

### **6.1 ENVIRONMENTAL RESOURCES/ SENSITIVE ZONES**

Existing Environmental Resources of Bhubaneswar include:

- Reserved forests (Elephant sanctuary);
- Plantations;
- Parks/open spaces;
- Monuments;
- Agricultural lands;
- River Daya and Kuakhai;
- Lakes & Ponds (Wetlands) and
- Ground water recharge areas

Details are given below.

#### **1.RESERVE/PROTECTED FORESTS**

The Bharatpur Reserve forests of 1200 Acres and the protected forests of 1500 Acres are located in the northwestern part and southwestern part of the City. These forests also serve as elephant sapphire, popularly known as Chandaka Elephant Sanctuary. These forests are extremely degraded. A number of afforestation programmes were taken up by the Forest Department of Bhubaneswar in these reserve forests.

These areas are to be protected from land use conversion. Also, the adjoining areas should be planned so as not to affect these areas depleting vegetation cover attempt has been made by the State Government for plantation and afforestation in and around Bhubaneswar. The scheme "Plan taken in and around Bhubaneswar" is being executed since 1984-85 by the Orissa Plantation Development Corporation in degraded land limits of Bhubaneswar. The scheme is now being executed by the Orissa Forest Development Corporation, Bhubaneswar and it is under the Divisional Forest Office, Coastal Shelter Belt Afforestation Division, Puri Bhubaneswar. Details about avenue plantation in Bhubaneswar are given in Annexure 15.

There is a lot of scope for further plantation in the City. In many areas, plantation has not been done and in some areas trees have been cut and replacement has not been made. Several areas in the city have potential for developing plantation in the industrial areas, along the major roads, bypass roads that are under construction and railway lines, along drains, within and around

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The Elephant Safari at Bharatpur Reserve Forest

monuments and in the institutional areas. -----

## **2. PARKS/OPEN SPACES/RECREATIONAL AREAS**

The are mainly 3 major public parks viz. the Indira Gandhi Park at Unit-II (10 acres), the Bijupatnaik park, Unit-VI and the Gandhi park in the City. Apart from these parks there are also some small parks inside the City. Nalco square, Nicco park, Unit-IV, Saheed Nagar, J.K.park, Dr. Mukherjee park, V.S.S Nagar are a few of them. All these parks are situated inside the city. Some parks were developed for the use by the tourists and were very close to the monuments, but the locals are now mostly using them. The open spaces are scattered in small patches in the City and are inadequate.

There is a need to look at the possibilities of upgrading the existing parks and creating more parks, especially within the residential areas and in their close proximity so as provide accessibility to nature to the residents. Also, recreational areas are to be created for both residents as well as tourists. The recreational areas for tourists are to be properly planned and provided.

## **3. MONUMENTS**

The City boasts of 47 monuments out of which 20 are under State Archeological Department and 27 are under Archeological Survey of India. Apart from the above there are some monuments of local significance. The state and centrally protected archeological monuments are given in the Annexure 13 & 14.

A brief description of some of the monuments are given below:

### **Lingaraj Temple**

The temple is named after the 'Linga' or Phallic symbol enshrined in it. Built in 617-657 A.D., it soars up to a height of about 54 metres and dominates the skyline for kilometers around. The temple consists of curvilinear walls, a pillared hall, a dancing hall and a hall for serving the offerings. It can be rather called a temple complex as more than a hundred temples of different sizes are situated within its premises. This is one of the famous Saiva Pitha in India. Its majestic stand and some of the finest

sculptures embodied in it make it a product of consummate skill and rare artistic genius. It represents the peak of Kalinga style of architecture spanning over 25 centuries of progressive history.

#### **Rajarani Temple**

It was constructed during the time of Kesaries. It is about 59' high. This temple composed of temples is a variety in itself. The slender waisted life-size figures, languorously poised, reflect the wealth of feminine charm – a sumptuous feast for the visitor's eyes. Built in the 11<sup>th</sup> century the speciality of this temple is that it has no presiding deity.

