at Rasa Mancha or at each of the temple sites, visitors would be left to carry back some memories of the sites alongwith them.

Sum up of Management strategies at Bishnupur Group of Temples
• Audio-visual application in dissemination about a particular temple.
• Installation of a touch screen kiosk at the temple premises.
• Noting down the visitor feedback.
• Conduction of educational awareness programmes for the local population.
• Conducting field trips at the temple sites for the local college and school students.
• Popular publication to be circulated at the temple premises.

6.4. Impact of Visitors on Natural Heritage Sites-Sundarbans National Park

We know that Sundarbans National Park is the only Natural Heritage Site under discussion. The impact of visitors and its effects have been studied thoroughly during my research tenure. As mentioned in the previous chapters, Sundarbans National Park is a part of the Sundarbans Biosphere Reserve. The Sundarbans Biosphere Reserve is demarcated by three zones, namely - Core zone, Buffer zone and Transition zone11.

**Core zone**:- It includes compact block of reserved forest covering 1700 sq.km lying in eastern part of Sunderbans. It is bounded by Matla river in West and opens into Bay of Bengal. It is a fully conserved area with National Park (1330 sq.km) and is devoted to conservation of biodiversity.
**Buffer zone** - It comprises majority of mangrove area including Reserved Forest surrounding Core zone. It Includes portion of Buffer zone of Sundarbans Tiger Reserve (STR), *Sajnekhali* Wildlife Sanctuary and compact Reserved Forest Blocks between Matla and Thakuran under 24 Pgs Forest Division. It is meant for co-operative activities compatible with sound ecological practices.

**Transition Zone** - It covers the balance of Biosphere Reserve area, which contains mangrove areas mostly in non-forest areas & reclaimed areas.

Tourists usually get to visit some areas in the buffer region of the Sundarbans Biosphere Reserve and part of Wildlife sanctuary within Sundarbans Tiger Reserve.

Of these, the buffer area of Sundarbans National Park forms the Tourist zone. Tourists can enter only the buffer zone and part of Wildlife Sanctuary within Sundarbans Tiger Reserve.

The tourist spots include:

1. *Sajnekhali*
2. *Dobanki*
3. *Netidhopani*
4. *Burir Dabri*
5. *Sundarikati*
6. *Bhagabatpore*
7. *Lothian Island Sanctuary*
8. *Kalash Beach*

The discussions made before on Victoria Memorial Hall and Bishnupur Temple Complex slightly will differ when discussing about a Natural Heritage Site. For in a Natural Heritage Site, the type of Tourism practiced is *Ecotourism*. Although Ecotourism is practiced in Sundarbans, let us see how far it has been successful.

Firstly, let us discuss what facilities Sundarbans has to offer for the tourists.

- **Visiting Period**

  Being at the southernmost tip of 24-Parganas South, Sundarbans suffer from the following extremes of temperature. The researcher during her study period has observed that the visitors visit this Heritage zone mostly in
October to early March. Heavy rain and occasional cyclones constitute serious barriers to visiting Sundarbans in between July-September.

**Sundarbans Permits:**

Sundarbans National Park has a number of entry points. Irrespective of any point from where one enters the Sundarbans National Park, one has to reach the entry point from Kolkata by road. The entry points are:

- **Godkhali** located just opposite Gosaba Island.
- **Koikhali** is nearer to the Haliday Wildlife sanctuary and tourist attractions like Bonnie camp, Kalas Island and beach, Haliday Island etc.
- **Namkhana** is 117 km away from Kolkata. Namkhana is also connected with railway from Kolkata and the distance is 109 km. This place is closer to Bhagabatpur Crocodile Project and Lothian Wildlife Sanctuary of Sundarbans.
- **Canning** is the nearest rail head to Sundarbans Tiger Reserve. Railway distance from Kolkata to Canning is 45 km and 29 km away from Godkhali Port. It takes 1hr 20 mins to reach Canning station from Sealdah station in Kolkata. Public transport is available between Canning and Godkhali port. In case a direct vehicle is not available, one can reach Godkhali via Sonakhali. There are bus and auto rickshaw services from Canning to Sonakhali and Sonakhli to Godkhali. (Fig.6.6)

**Visitor Attractions**

The entire boat/ launch journey across the rivers to Sundarbans is itself very attractive and enjoyable. However, for bringing the visitors closer to Nature, some facilities have been provided at different places of Sundarbans Biosphere Reserve. These include the following -

- Observation towers/ Watch Towers- Sajnekhali, Suddhanyakhali Dobanki, Netidhopani, Burirdabri, Jhingekhali, Sundarikati.
- Nature Trails, i.e. Mud Walk at Burirdabri & Cage Trail at Dobanki.
- Deer acclimatization at Dobanki.
- Existence of a Wildlife Sanctuary at Sajnekhali.
- Mangrove Interpretation Centres Sajnekhali.
- Interpretation Centres at Bhagabatpur, Sundarikati (Bonnie Camp).
Visitors have the provision of availing Guides from Sajnekhali for demonstration of the natural exhibits to the visitors, for Sundarbans Biosphere Reserve is itself a museum in nature. Before discussing the details of each of the visitor facilities, let us elaborate on the fact why Sundarban Biosphere Reserve (SBR) may be regarded as a living museum.

❖ A living Museum

Based on her observations and intensive study, the researcher rightfully considers Sundarbans Biosphere Reserve to be a living Museum within Nature. The total exhibit orientation is naturally controlled, without any human interference. The objects are naturally displayed, naturally lit up by sunlight and naturally conserved. Total area of reserve is 2585 km², covering land area of 1680 km² and 905 km² as water area. Within this area, 1330.12 km² is designated as core area, declared as Sundarbans National Park, vide Department of Forests, Government of West Bengal Notification No. 2867- dated 4.5.1984. An area of 124.40 km² within core area is preserved as primitive zone to act as gene pool. An area of 1225 km² outside core is known as Buffer Zone. In this area is located Sajnekhali Wildlife Sanctuary covering an area of 362.33 km² and subsidiary wilderness zone of 241.06 km². Since Sundarbans encompasses a rich biodiversity, a few nature interpretation centres have been established in some parts of Sundarbans of which Sajnekhali houses the largest of all. These have been established to create mass awareness on biological heritage of Sundarbans. However for a tourist who is an ardent lover of nature, the journey by boat itself will make him pass through this living museum, where all the “galleries” are naturally arranged to form a compact “museum”.

A visitor has to have that sense of observation and some brochures at hand or they can hire Guides or “Docents” for identification of the museum specimens.

As one comes close to the Tiger Reserve, there stands a large, prominent notice demarcating the zone from rest of the area. From that onwards the large water-body can be seen at places interspersed with
green mangrove zones. This can be considered as a gateway to the galleries of the museum.

The ways in which it fulfills the criteria of a so-called living Museum can be summarized as follows:

1. **Collection**: There is natural collection of floral and faunal specimens, both macro and micro.

2. **Documentation**: Nature has created different zones in which edaphic and other abiotic and biotic factors themselves create environment for the growth or existence of a particular flora or fauna. They are thus naturally documented.

3. **Conservation**: Nature itself has created different adaptive features in the plants and animals so that the ecosystem remains balanced and its entities are conserved. The advantage here is of in-situ conservation of the flora and fauna.

4. **Display of Exhibits**: Most people go to museums and try to see the galleries in a single visit.

5. **Education**: The entire mangrove ecosystem is there to make its knowledge known to people of all ages and backgrounds. Education is one of the main goals in the museum’s policy. The specimens in this museum collection carry all sorts of visual information. It is for the part of visitors to note them down or photodocument them for further research. Tactile exhibits are an invaluable means of disseminating information to children and students and that is exactly what this natural mangrove museum provides. Visitor of all ages can actually touch the specimens (mangroves) and feel their adaptive and special features.

6. **Extramural programmes**: Field trips help to widen the visitor’s focus beyond the museum’s walls. Here, the museum itself is located within nature and there are always possibilities of fieldtrips which makes the learning easier. Here the Guide acts as Museum Educator.

7. **Research**: The Mangrove ecosystem provides ample opportunities for research both at macro and micro level.

8. **Caring for the Visitor**: Visitor services are central to the coordination of public access to the museum. Here, naturally the environment is that it is bound to drive out visitor monotony and fatigue.
Facilities for the Visitors (Plate: 74a-m)

a) Observation towers/ Watch Towers- Netidhopani, Bonnie Camp, Sajnekhali, Suddhanyakhali

- **Sajnekhali**
  Sajnekhali is the official gateway to the Sundarbans Tiger Reserve. The location of the interpretation centre is such that after paying a visit to the centre, visitors are led towards a watch tower. This watchtower can accommodate around twenty visitors at a time. It is a good spot for birdwatching and visitors get introduced to the avian diversity at the Interpretation Centre before they move on to the watch tower. Moreover, one gets a clear view of the sweet water bodies which serves as a source of drink for wild boar, deer, rhesus monkey and the Bengal tiger. For introducing the visitors to the endangered status of the two important reptiles of Sundarbans - Estuarine crocodile and the turtle- *Batagur baska*, there is also a crocodile enclosure and turtle hatchery within the premises.

- **Sudhanyakhali**
  Sudhanyakhali, opened to visitors in 1999 has a watchtower for wildlife sighting in the early morning and evening. A mangrove park is an added attraction. One may spot a tigers near the sweet water pond in front of the watchtower.

- **Dobanki**
  Dobanki camp was established as a tourist spot in 2003. From the top of the tower a wild expanse of dense jungle can be seen with two paths called Observation Routes. If a tiger crosses this jungle, they usually get spotted on these routes.

- **Netidhopani**
  The camp has a watchtower established in 2001 and ruins of a 400 year old brick temple.
➢ Burirdabri
The complex was inaugurated in the year 2003. One comes across the Raimongal View Point from which one can see across the river Raimongal, the international boundary between India and Bangladesh to the Bangladesh Sundarbans.

➢ Jhingekhali
This camp, established in 2004 has a watch tower with observation lines and sweet water pond for observing the wildlife.

➢ Sundarikati
Sundarikati or Bonnie camp is another ecotourism camp set up by the forest department. It is also an interesting tourist destination. This is unique in its own way, for there is no separate building for the interpretation centre. Whatever awareness regarding the ecosystem of Sundarbans has been created is housed at the basement of the tall watch tower. The visitors visiting the site will look forward in climbing up the watch tower and in turn is bound to pay a visit to the interpretation centre.

b) Nature Trails, i.e. Mud Walk at Burirdabri & Cage Trail at Dobanki

➢ Cage Trail at Dobanki
Dobanki has a 170 m elevated “Canopy walk” leading to a watchtower. This gives the feeling of walking at a height on a canopy of mangrove vegetation. The forest harbours tiger, spotted deer, wild boar etc. There is a Deer Acclimatization Centre where spotted deer are kept for treatment, multiplication and acclimatization to mangrove conditions.

➢ Mud Walk at Burirdabri
The Complex is famous for its Mud walk and Mangrove cage trail of around 300 m length, leading to Raimongal View Point, as already mentioned before. One may encounter numerous tiger pugmarks on either side of the trail. A nylon-net separates the tourist from the
Chapter 6

tigers. The structure is safe and the feeling of walking in a protected tunnel is unique.

c) Interpretation Centres

• **Role of Museums/ Nature Interpretation Centres**
  
  Interpretation Centers are buildings generally located at the place of interest that is an ecologically rich zone, nature reserve, etc. for dissemination of knowledge and information of the site through different exhibits. They are specialized for communicating the significance and meaning of natural or cultural heritage and serve for education and awareness about a specific site/ zone. Visitors or tourists need to visit the interpretation centres visiting the respective ecologically important site.

  Sundarbans Biosphere Resource Information Centre at Salt-Lake, Kolkata was established in the year 2005 by the West Bengal Forest Department under the UNDP programme on Sundarbans Conservation. It aims at portraying both the natural and cultural heritage of Sundarbans through its large number of exhibits, computerized databank, publications and educational activities. The researcher was involved as Research Assistant in the development of this Interpretation Centre. During her tenure from 2005-2008, she found a very positive impact of this Interpretation Centre on the tourists visiting Sundarbans.

  Smaller interpretation centres have also been established at Sajnekhali, the official gateway to Sundarbans at Sundarikati / Bonnie Camp. At Bhagabatpur, a breeding centre for the endangered estuarine crocodile had been established where visitors not only get to see the various stages of the live crocodiles, but also get information about the crocodiles as well as about the need for protecting them through the adjacent Nature Interpretation Centre.

  The researcher has undertaken detailed survey of the Interpretation Centres in various regions of Sundarbans namely Mangrove
Interpretation Centre, Sajnekhali; Bhagbatpur Interpretation Centre, Interpretation Centre at Sundarikati, Bonnie Camp and Sundarbans Biosphere Resource Information Centre, Aranya Bhaban, Saltlake to evaluate the success of Museums in Conservation & Awareness regarding significance of the natural heritage of Sundarbans.

(i) Sajnekhali Mangrove Interpretation Centre  (Plate:75A)
This was established by the Department of Forests, Government of West Bengal in the year 1997. It is the largest of all the Nature Interpretation Centres existing in Sundarbans. It gives an overall account of the Sundarbans Mangrove Ecosystem and the floral, faunal diversity and well as the means of livelihood of the people of Sundarbans. Interested visitors get an insight into the census technique of tiger. There is an auditorium where movies in relation to mangroves, mangrove conservation, faunal diversity of Sundarbans, Sundarbans ecosystem are regularly screened by means of which visitors are enriched. For introducing the visitors to the endangered status of the two important reptiles of Sundarbans- Estuarine crocodile and Olive Ridley turtle, there is also a crocodile enclosure and turtle hatchery within the premises. Boat trip can be made to Sudhanyakhali, Dobanki, Netidhopani, Haliday Island. There is also a Bono Bibi Temple in the complex. In the Interpretation Centre, mention has been made regarding the deities and socio-cultural heritage of Sundarbans. So visitors will come to know of the deities worshipped by the people of Sundarbans as well as get to see the deity in reality. The depictions of the various entities in Sundarbans have been made through models, charts, sketches, posters as well as some preserved specimens. Seminars, workshops, awareness camps etc are organized frequently in the vicinity of Interpretation Centre. Interpretation trips are also arranged for school students, villagers, Panchayat members and women. Audio-visual equipment is being used to highlight the need of conservation of nature and eco-system. Short term training course about the mangrove eco-system are conducted for the registered local tourist guides, which generate local interest and employment.
(ii) **Bhagabatpur Crocodile Breeding Centre and Nature Interpretation Centre (Plate:75B)**

At Bhagabatpur, a breeding centre for the endangered estuarine crocodile has been established where visitors not only get to see the various stages of the live crocodiles, but also get information about the crocodiles as well as about the need for protecting them through the adjacent Nature Interpretation Centre.

It has been studied that to restore the population of the endangered estuarine crocodile, Forest Department of West Bengal has initiated a site for Breeding and rearing of these reptiles in captivity at Bhagabatpur, 24 Parganas South, followed by the release of the matured crocodiles back into their natural habitat, i.e. the tidal creeks of Sundarbans. If one takes the chance of visiting the site, he or she may be able to get a clear idea about the birth and nurturing of baby crocodiles, their food habits, their gaining of maturity and final release into the estuaries. To supplement the living reptiles, an Interpretation Centre has been set up adjacent to the Breeding site for creating awareness on crocodiles and floral and faunal heritage of Sundarbans.

One of the Display board requests the visitors to pay a visit to the Interpretation Centre, at the entrance of breeding place for information on wildlife. So from the entry point itself, an indication is there to pay a visit to the Interpretation Centre suggesting there might be something valuable to gain from the Centre. Near the entry point of the Interpretation Centre, there are display boards portraying the following themes: World distribution of Crocodile, Alligator, Caiman & Gharial—giving an impression of the distribution pattern and types of crocodiles across the world including the number of species.

Another interesting display is the “Salient features of Estuarine crocodiles” giving an overall impression regarding the external or identifying features by which we can identify an estuarine crocodile from other members like gharial and alligator. So one can note down the characteristic features and compare them with the live specimens. This will increase their power of observation of the morphological features of
the crocodile hatchlings, which they could have missed had they seen the hatchlings without noticing the display board. The captive breeding procedure is represented by means of flowcharts.

Once again, the ways of alerting people about the do's and don'ts of visiting the breeding centre is highlighted in a very lucid way. The colourful pictorial depiction of the Food web prevalent in the mangrove ecosystem where crocodile forms the topmost of the food chain is of special interest to children and students.

A statistics of the success of the breeding of estuarine crocodile in Bhagabatpur and around the world have also being displayed. The Interpretation centre consists of a large single Hall displaying various preserved specimens of different stages of crocodile hatchlings starting from the large ovoid creamish white eggs; A 3D Model of the map of Sundarbans have been kept well lighted. The entire wall displays a large number of enlarged photographs on different stages of capturing of the mature crocodiles from breeding centres and their release into the various tidal creeks of Sundarbans, floral and avi-faunal diversity of Sundarbans and sources of livelihood like honey collection, fishing, agriculture and prawn seed collection. Black and white labeled sketches showing distinguishing features of tongues of estuarine crocodile, marsh crocodile and alligator form an added attraction. A chart displaying the origin and evolution of reptiles is very interesting as well as informative.