#### **Mukteswar Temple**

It is a gem of Orissan architecture in sand stone. It is 37' high. The graceful feminine figures have remained unblemished for nearly 10 centuries. An important landmark in the architectural development of Bhubaneswar, the Mukteswar evolved a full-fledged plan, which from then on appeared in all the later temples. The magnificent arched *Toran* (gate way) adorning the entrance is a piece of stone work unparalleled in history. The temple was built during the regime of Kesaries.

#### **Parsurameswar Temple**

This temple is datable to the 7<sup>th</sup> century AD. It appears to be the beginning in the era of construction of temples. Its Jagamohan has a flat roof and the temple has earliest form of sculptural design. It is a small but exquisitely decorated Siva Temple, with friezes featuring amorous couples, birds, lions, flowers and female figures. It has a speciality that it introduces the image of Sapta Matraka (the seven mothers) which represents the feminine form of Sakti (energy). It is closely located to Kedar Gouri Temple.

#### **Vaital Temple**

Located to the west of Parsurameswar temple Vaital temple is a typical one. The presiding deity of this temple is Chamunda also called Kali, enthroned on a corpse. She is the eight armed terrible and blood thirsty Goddess representing the violent principle of the Universe. The roof of this temple is not a tower but vault almost looking like an overturned boat.

#### **Bhaskereswar Temple**

Bhaskereswar is a deviation from the Orissa temples. Here the enshrined 'Shiva Linga' has an unusual height of 2.74 metres. The construction has some peculiarity on its roof.

#### **Kedargouri Temple**

Dedicated to Siva (who is also called the Kedaraswar) and Goddess Gouri, the temple is situated within the same premises next to the Mukteswar Temple. By the side of the temple there is a perennial stream. According to Kapila Samhita (a religious text) a single sip of water from this tank absolves the drinker from the repeated cycles of birth and death. The legend goes that king Lalatendu Kesari, after a tragic episode relating to two lovers Kedar and Gouri, had built this temple in their memory. Near the temple there is a 'Khirakunda' and another Marichi Kunda'. The water of Khira Kunda is whitish and extremely hygienic and digestive for which it is carried to different places for drinking purpose. The water of Marichi Kunda is sold on Asokastami day by auction and it taken by sterile women to bear child.

#### **Ananta Basudev Temple**

In a predominantly "Saiva Pitha" (place of worship of Lord Siva) like Bhubaneswar, the Ananta Basudev temple is an exception for it being an important vaishnava shrine. Built in 1278 A.D. by Rani Chandrika Devi, the presiding deities in this temple are Ananta (Balaram, the brother of Lord Jagannath) and Subhadra (his sister). It has one similarity to Sri Jagannath Temple in Puri. Here the Prasad (Holy Food offered to deities) are sold to the people.





### **Brahmeswar Temple**

This temple has remarkable similarity to Lingraj temple. It is one of the first Kalinga style temple built during the period and carries fine artistic carvings of musicians and dancers. For the first time the use of iron beam is noticed.

### **Mohini Temple**

It is situated on the southern bank of the Bindusagar tank. The worshipped deity is Chammunda – eight armed standing on a prostrate male body and brandishing a sword with her uppermost right hand. The accompanied deities are lord Ganesh, Lord Kartikeya and Goddess Parvati.

### **Ram Temple and Iskcon Temple**

Among the contemporary temples the Sri Ram Temple at Janpath, Kharvel Nagar and Sri Krishna balaram Temple promoted by International Society for Krishna Consciousness in NH-5, Nayapalli are the exhibitions of the same ancient spirit in a modern form. The Krishna Balaram temple is beautifully designed and painted in sober colours with all in-built facilities available for devotees.

### **Dhauligiri: Shanti Stupa (Peace Pagoda)**

Eight kilometers south of Bhubaneswar, Dhauligiri is located on the bank of River Daya. It is here the ancient Kalinga War was fought in 261 BC, where Ashok The Great unsheathed his sword and fought the bloodiest battle and it is here after the battle he was transformed to Ashok. The Compassionate who championed the cause of Buddhism. On the foot of the hill there are the Rock Edicts of Ashok near the Elephant structure. The Japan Budha Sangha and Kalinga Nippon Budha Sangha have recently built the Shanti Stupa atop the hill which is visible miles around. There is also a Siva temple recently constructed on the top of the hill in 1972.