(iii) Sundarikati/ Bonnie Camp (Plate:75C)

Laminated bilingual posters, models, dioramas, photographs are the means of communicating the visitors about the importance of the mangrove ecosystem. The geographic position of Sundarbans has been depicted through maps and satellite imageries. The aquatic ecosystem and the entire method of honey collection have been well represented through a well-lit diorama. The importance of the Bengal tiger and the need for the conservation of the entire mangrove ecosystem has been highlighted at each and every place.
For efficient management of visitors, Guides who are from surrounding local areas like Goasaba, Basanti, Sandeshkhali and Hingalganj are allotted duties with a tourist group. At present there are around 32 such guides, one per watercraft, who are trained by the Forest Department.

(iv) **Sundarban Biosphere Resource Information Centre (SBRIC)**

The Information Centre is a unique one-window centre established by the Department of Forests, inaugurated in 2005. It had the following sections: (Plate: 75D)

**Floral Resource Section:** It displays the floral diversity of Sundarbans, starting from the Mushrooms, algae and lichen diversity. One gets the opportunity to examine dried specimens of aerial roots of mangroves, fruits and seeds and viviparous germinated seedlings of Garjan, Kankra, etc. The Herbarium contains specimens of mangroves, non-mangroves and pteridophytes from Sundarbans.

**Faunal Resource Section:** The faunal richness of Sundarbans has been highlighted both through wet preservation and dry preservation. A variety of invertebrates, molluscan species, oyster colony are other attractions. One gets the rare opportunity to view the living fossil of Sundarbans- Horse shoe crabs. Butterflies and Moths have been preserved and mounted. One is fascinated by the collection of a variety of sharks, amphibious mud-skipper, preserved eggs of Olive Ridley and estuarine crocodile. Plaster casts of tiger pugmark create interest for the inquisitive visitors.

**Library-cum-Data Bank:** A well maintained library holds all published literature on Sundarbans.

**Photo Gallery:** Thematic and individual posters based on flora, fauna and socio-economy of Sundarbans are well displayed.

**Multimedia Centre:** Hold long and short term training programmes and other educational programmes.

Besides, with the application of current technologies, a user-friendly software has been created to fulfil the interest of the inquisitive visitors on any data related to Sundarbans.
The researcher has been a part of this project of setting up of this Museum and had conducted lots of awareness programmes on Sundarbans. Potted plants of some representative mangroves served the purpose of giving a quick idea to the visitors regarding a particular plant. This Museum is very helpful to all visitors or tourists intending to visit Sundarbans.

During 2013, the collections of this Information Centre had been shifted to Central Park, Saltlake with future plan to remodel and re-establish the museum.

6.4.1. Visitor Statistics

Sundarbans is reputed worldwide for being a UNESCO designated World Heritage Site. Every year, it is flooded with millions of tourists, both foreigners and Indians, both general people and nature lovers. For being the only Mangrove-Tiger combination in the whole world, whoever visits Sundarbans aims to spot a tiger amidst the mangrove jungle! Since inception of the Tiger Reserve, there has been a steady increase of tourists to the area.

A survey of Annual Report of the Department of Forests, GoWB reveals the following data on the total number of visitors (both Indian and Foreigner) at Sajnekhali entry point during 2003-2012:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Year</th>
<th>Indian Tourists</th>
<th>Foreigners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2003-2004</td>
<td>32,909</td>
<td>297</td>
</tr>
<tr>
<td>2</td>
<td>2004-2005</td>
<td>31,376</td>
<td>697</td>
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<tr>
<td>3</td>
<td>2005-2006</td>
<td>39,200</td>
<td>463</td>
</tr>
<tr>
<td>4</td>
<td>2006-2007</td>
<td>58,406</td>
<td>1,218</td>
</tr>
<tr>
<td>5</td>
<td>2007-2008</td>
<td>55,472</td>
<td>1,476</td>
</tr>
<tr>
<td>6</td>
<td>2008-2009</td>
<td>79,029</td>
<td>1,581</td>
</tr>
<tr>
<td>7</td>
<td>2009-2010</td>
<td>44,849</td>
<td>2,431</td>
</tr>
<tr>
<td>8</td>
<td>2010-2011</td>
<td>58,460</td>
<td>2,411</td>
</tr>
<tr>
<td>9</td>
<td>2011-2012</td>
<td>79,393</td>
<td>2,827</td>
</tr>
</tbody>
</table>

Table 6.3: Yearly increase in the number of Tourists at Sajnekhali Entry Point

(Fig:6.5)
As per the indepth study conducted by the researcher in her research period, visitors in Sundarbans can be classified accordingly:

1. General people
2. Students- school, college, University
3. Researchers
4. Foreigners
5. Nature Lovers

The number of tourists has increased rapidly since 2003-2004. Over one lakh visitors including foreigners visit Sundarbans annually. It has been observed that around 75% tourist visits the circuit: Sajnekhali- Sudhyanakhali- Dobanki- Netidhopani and around 25% visit the other areas as mentioned above. October and March are considered as intermediate seson. April to September is off season. All the tours are generally conducted by private organisers but only through permission from Forest Department. Before allowing a tour operator to conduct the tour, the forest department checks the security of the launch or boat as approved by the West Bengal Inland Waterways and Zilla Parishad respectively.

However, most of the tourists are not satisfied since tiger sightings in the wild are rare and destinations are over-crowded. As a result they do not want to repeat their visit.

6.4.2. Study on Direct & Indirect Effects of Tourists on the Sundarbans Biosphere Reserve

The general mass visiting Sundarbans generally ride on the boats, listen to songs without any eagerness to learn and study the natural heritage. They frantically search for the Bengal tiger and repent for visiting the site when they fail to do so.

In the name of ecotourism, humans are causing menace to the Natural Heritage through the following actions:

1. Water pollution by diesel of boats
2. Litters like plastic bottles/cups/plates lie scattered here and there causing soil, water & visual pollution. Plastic plates/cups served, collected in a bin after use- but returning back from journey thrown once again in River at Canning

3. Use of Mobile phones within reserved forest

4. Local people – alienated if outsiders gain entry

5. Use of spotlights in evening- a shock for animals

6. Unregulated tourist flow disturb flora & fauna

7. Damage of forests for tourism infrastructure

8. Advertising luxury & food

10. Cruise allowing visitors alcohol consumption & use of loudspeakers

12. Sometimes tourists take highly priced fish from markets of Kolkata

14. Many tourists expect campfire and buying of animal parts.

- **Study on Socio-Economic and Environmental Impacts of Ecotourism**

  In spite of the definition proposed and characteristics of Ecotourism, lot of misuse has been done on this term and the following tourist impacts may be seen:

  1. Tourism may cause degradation of the habitat by polluting waterways - through the diesel of the boats.
  2. Accumulation of garbage - plastic bottles, cups, plates causes soil, water as well as a visual pollution.
  3. Unregulated tourist activity may cause disturbance to the flora and fauna e.g. visitors may disturb nesting birds.
  4. Use of spotlights shocks and disconcerts animals. Frequent damage to flora may affect their regeneration potential.
  5. Ecotourism ventures often alienate local people if they are denied access to the area in question on one hand while outside tourists are encouraged on the other.
  6. Influx of outsiders as tourists and entrepreneurs cause social and cultural degradation of the local population.
  7. There may be a tendency to use Forest land for building up infrastructure for tourism.
• **Analysis**

1. Most of “Ecotourists” are actually visiting this heritage site to drive away their monotonous busy life and hence ‘enjoy’ luxuriously.

2. Tourists need to understand the concept of Ecotourism and realise the importance Sundarbans Tiger reserve & Mangrove ecosystem as a whole.

3. In the recent natural catastrophe-AILA, the Tiger Reserve zone suffered few damage as compared to the inhabited zones.

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**6.4.3. Management Strategy And Awareness Programmes**

Since the concerned site is a Natural Heritage and a popular Tourist place as well, the management strategies are very much vital in order to retain the biodiversity of the site. The following measures may be proposed for the entire ecotourism team:

The prime necessity is that the tourists could be first made aware about the significance of the site. Once they understand its value, only then will their urge for conserving it arise.

1. The tourists could be made to educate themselves with the preliminary knowledge on the area’s ecology, geography, culture, history, language. This can be achieved through the exhibits at the Interpretation Centres, audio-visual programmes, film shows or popular attractive publications.

2. Dress code- A tourist could be properly informed that he/she is entering the zone meant for wild animals. So he should never bewilder the nature and wild animals with bright attractive colours. He should feel himself to be a part of nature/forest and hence should wear shades of green, brown or yellow. Visitors should avoid spraying perfumes. Shoes should be casual and tough and rough as the entire topography is muddy, saline, rugged with the breathing mangrove roots protruding out from the soil.

3. Considering the importance the visitors could be requested to carry the following things with them:
   a. Route map showing the rivers, creeks and islands through which tourist passes by.
   b. Binoculars
c. Field guidebook for preliminary identification of mangroves, birds, butterflies etc.
d. Torchlight
e. Insect repellant
f. Camera
g. First aid medicines
h. It should be kept in mind to switch off the mobile phones once within reserved forest

4. One should have the respect for the social and cultural sensibilities of the region when interacting with local residents. One should not to tempt the locals specially children by offering them food, sweets, etc.

5. Tourists should never gain the inclination towards buying local fauna and flora parts, skins or products, etc., which might lead to the degradation and exploitation of the region, or may be illegal.

6. Waste materials should be disposed of properly. They should not carry and throw any non-biodegradable waste material like polythene in form of tins, bottles, plastics, bags, even soaps / detergents within forest areas or river or creek water.

7. Tourists should not to use wood as fuel to cook at camp site. Campfire strictly prohibited.

8. Tourists should not consume alcohol or any form of intoxicants.

9. Use of microphone within forest area should be prohibited. One should avoid speaking loudly while on watch tower or mangrove trail. Silence has to be maintained.

10. Visitors must be in groups of at least six people. Tourists should not stray away from the group and avoid loitering in the dark.

- **Proposed Visitor Management Guideline for Managers of Ecotourism**

  1. No Construction of lodges with large accommodations
  2. Visit of a large no. of tourists at a time in any particular Ecotourism centre should never be allowed.
  3. Food should never be distributed in any form of non-biodegradable material.
4. They should organize nature camps with school children /college students for more conservation awareness.

With the buzz around issues like Global warming and climate change, people are gradually realizing the importance of environment, forests and ecosystems. There is a greater urge to flee the polluted metropolises of urban life and get back to nature which culminates into Eco-tourism or Nature tourism /Nature based tourism. With the passage of time, the anthropogenic effects on Sundarbans are getting amplified leading to noticeable destruction of the unique ecosystem.

- **Caring for the benefits of the livelihood of Local People**
  In order to put an end to deterioration of the Sundarbans forest, conservation efforts are being taken. As discussed in the previous chapters, the local community which depended solely on the forest would face problem if their benefits are not looked after. Their existence will be at stake if conservation initiatives fail to create alternate livelihood options for the local community. Ecotourism can be a solution to take care of the conservation efforts of this delicate ecosystem as well as provide livelihood opportunity to the local people. Ecotourism has emerged as a development tool, which aims to protect the natural environment and cultural diversity by attracting the ecotourists and generating a source of revenue for the local people without harming the nature

- **SWOT analysis of Ecotourism in Sundarbans**
  Taking into account the background information on Sundarbans as well as the opinions from tourists, tour-operators, forest officials and local people, SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis has been done for ecotourism in Sundarbans.

  - **Strengths**
    a) Sundarbans is a well established tourism destination with a variety of natural attractions like the Royal Bengal Tiger, estuarine crocodile, mangrove vegetation, different avifauna etc.
    b) The local people strongly supporting the need of ecotourism in this region.
c) Good number of domestic and foreign tourists visiting this destination.

d) Unique culture exists of the local people.

**Weaknesses**

a) Lack of coordination among local people.
b) Low involvement of local people in tourism.
c) Little incentive for the local people from tourism in terms of income generation.

**Opportunities**

a) Social mobilization through Joint Forest Management, Self-help groups, Eco-Development Committees etc.
b) Proper ecotourism package development involving local people in decision making and planning so that there is a larger involvement of the local people.
c) Diversification of ecotourism products like stay in country boats, trail walks etc. which will help in retaining majority of the income generated with the local people.

**Threats**

a) Migration of extremely poor landless people to Kolkata in search of job opportunities.
b) Potential negative environmental impacts (damage to mangrove vegetation due to rise in salinity, loss of species due to tiger shrimp cultivation etc.)
c) Pollution by sewage, dumping of the wastes in river.
d) Increase in biotic pressure due to increase in mass tourism.
e) Lack of proper management causing negative impact on this fragile ecosystem.
f) Tourists' dissatisfaction after visiting this place.

For ecotourism to be effective in its true sense there is a need to develop a proper ecotourism package which should be different from the existing mass tourism packages. At present a small percentage of the local people are engaged in tourism related activities. Focus should be on more involvement
and participation of the local people in ecotourism. This will help in maintaining a social balance in terms of income generation of the local people. This will also reduce their dependence on the forest to a great extent thereby aiding the conservation process.

Thus we see that for maintenance of the heritage sites, proper management and control of Tourism is a vital duty to prevent the negative impacts as discussed earlier in this chapter. The concept of Ecotourism may be applied to other heritage sites for proper preservation of the sites. In the following section of this chapter, the researcher gives an account of some other important Heritage Sites surveyed for a comparative analysis.

6.5. Comparative Studies With Other Heritage Sites In India

During the tenure of her research work, the researcher had visited some of the Heritage Sites outside West Bengal to make a comparative analysis of those sites with her sites of study:

The Heritage zones studied were:

1. **Taj Mahal, Agra**: UNESCO recognized World Heritage Site (Cultural)
2. **Humayun’s Tomb, Delhi** - UNESCO recognized World Heritage Site (Cultural)
3. **Keoladeo National Park, Bharatpur, Rajasthan** - UNESCO recognized World Heritage Site (Natural)

The Cultural Heritage Sites that have been studied are surrounded by well laid out gardens as in Victoria Memorial Hall, Kolkata and Temples of Bishnupur, Bankura.

1. **Taj Mahal, Agra**

   **Location**: Uttar Pradesh, Agra District

   **Geographical Location**: 27°10’30”N 78°02’31”E 27.17500°N 78.04194°E, on right bank of the Yamuna river.
Year of Inscription as World Heritage Site: 1983
Type: Cultural
Criteria: i
Reference: 252
State Party: India
Region: Asia-Pacific
Height: 73 m / 240 ft
Year of construction: 1632–1653
Architect: Ustad Ahmad Lahauri
Architecture: Mughal architecture
Visitation: More than 3 million (in 2003)

• Brief Description:
The Taj Mahal is the jewel of Muslim art in India and one of the universally admired masterpieces of the world's heritage, being one of the seventh wonders of the world. The monument was built under the order of the Mughal emperor Shah Jahan in memory of his favourite wife- Mumtaz Mahal.

The monument is located within a vast Mughal garden that encompasses nearly 17 hectares. The construction started in 1632 AD and was completed in 1648 AD, with the mosque, the guest house and the main gateway on the south. The outer courtyard and its cloisters were added subsequently and completed in 1653 AD.

The relief work is in marble and inlay with precious and semi precious stones.
The tomb is placed at one end of the quadripartite garden rather than in the exact centre. The tomb is further raised on a square platform with the four sides of the octagonal base of the minarets extended beyond the square at the corners. The top of the platform is reached through a lateral flight of steps provided in the centre of the southern side. The ground plan of the Taj Mahal is in perfect balance of composition, the octagonal tomb chamber in the centre, encompassed by the portal halls and the four corner rooms. The plan is repeated on the upper floor. The exterior of the tomb is square in
plan, with chambered corners. The large double storied domed chamber, which houses the cenotaphs of Mumtaz Mahal and Shah Jahan, is a perfect octagon in plan. The exquisite octagonal marble lattice screen encircling both cenotaphs is noteworthy. It is highly polished and richly decorated with inlay work. The borders of the frames are inlaid with precious stones representing flowers executed with wonderful perfection.

The most impressive in the Taj Mahal complex next to the tomb, is the main gate which stands majestically in the centre of the southern wall of the forecourt. The gate is flanked on the north front by double arcade galleries.

The garden in front of the galleries is subdivided into four quarters by two main walk-ways and each quarters in turn subdivided by the narrower cross-axial walkways. The enclosure walls on the east and west have a pavilion at the centre.

The building material used is brick-in-lime mortar veneered with red sandstone and marble and inlay work of precious/semi precious stones. The mosque and the guest house in the Taj Mahal complex are built of red sandstone in contrast to the marble tomb in the centre. The frame of the portal arches and the spandrels are veneered in white marble.

- **Protection and management requirements**
  
The management of Taj Mahal complex is carried out by the Archaeological Survey of India and the legal protection of the monument and the control over the regulated area around the monument is through the various legislative and regulatory frameworks that have been established, including the Ancient Monument and Archaeological Sites and Remains Act 1958 and Rules 1959 Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation); which is adequate to the overall administration of the property and buffer areas. Additional supplementary laws ensure the protection of the property in terms of development in the surroundings.
An area of 10,400 km\(^2\) around the Taj Mahal is defined to protect the monument from pollution. The Supreme Court of India in December, 1996, delivered a rule banning use of coal / coke in industries located in the Taj Trapezium Zone (TTZ) and switching over to natural gas or relocating them outside the TTZ. The TTZ comprises of 40 protected monuments including three World Heritage Sites - Taj Mahal, Agra Fort and Fatehpur Sikri.

- **Lines of Similarity of Taj mahal with studied site - Victoria Memorial Hall, Kolkata**

  1. Both are located amidst a vast Garden.

  2. Garden architecture is of Mughal type, i.e. quadripartite the only difference being that while Victoria Memorial Hall is located nearly centrally at the garden, Taj Mahal is located at one extreme end of the Garden.