### **Khandagiri and Udayagiri**

Five kilometers west of Bhubaneswar the twin hills of Khandagiri and Udayagiri are honeycombed with ancient Jain caves. These served as homes for the Jain Monks who lived some 2000 years ago during the reign of emperor Kharvela. Out of the 117 caves the Rani cave, Tiger cave, Elephant cave and Ganesh cave are important. In the Elephant cave King Kharvela's 13 years administration is recorded on stone pillars in pali language and this is a magnificent specimen of pali record found in India. The colossal figure of Mahavir Jain on the Khandagiri hills is a image mastery carved from blackstone.

At foot of the hills a Youth Hostel has been constructed by Government. On the Maghasaptami day i.e. in the month of February each year a big festival is held and the sacred lamp called Mahadipa is taken to the top of the temple and kept burning throughout the night. The devotees break their fast next day after taking a holy dip in the Bindusagar.

### **Sisupalgarh**

Sisupalgarh is located five km south-west of Bhubaneswar, on the way to Puri. It was the capital city of Kalinga during 4<sup>th</sup>-3<sup>rd</sup> century BC, and now only 13 gigantic stone pillars, probably part of audience hall stand mute testimony Recent excavations have brought to light different types of gold and silver coins, ceramic, iron and copper articles representing the advanced Kalinga culture existing in the past.

The monuments form an important source of heritage and have a very high tourism potential. However, the spaces within the monuments and outside are to be properly planned so as to ensure their protection and to put to tourism use.

## **4. AGRICULTURAL LANDS**

Agricultural practice in the City is mostly observed on the banks of the river Daya and River Kuakhai especially in the southern and eastern stretch. The agricultural lands are used for the production of

vegetables and food grains. The fertile tract supports the agro-based economy of the city. The fringe areas are devoted for the agricultural practices. Double crop areas are mainly confined to basin areas of river.

Unorganized development is more on agricultural land than the formal development and rate of growth of unorganized development is very high than planned/project based development. These areas are especially the banks of Kuakhai river are facing land use conversion to brick kiln use.

## 5. RIVER DAYA AND KUAKHAI

Bhubaneswar City gets its water supply from Mahanadi, Kuakhai and Daya River. River Daya and River Kuakhai is needed for drinking water supplies for the current and the future needs of the City and for carrying storm water and the treated Sewage from the City Presently, water supplied to the City is about 182 MLD.

## 6 WETLANDS, LAKES & PONDS

Bhubaneswar, the "Temple City" has about 500 and odd temples mostly confined to the Old Town area. Each temple in this part of the city has one or more water tanks nearby. Some are quite small while others represent huge expanse of freshwater. As regard to their origin, temple ponds are believed to have originated initially as vast depressions created by removing enormous amount of soil needed to built earthen ramps that were used for dragging the huge blocks of stone to heights corresponding to the rising height of the temple under construction. After the completion of the temples, these depressions were sized and lined with the surplus stone available and were converted into temple ponds for use during daily rituals and festive occasions.

Some of the ponds studied are of great religious importance and others are well known for the use. Table 6.1 shows the lakes, their location and the dimensions of some of the prominent lakes in Bhubaneswar.