  3. Both have a Marble veneering and in both the monuments, the marbles used are of Makrana type, from Rajasthan.

  4. Both are prone to atmospheric pollution.

- **Garden:**
  
  **Style:** Persian

  **Canals:** Two (crossing in the centre)

  **Flowerbeds:** 16

  **Trees:** Cyprus & Fruit Bearing

  The garden that starts from the end of the main gateway and ends near the squared base of the mausoleum is an integral part of the Taj Mahal structure. The garden is based on the concept of ‘paradise garden’ and was brought in by Babur. This garden, filled with flowers, fruits, birds, leaves, symmetry, and delicacy, served many functions along with portraying strong symbolic or abstract meanings about paradise.

  Out of the total area of 580 m by 300 m of the Taj complex, these gardens alone cover an area of 300 m by 300 m distance and are based on geometric arrangements of nature. Another architectural attribute that
has been followed in the case of the entire monument, especially the gardens of the Taj Mahal of Agra, is the usage of number four and its multiples. Since four is considered the holiest number in Islam, all the arrangements of Charbagh Garden of Taj Mahal are based on four or its multiples. The entire garden is divided into four parts, with two marble canals studded with fountains crossing in the center. In each quarter portion, there are 16 flowerbeds that have been divided by stone-paved raised pathways. It is said that even each of the flowerbed was planted with 400 plants.

The trees of the Taj garden are either that of Cyprus (signifying death) or of the fruit bearing type (signifying life) and even they are arranged in a symmetrical pattern.

- **Tourism**

  The Taj Mahal attracts a large number of tourists. UNESCO documented more than 2 million visitors in 2001, including more than 200,000 from overseas. Most tourists visit in the cooler months of October, November and February. Polluting traffic is not allowed near the complex and tourists must either walk from parking lots or catch a battery operated bus.

  The grounds are open from 06:00 a.m. to 07:00 p.m. weekdays, except for Friday when the complex is open for prayers at the mosque between 12:00 noon and 14:00 p.m.

- **The Taj Museum**

  The museum was established in 1982 in the ground floor in western Naubat Khana, also known as Jal Mahal, within the Taj Mahal complex. It is a double storied building having a quadrangle projection outside and is built on a raised platform.

  The museum comprises of three galleries in addition to the main hall and has on display various exhibits relating mostly to the construction of the Taj Mahal and to the period of its builders.
Taj Nature Walk: A unique set-up (Plate:77)

The Taj nature walk is located on Fatehabad road 500 meter away from Taj Mahal east gate. It has an area of about 180 hectares and was established in the year 1998. It spreads up to the right bank of river Yamuna. The Taj nature walk is a green belt area, having variety of thorny and broad-leaved tree species dotted with high grass lands. These high grass lands mounds provide a unique platform to enjoy the beauty of Taj Mahal from different directions. Along with six grass mounds, there is nine km long nature trail providing visuals of Taj Mahal from different settings.

Taj photo points
There are four points that provides scenic beauty of Taj Mahal in the back drop.

Watch towers
20 feet high watch towers located at different locations on hillocks that facilitate tourists to have the over view of the Taj Mahal.

There is a ridge to valley nature trail. The landscape of the Taj nature walk is undulating because it is located in the ravine ecosystem and consists of rift and valleys. Tourists walking on these nature trails can enjoy sighting of Taj Mahal from different angles and background.

Flower beds
46 varieties of flowers of 69 colours are grown every year in the designed flower beds from October to April every year. These flowers are home to a variety of butterflies.

Vegetation and Wild Life
The area is rich in flora and fauna. Pheasants are prime faunal species in ravines. Others include red vented bulbul, grey hornbill, paradise flycatcher, golden oriole, seven sisters, tree pie; Indian flame backed three tooted
woodpecker, ringed dove, common green pigeon, blue rock pigeon, parakeet, white-breasted kingfisher, hoopoe, small bee eater, Indian cuckoo etc.

During winters migratory birds are seen in flocks. Among the mammals scavengers like hyena and jackal, herbivores like blue bull and hares. Other important reptiles are rat snake, cobra and monitor lizard.

Thus, we see how nature has been interconnected with the cultural heritage by construction of this Nature Trail. This concept may be applicable for other cultural heritage sites as well.

- **Notable points:**
  - Operation of Battery-operated cars/ buses to check atmospheric pollution.
  - Restriction of vehicles around few kilometers from the Monument.
  - Visitors are to wear a shoe bag before their entry within the Monument to minimize accumulation of dust on the marble edifice.
  - Concept of Taj Nature Walk creates a blending of nature with culture.

### 6.5.1. Humayun’s Tomb

**Location:** Nizamuddin East, Delhi, India

**Geographical Location:** 28.5933° N, 77.2506°E

**Year of Inscription as WHS:** 1993 (17th session)

**Type:** Cultural

**Criteria:** ii, iv

**Reference:** 232

**State Party:** India

**Region:** Asia- Pacific

**Year of construction:** 1565 to 1572

**Architect:** Mirak Mirza Ghiyath

**Architecture:** Mughal architecture
- **Humayun's Tomb, Delhi**

The tomb of Humayun, second Mughal Emperor of India, was built by his widow, Biga Begum (Hajji Begum), in 1569-70, fourteen years after his death. It was later used for the burial of various members of the ruling family and contains some 150 graves.

In plan it is an irregular octagon with four long and four short sides. It is surmounted by a 42.5 m high double dome clad with marble flanked by decorative pillared kiosks (*chhatris*). The middle of each side is deeply recessed by large arched vaults with a series of smaller ones set into the face. The interior is a large octagonal chamber with vaulted roof compartments interconnected by galleries or corridors. This octagonal plan is repeated on the second storey.

This tomb, built in 1570, is of particular cultural significance as it was the first garden-tomb on the Indian subcontinent. It inspired several major architectural innovations, culminating in the construction of the Taj Mahal.

- **Char Bagh Garden**

The Char Bagh Garden is a Persian style Garden with quadrilateral layout and was the first of its kind in the South-Asia region in such a scale. The four central water channels appear to be disappearing beneath the tomb structure and reappearing on the other side in a straight line, suggesting the Quranic verse, which talks of rivers flowing beneath the 'Garden of Paradise'.

The entire tomb and the garden is enclosed within high rubble walls on three sides, the fourth side was meant to be the river Yamuna, which has since shifted course away from the structure.

- **The Tomb Complex**

The building style is a combination of Persian architecture and indigenous building styles. The building medium in the Humayun's Tomb is of three kinds of stones, viz., red sandstone, while marble and quartzite.
The Humayun’s Tomb complex also houses many other prominent buildings which are examples of architecture of the period preceding and succeeding Humayun. The prominent among them are:

- Barber’s Tomb
- Nila Gumbad
- Chilah Nizamuddin Aulia
- Afsarwala Mosque
- Afsarwala Tomb
- Arab-Sarai
- Garden of Bu Halima
- Tomb and Mosque of Isa Khan

**Revitalization of the Gardens**

The Aga Khan Trust funded a restoration project for the entire Garden. The objective of the garden project was to revitalise the gardens, pathways, fountains and water channels of the chahâr-bâgh, or four-part paradise garden, surrounding Humayun’s Tomb in Delhi, according to the original plans of the builders.

Currently a management plan is underway for the long-term sustainability of the enhanced site. The project’s implementation phase began when the Trust began work on the 12 hectare (30 acre) garden site in 2000. Working under the aegis of the National Culture Fund and in collaboration with the Archaeological Survey of India (ASI), the Trust undertook the first privately funded restoration of a World Heritage Site in India. Work was completed in March 2003.

The project featured on the following aspects:

- Removal of 3,000 truckloads of earth (12,000 cubic metres),
- Planting of 12 hectares (30 acres) of lawn,
- Re-setting and alignment of over 3,500 kilometres of path kerbstones,
- Preparation by some 60 stonecutters of 3,000 metres of hand-dressed red sandstone slabs (to edge the channels),
- Creation of 128 ground-water recharge pits and the de-silting and creation of other wells as part of the largest rainwater-harvesting system scheme in any heritage site in India,
- Creation of a site exhibition,
- Planning and installation of a new water-circulation system for the walkway channels,
- Planting of 2,500 trees and plants, including mango, lemon, neem, hibiscus and jasmine cuttings, according to Mughal texts,
- Repair of fountains, wells and rainwater-harvesting systems,
- Provision of wheelchair access to a significant part of the site.

The revitalization of the gardens required a variety of activities, from masonry to archival research, and included the following:

**Planting**

The choice of plants and planting patterns was derived from a combination of factors, including their mention in Mughal chronicles, as well as through pollen analysis tests, archival material, visitor accounts, and soil and climatic conditions in the Humayun’s Tomb gardens.

Along the periphery of the garden large shade trees such as Mango and Neem were planted. Over 300 plants of lemon and orange, said to have been favoured by Humayun, were planted along the outer pathways. Similarly, over 500 saplings of Pomegranate were planted in the sunken area towards the east. Over 2,000 flower-bearing and sweet-smelling plants such as the *Hibiscus* sp.(recorded in the Akbarnama to have been planted here), *Chandni, Harsingar, Motia* and *Mogra* have also been planted.

**Documentation**

An extremely high level of documentation has been maintained. This has included a detailed garden survey with each plant and every species marked on a digitised plan. In addition, each stone in the channels and pathways has been individually plotted. A comprehensive measured drawing of the tomb itself has also been prepared. In addition
to the drawings, over 1,000 rolls of film have been taken and continuous video documentation of the project has been carried out.

The garden has been portrayed in a very nice way. Before entering the tomb, there is a small exhibition room, where the parts and significance of the entire garden has been represented.

**Significant Features that can be incorporated in other heritage sites: (with reference to West Bengal)**

1. Equal attention given to Garden as well as the monument.
2. Wheelchair access to significant sites.
3. Documentation of the plant species, water channels and of the entire complex.
4. Exhibition of the garden plan and its components at the exhibition room prior to entry through the Gateway.

**6.5.3. Keoladeo National Park, Bharatpur**

Though geographically different, the researcher during the course of her study has visited another important World Heritage Site - Keoladeo National Park.

**Location:** Bharatpur, Rajasthan, 50 km west of Agra

**Geographical Location:** N 27° 9´ 32" E 77° 30´ 31"

**Year of Inscription as WHS:** 1985 (9th session)

**Type:** Natural

**Criteria:** x

**Reference:** 340

**State Party:** India

**Region:** Asia- Pacific

**Area:** 2.873 ha / 29 km²

**Designated:** 1st October

**Established:** 10th March, 1982

**Visitation:** 100,000 (in 2000)

**Governing Body:** Rajasthan Tourism Development Corporation
• **Description**
  The Keoladeo National Park or Keoladeo Ghana National Park formerly known as the Bharatpur Bird Sanctuary in Bharatpur, Rajasthan, India is one of the UNESCO recognized Natural Heritage Sites of India that plays host to thousands of birds especially during the winter season.

• **History**
  The sanctuary was created 250 years ago and is named after Keoladeo (Shiva) temple within its boundaries. Initially, it was a natural depression. The entire zone was flooded after the Ajan Bund was constructed by Maharaja Suraj Mal, the then ruler of the princely state of Bharatpur, between 1726–1763. The bund was created at the confluence of two rivers, the Gambhir and Banganga. The park formed a hunting ground for the Maharajas of Bharatpur, a tradition dating back to 1850, and duck shoots were organised yearly in honor of the British viceroys. Large number of the bird population was wiped away due to such activities.

  The area was designated as a Bird sanctuary on 13th March 1976 and a Ramsar site under the Wetland Convention in October 1981. On 10th March 1982, the area was recognized as a National Park. In 1985, the Park was declared a World Heritage Site under the world Heritage Convention. It is a Reserve forest under the Rajasthan Forest Act, 1953 and therefore, the property of the State of Rajasthan of the Indian Union.

  The 29 km² reserve is locally known as Ghana (meaning thicket), and is an amalgamation of dry grasslands, woodlands, woodland swamps, and wetlands. These diverse habitats are home to around 366 bird species, 379 floral species, 50 species of fish, 13 species of snakes, 5 species of lizards, 7 amphibian species, 7 turtle species, and a variety of other invertebrates. Every year this heritage zone forms a breeding and roosting site for thousands of migratory waterfowls. The park’s well-designed system of dykes and sluices provides areas of varying water depths that are beneficial to the avifaunal species.
The park was the only known wintering site of the central population of the critically endangered Siberian Crane. It also forms a roosting place for globally threatened species such as the Greater Spotted Eagle and Imperial Eagle.

- **Protection and Management of Keoladeo National Park**
  The property is legally protected under the provisions of Wildlife (Protection) Act, 1972 and Indian Forest Act, 1927. The site is managed by the Rajasthan Forest Department with the support of local communities and national and international conservation organizations. The park managers have enlisted local villagers to remove the invasive plant, *Prosopis juliflora*, within upland savanna habitats.

- **Threats/ Weaknesses**
  1. Insufficient water supply (both quantity and quality)
  2. Invasive vegetation (*Prosopis sp.*, *Eichhornia sp.*, *Paspalum sp.*)
  3. Inappropriate use of the property by neighboring villages. In 1982, grazing was banned in the park, leading to violent clashes between local farmers and the government.

  Efforts have been taken to overcome these threats through proper management plan. Two projects have been undertaken to solve the water crisis. Invasive alien species have been removed through cooperative arrangements with the surrounding populations. The 2 m high boundary wall that surrounds the park virtually eliminates the threats of poaching or pollution, and there is no encroachment or habitations inside the park. Noise pollution from the adjoining Bharatpur city and National Highway are minimal. Soils are predominantly alluvial - some clay has formed as a result of the periodic inundations.

- **Faunal diversity within Keoladeo National Park**
  - Rhesus Macaque
  - Langur
  - Large predators are absent, leopard having been deliberately exterminated by 1964. Small carnivores include Bengal fox, Jackal, Striped Hyena,
Common Palm Civet, Small Indian Civet, Indian Grey Mongoose *Herpestes edwardsi*, Fishing Cat, Leopard Cat, Jungle Cat and Smooth-coated Otter.

- Ungulates include Blackbuck, Chital, Sambar, Hog deer, Nilgai and Wild boar.
- Indian porcupine
- Indian hare
- An estimated 65 million fish fry are carried into the park's water impoundments by river flooding every year during the monsoon season, thereby providing food base for large numbers of wading and fish-eating birds.

**Avifaunal Diversity**

Location in the Gangetic Plain makes this park a breeding site for herons, storks and cormorants and large numbers of migrant ducks. The most common waterfowl are Gadwall, Shoveler, Common Teal, Cotton Teal, Tufted Duck, Comb Duck, Little Cormorant, Great Cormorant, Indian Shag, Ruff, Painted Stork, White Spoonbill, Asian Open-billed Stork, Oriental Ibis, Darter, Common Sandpiper, Wood Sandpiper and Green Sandpiper. Sarus crane also finds a place in this Park.

Terrestrial avifauna includes Warblers, Babblers, Bee-eaters, Bulbuls, Buntings, Partridges and Quails. Grey Hornbill and Marshall's iora are also present. Prey eaters include Osprey, Peregrine, Pallas' Sea Eagle, Short-toed Eagle, Tawny Eagle, Imperial Eagle, Spotted Eagle and Crested Serpent Eagle. Greater Spotted Eagle has recently been recorded breeding here, a new breeding record for the species in India and Lesser Spotted Eagle nested in the park in 1986, the first nesting record for the species in India for some time.

Other threatened avifauna species includes Dalmatian Pelican, Spot-Billed Pelican, Greater Adjutant, Lesser Adjutant, Marbled Teal, Baikal Teal, Baer's Pochard, Red Kite, Cinereous Vulture and Sociable Lapwing.
- **Reptiles**
  
  Water snakes
  1. Indian Python
  2. Banded Krait
  3. Green Rat snake
  4. Turtles and monitor lizard.

- **Floral Diversity**
  
  The principal vegetation types are tropical dry deciduous forest, intermixed with dry grassland in areas where forest has been degraded. Apart from the artificially managed marshes; much of the area is covered by medium-sized trees and shrubs. The North-East part of the park is dominated by Kadam (*Mitragyna parvifolia*), Jamun (*Syzygium cumini*) and Babul (*Acacia nilotica*). The open woodland is mostly Babul with a small amount of Kandi (*Prosopis cineraria*) and Ber (*Zizyphus*). Scrublands are dominated by Ber and Kair (*Capparis decidua*). Piloo (*Salvadora oleoides* and *Salvadora persica*) is also present in the park and happens to be virtually the only woody plants found in areas of saline soil. The aquatic vegetation is rich and provides a valuable food source for waterfowl. The Park’s total flora consists of 379 species of flowering plants of which 96 are wetland species.

- **Facilities for Tourists**
  
  The nearest airports are in Delhi and Jaipur. Bharatpur is easily reached by train or bus, although private taxis from New Delhi or Agra can be employed. The Park gate is close to the bus stand and railway station.

  During 1988, mean maximum temperature ranged from 20.9° Celsius (C) in January to 47.8°C in May, while the mean temperature varied from 6.8°C in December to 26.5°C in June. The diurnal temperature variation ranged from 5°C in January to 50°C in May. Mean relative humidity varied from 62% in March to 83.3% in December. The mean annual precipitation is 662 millimeters (mm), with rain falling on an average of 36 days per year. During 1988 only 395 mm of rain fell during 32 wet days.
• **World Heritage Site**

The UNESCO convention for listing goes on to explain the criteria the selection of Keoladeo Ghana National Park as a **World Heritage Site under the Natural Criteria (iv) of Operational Guidelines 2002** and the description which follows is that the park is a “Habitat of rare and endangered species. The park is a wetland of international importance for migratory waterfowl. It is the wintering ground for the rare Siberian Crane and habitat for large numbers of resident nesting birds.” According to the revised **Operational Guidelines of 2005**, the park falls under **Criteria (x)**.

• **Management**

The management objective is to allow the area to flood and dry out annually, rather than be maintained as a system of permanent marshes. Water for the wetlands is supplied from the dam outside the park boundaries. Usually some 14.17 million cubic meters of water is the estimated annual requirement of the park. The water level inside the park is regulated by means of dykes and artificial embankments. The alternative arrangement of water in case of emergencies such as danger of marshes and water bodies drying out completely is ensured through four boreholes so that survival of the aquatic flora and fauna is not endangered before the arrival of monsoon. The boundaries of the park are clearly delineated by a boundary encircling the park restricting the encroachment of humans and domestic cattle inside the perimeters of the park. The road from Bharatpur town which used to intersect the park was also closed and relocated outside the boundary to reduce the disturbance by visitors from the town which helped in bringing down the levels of pollution inside the park considerably. As opposed to most of the national parks in India and elsewhere, Bharatpur Bird sanctuary has no buffer zone. Due to the heavy density of population and more than 15 villages settled on the periphery of park, it was impossible for authorities to create a buffer zone around the bird sanctuary. Grazing and collection of firewood and grass was phased out from the park as far back as 1983.

• **Weaknesses**

1. The Siberian crane, which formerly lived throughout the entire Indo-Gangetic plains of India, is no longer found in this area. Its absence has
1. There has been attributed to hunting by nomadic tribes along the species 5,000 mile migration route from Siberia to Bharatpur.

2. Some 2,500 cattle and water buffalo were allowed in the area up until November 1982 when grazing was banned. Predictably, the ban led to a buildup of local resentment, resulting in an attempted forced entry into the park. Police opened fire and eight people were killed.

3. The absence of grazing is causing management problems as vegetation, principally *Paspalum distichum*, a perennial amphibious grass, blocks up the channels. The Rajasthan government has rejected a proposal from the Bombay Natural History Society to allow limited grazing. Furthermore, recycled nutrients from the large quantity of dung deposited by livestock probably supported considerable numbers of insects.

4. The presence of some 700 feral cattle within the park is cause for concern as they compete with wildlife for valuable forage. Larvae of the Lepidopteran *Parapoynx diminutalis* has also been a serious pest, and reduced the growth of *Nymphoides cristatum* during June–July 1986.

5. High levels of pollutants in Ajan Bund are believed to be responsible for the increasing number of Piscivorous birds. Fewer birds were recorded in 1984 than in previous years. Four Sarus cranes and 40 ring doves were found dead outside the park during 1988 and early 1989, possibly due to pesticide poisoning.

6. Disturbance from visitors can be a cause for concern, especially during the December and January when visitors come to see the cranes.

7. A non-native water hyacinth *Eichornia* species was introduced in 1961, and has now proliferated to the extent that it is blocking the artificial waterways and filling the impoundments. This is significantly altering the habitat for many bird species, and posing a serious management problem.

- **Popularity of the National Park**

More than 1,00,000 visitors including birdwatchers and school/college/University students, foreigners come to the park annually. The location of the park invites visitors from Agra, Fatehpur Sikri and Jaipur. The Park opens from sunrise to sunset around the year.
Scientific Research and Facilities

The Bombay Natural History Society has done considerable work in the area. It has recently intensified its operations and has established a hydro-biological station to monitor the ecology of the wetland. Limnological studies have been carried out by the Zoology Department of the University of Rajasthan, Jaipur. The park authorities are monitoring the bird populations. A documentary film 'Indian Birds of the monsoon' was produced by S. and B. Breeden in 1979–1980. The park has considerable potential for education.

Between December 1992 and January 1995, a collaborative project between the Governments of India and Russia, International Crane Foundation and Wild Bird Society of Japan was set up to save the Siberian crane. The project focused on releasing captivity bred cranes into the wild, tracking migratory routes of common cranes, and building up the resident crane population in the park. Although the project did not yield the desired results, the successful survival of introduced cranes in the park has been fruitful.

Nature Interpretation Centre and Research Work

The researcher during her study had found out that not only are the visitors attracted towards the natural resources of this National Park, but also an interesting Interpretation centre has been built within the premises of the park. The Salim Ali Visitor Interpretation Centre was inaugurated in 2006. The Interpretation Centre and Programme is dedicated to the renowned ornithologist, the late Dr. Salim Ali. It contains a variety of life-size and enlarged models and photographs of avi-fauna of India, specifically in the National Park.

Awareness Approach in other World Heritage Sites of India:

Ajanta - Ellora Caves

The Ajanta - Ellora Caves located at Aurangabad, Maharashtra has been enlisted under the World Heritage Site List by UNESCO in the year 1983. The caves are reputed for exquisite paintings and sculptures of Buddhist religious art.
In the recent past, Visitor facility centres have been inaugurated at Ajanta and Ellora. Both the centres have been designed in such a way so as to provide extensive information on these Heritage Sites through audiovisual media.

The Ajanta visitors' centre spreads across an area of 3,23,695 m$^2$. It houses five museum halls with actual-sized replicas of four of the caves. The Ellora centre spreads across 2,10,000 m$^2$, with three museums and one-tenth replica of the Kailash Temple. Both the centres intends to make audiovisual presentations on Buddhism, an introduction to Ajanta, the significance of world heritage sites, murals, the Jataka tales and games to facilitate e-learning.

**Technological Application on Monuments**

Archaeological Survey of India (ASI) has launched interesting mobile Apps which includes history, architectural details and published references for further studies, its location, etc. of the ASI protected monuments in Delhi. It also provides route map to the desired monument from the point where a person is standing. The distance from the point and how much time is required to reach and current traffic information is also given by this App. One can also plan his itinerary for visit the monuments through this Apps for his stay in Delhi. This is a 3.77 MB file and can be downloaded free of cost from play store.

**6.6. Comparative Studies with Other Heritage Sites outside India**

The researcher during her study period has consulted different websites of significant Gardens and Heritage Sites across the world to analyze the management strategies followed there. Of these, a comparative study has been made with a renowned Garden to show how people even care for the Gardens.

- **Smithsonian Gardens, Washington DC**

Smithsonian Gardens was established in 1972 to maintain the museum grounds. Smithsonian Gardens extends the museum experience in a public garden setting, inspiring visitors with innovative displays and educating them about horticulture, plants, the natural environment and artistic design. It also houses a 64,000-square-foot state-of-the-art off-site greenhouse facility where thousands of annual and perennial plants for the Smithsonian gardens are grown.
There is a separate website on the Garden (http://www.gardens.si.edu). The website addresses important queries like details of the Garden, its collections, research, and educational programmes undertaken, etc. The advantage here is that visitors get an overall idea of the happenings at the garden and plan their visits accordingly.

Now let us see the application of technology for creating awareness on the Smithsonian Garden:

- **Community of Gardens**
  
  Community of Gardens is the Smithsonian’s digital home for sharing and preserving the stories of gardens and the gardeners who make them grow.

- **Social Networking**
  
  The site is connected with Facebook, U- Tube, Flicker, Twitter, Pinterest, etc.

- **Mobile Field Guide - Leafsnap**
  
  Leafsnap is the first in a series of electronic field guides being developed by researchers from Columbia University, the University of Maryland, and the Smithsonian Institution. This free mobile Apps uses visual recognition software to help identify tree species from photographs of their leaves.

  Collections and Research: Focuses on the different areas of research on the Garden that are being carried out.

  Come & Learn: Garden tours and activity packages. It gives the opportunity to extend the museum experience into an outdoor living classroom.

  Get involved: Provides opportunities for people to get involved as Volunteer and Interns, Research opportunities and Fellowships to work on the Garden.

- **Tree Collection**
  
  The Smithsonian Tree Collection has around 1900 accessioned specimens located throughout the Smithsonian museum grounds and gardens, maintained by the Smithsonian Gardens Arborist with the help of other staff and volunteers.
Trees of the Smithsonian Activities:
   a) A Tree of Trees: What’s in a Name?
   b) Tree Expedition: What’s Out There?
   c) What do Trees Provide?
   d) The Art of Bark
   e) Trees of Significance

- **Gardens**
  The many gardens that surround the Smithsonian museums along the National Mall act as “outdoor museums.” This includes:
  - **Butterfly Habitat Garden at the National Museum of Natural History**
  - **Urban Bird Habitat at the National Museum of Natural History**
  - **Kathrine Dulin Folger Rose Garden**
  - **Courtyard Garden at the Freer Gallery of Art**
  - **Enid A. Haupt Garden**
  - **Hirshhorn Museum and Sculpture Garden**
  - **Robert and Arlene Kogod Courtyard at the Donald W. Reynolds Center for American Art and Portraiture**
  - **Terraces at the National Air and Space Museum**
  - **Heirloom Garden at the National Museum of American History, Behring Centre**
  - **Victory Garden at the National Museum of American History, Behring Center**
  - **Native Landscape at the National Museum of American Indian**
  - **Mary Livingston Ripley Garden**

- **Exhibits**
  1. One of the exhibits at the National Museum of Natural History—*Butterflies + Plants: Partners in Evolution* obtains the nectar and pollen producing plants from this Garden.
  2. Each year, Smithsonian Gardens collaborates with the U.S. Botanic Garden to present a themed orchid exhibit that attracts hundreds of thousands of visitors.
3. Occasional travelling exhibition series namely *American Garden Legacy* is held whereby the holdings in Smithsonian Gardens’ Archives of American Gardens are showcased.

- **Educational Programmes**
  Smithsonian Gardens provides a wide variety of educational and outreach programs for visitors to the Smithsonian gardens and to the general public including garden tours, lectures, workshops and special events. Garden Fest, an annual event that takes place in the Enid A. Haupt Garden each spring, intends to raise the awareness about gardens, gardening and the Smithsonian Gardens’ collections to the visitors.

- **Collections**
  Smithsonian Gardens manages three distinct collections, including an orchid collection, photographic archive and a horticultural artifacts collection.

- **Research**
  Smithsonian Gardens sponsors the Enid A. Haupt Fellowship in Horticulture that aims to advance the knowledge and understanding of the varied roles and significance of horticulture in society.

- **Publications**
  *A Guide to Smithsonian Gardens*, published by Smithsonian Books, includes detailed information about the history, design and plants of each garden.

### Points to be noted:

1. Separate website on the Garden.
2. Educational Programmes based on the Garden.
3. Researches on the Garden.
4. Mobile field guide for identifying the trees and knowing the details.
5. Community of Garden.
Thus we can say that the development of Nature Interpretation Centres or Visitor Centres at the Heritage Sites is very much relevant. It not only serves as a Guide for the tourists, but can actually create awareness on the significance of the site and the need for its preservation.

6.7. Overview of the study

The researcher thus gives an account of some of the common points between the areas of her study within West Bengal and those outside West Bengal. It is seen that each site has its own merit and demerit so far as Management policies are concerned. A comparative analysis therefore provides the best inputs that can be adopted from each site to develop a common set of strategies for any heritage site, be it cultural or natural in the near future. From comparative analysis, it is observed that Victoria Memorial Hall, Kolkata, Taj Mahal, Agra and Humayun’s Tomb, Delhi share the basic architectural feature, i.e. location of the monument with a char-bagh type Garden containing flowerbeds, greeneries and water bodies. Three of these monuments are prone to atmospheric pollution. However, the preventive measures adopted for each of them are different. Similarly, for a natural heritage site, some means of creating awareness may be adopted from Keoladeo National Park to create awareness on Sundarbans National Park.

The overall findings and some humble recommendations are summed up in the concluding chapter of this Thesis.

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Plate 69: Visitors at Victoria Memorial Hall, Kolkata
Plate 70: Attractions for the Visitors at Victoria Memorial Hall, Kolkata

70a-c: Programmes for the Visitors at Victoria Memorial Hall, Kolkata

70d: Venue for Light & Sound show at the Garden of Victoria Memorial Hall
Figure 6.1: Representation of Monthly Visitor statistics in the Victoria Memorial Hall Garden during 2012-2013

Figure 6.2: Representation of Monthly Visitor statistics (Indians) in the Victoria Memorial Hall Museum & Garden during 2012-2013
Figure 6.3: Representation of Monthly Visitor statistics (Foreigners) in the Victoria Memorial Hall Museum & Garden during 2012-2013

Fig.6.4 Representation of Monthly Visitor statistics of Indians andForeigners at the Bishnupur Temple Complex during 2003-2012
Plate 71: Impact of Visitors at Bishnupur Temple Complex –

Graffiti on surface of Temples
Plate 72: Means for attracting Visitors at Bishnupur Temple Complex

72a: Concealed speakers within Temple complex playing Bishnupur Gharana in the Evening for the Tourists

72b: Notification placed adjacent to the Temples of Bishnupur
Plate 73: Steps to Create Awareness on Temples of Bishnupur

73a. The generation that needs to be sensitized on Temple Heritage of Bishnupur

73b. Seminars in Local Colleges: *Heritage of Bishnupur*, Ramananda College

73c. Existing Acharya Jogesh Chandra Purakirti Bhavan at Bishnupur- May initiate exhibitions or Awareness programmes

73d. Collector K. Baskaran Inaugurating the Touch Screen Kiosk at Big Temple in Thanjavur- future concept for Bishnupur Temples
Fig. 6.5: Representation of Yearly Increase in the No. of Tourists at Sajnekhali – the gateway to Sundarbans National Park
Plate 74: Visitor Attractions at Sundarbans

74a. Watch Tower at Bonnie Camp, Sundarbans

74b. Watch Tower at Sajnekhali, Sundarbans

74c. Watch Tower at Netidhopani, Sundarbans

74d. Entry to Crocodile Breeding Project, Bhagatpur, Sundarbans
74e. Mangrove Interpretation Centre, Sajnekhali

74f. Entry to Dobanki

74g. Cage Trail at Dobanki

74h. Deer Breeding at Dobanki

74i. Burirdabri Mud Walk
74j. Breeding Zone of River Terrapin at Sajnekhali

74k. Place of Hatching of Eggs of River Terrapin at Sajnekhali

74l. Sweet Water Pond at Sajnekhali

74m. Entry to Sudhanyakhal
Map 6.1. Magnified View of Sundarbans Tiger Reserve showing the Entry Point for the Tourists (Marked in Red)

74n. Tourists Entering Sundarbans Tiger Reserve
Plate 75: Nature Interpretation Centres depicting Biodiversity of Sundarbans

75A. Mangrove Interpretation Centre, Sajnekhali

Entrance

View of the Galleries

Display of Faunal Diversity of Sundarbans
Display of Mangrove Ecology and Socio-Economy through Diorama

Place for Worshipping Goddess Banabibi within the Museum Complex
75B. Interpretation Centre and Crocodile Breeding Centre, Bhagabatpur

Crocodile Breeding zone

The plaque at entrance of the Interpretation Centre

First Breeding step- Piling up of eggs at different levels
Different Stages of Breeding of Crocodiles
Chapter 6

Display through Photographs

Wet preserved Eggs of Estuarine Crocodiles
Model Depicting Map of Sundarbans

Do’s and Don’ts for Tourists

Data on Floral diversity and Estuarine crocodile

Information on Estuarine Crocodile

Food Web of Mangrove Ecosystem

Informative Posters outside the Interpretation Centre, Bhagabatpur
75C: Interpretation Centre at Sundarikati, Bonnie Camp

Display through Photographs and Posters
75D: Sundarban Biosphere Resource Information Centre, Aranya Bhawan, Salt-Lake

Entrance to the Museum

Floral Resource Section and Herbarium
Exhibits from Faunal Resource Section

Model of Sundarbans Biosphere Reserve

Laminated Poster

Library and Multimedia Centre

Potted Mangrove Plants
Plate 76: Comparative Study: Taj Mahal, Agra
A World Heritage Site (Cultural)

76a. Notification for the Tourists

76b. View of the Entrance to the Taj Mahal

76c. Taj Mahal – The Marble Edifice

76d. Taj Museum within the premises of Taj Mahal
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76e. Battery operated Car for the Tourists

76f. Garden surrounding the Monument

76g. Barriers against Vehicles at the Entrance of the Monument
Plate 77: Taj Nature Walk - Unique Concept
Plate 78: Comparative Study: Humayun’s Tomb
A World Heritage Site (Cultural)

78a. Notification for the Tourists

78b. Entrance to the Tomb

78c. General View of the Tomb
78d. General View of the Garden surrounding the Tomb

78e. Miniature Model of the Humayun’s Tomb Complex
Plate 79: Keoladeo National Park, Bharatpur - A World Heritage Site (Natural)

79a. Entrance to the National Park

79b. Information for the Tourists at the Entry Point

79c. Cycle Rickshaws & Bicycles: for Visitors to move around the Park
79d. Signage for Information to the Visitors about the Avifauna

79e. Watch Tower for Observation of Migratory Birds within the National Park
Plate 80: Salim Ali Nature Interpretation Centre, Bharatpur

80a. Entrance to the Museum

80b. Display within the Museum
Plate 81: Ajanta Caves, Aurangabad- World Heritage Site (Cultural)

81a. Caves at Ajanta surrounded by Greenery

81b. Recently constructed Interpretation Centre at Ajanta
Plate 82: Smithsonian Gardens, Washington DC - Selected Web-pages

82a. Community of Gardens

82b. Smithsonian Gardens Home Page
82c. Home –Leafsnap - An Electronic Field Guide

82d. Smithsonian Gardens – Guide to the Trees of the Smithsonian Garden