**Table 6.1**  
**Heritage lakes & Manmade lakes in Bhubaneswar**

S L.	Name Of Lake	Location	Area In Ha	Perimeter In m
<b>Heritage lakes</b>				
1.	Bindusagar	Old Town	8.84	1252
2.	Papanasini	Bhubaneswar	0.20	181
3.	Kapileswar	Kapileswar	0.22	224
4.	Deepa Tank	Goutam Nagar	0.44	271
5.	Sukhmeswar Tank	Bhubaneswar	0.31	220
6.	Nala Kunda	Bhubaneswar	0.19	174
7.	Paradareswar Pond	Goutam Nagar	0.20	308
8.	Gangajamuna Tank	Goutam Nagar	0.06	93
9.	Kedareswar Tank	Old Town	0.01	40
10.	Chintamaniswar Tank	Chintamaniswar	0.02	72
<b>Manmade lakes</b>				
11.	Chilli pokhari	Rajarani	1.07	438
12.	Sundarapada tank	Sundarpada	0.43	415
13.	Ekarma lake	Jaydev Vihar	0.92	520
14.	Barmaunda tank	Baramunda	0.24	203
15.	Sabrsahi tank	Barmunda	0.22	163
16.	Fishery tank	Laxmi Sagar	7.43	1440
17.	Vanivihar lake	Vani Vihar	3.05	1028
18.	Kandar pokhari	Bhubaneswar	1.30	488
19.	Pota pokhari	Gada Gopi Prasd	2.49	503
20.	Sundarpada lake	Sundarpada	5.49	1090
21.	Hadi pokhari	Bhubnaeswar	0.25	710
22.	Godi pokhari	Gaoutam nagr	0.21	183
23.	Phase I,II,& III tank	Saheed Nagar	36.8	NA

Details about some of these water bodies are as follows.

### Bindusagar Pond



Bindusagar, literally means “the water body with fine suspension of silt” that shine brilliantly in the sun rays imparting grey colour to the ripples of waters, is located near the famous Lingaraja temple. It is about 3.5 km. away from New Capital. The religious merit of the water is lauded in the highest terms in many Hindu Scriptures such as the Padma Purana, the Siva Purana, the Brahmanda Purana, the Kapila Samhita and the Ekamra Purana. The Ekamra Chandrika gives details of ceremonies to be observed in this tank, including Sradha and Tarpana of Hindus. As such, the pond is extensively used by devotees who flock the area in thousands from corners of the country throughout the year. A deep in the pond before entering into the temple complex is associated with religious sentiments.

Bindusagar is a spring fed rectangular tank of 450 m length and 320 breadth. The average depth varies between 2.5 m in summer to 4.5 m in monsoon. The bottom is flat, smooth with laterite bed and is free of any macrophytic vegetation except for the isolated patches of *Eichhornia crassipes*, *Nymphaea stellata*, *Escherichia coil*, and *Aerobacter aerogens* which indicates the fecal coliform contamination.



Through a small inlet at the north western end, the pond was receiving sewage, water and run off from nearby paddy fields throughout the year. This inlet has recently been sealed. Instead the Municipality has been flushing the pond water regularly with fresh town water supply. A small outlet at the south allows a limited quantity of tank water to flow out.

Besides the religious significance, the pond serves as the dumping site for left overs of variety of cooked and uncooked food from the near by famous “Ananta Vasudev” temple. The wastewater from the near by locality do enter into the pond. Local residents regularly bath in it and also depend on it for their personal hygiene, recreation and washing cloths.

Until recently, the tank has remained practically unmanaged. However, with the direct initiative of the Municipality, the tank was completely drained up and mechanically dredged to level the bottom evenly by laterite slabs in 1979 with the purpose of increasing the aesthetic value, decreasing the eutrophication and increasing fish production.

#### **Kedar Gouri Tank**

The Kedargouri tank is located inside the premises of Kedargouri Temple. The tank is believed to be about 1000 year old and a great religious sanctity is associated with it. As such, the little water body commands highest veneration from the people. According to legends the tank was endowed with most heavenly virtues and a single sip of water is enough to emancipate the devotee from all future transmigrations.

The tank is 213.3 m long and 8.3 m broad with an average depth of about 4.9 m. The water body is lined with stone revetments. The bottom is formed of small boulders. The water is fairly transparent and the bottom is visible throughout. The tank is spring fed. To the west of Kedareswar temple, there is a perennial spring called "Dudha Kunda" meaning "milk tank". Its water is prized for medicinal properties. In the temple premises is located the Kedar Kunda also.

#### **Mausima Temple Tank**

Behind the Mausima Temple (Rameswar Temple) lies the Rameswar Tank. At present tank is gaining importance for being one of the recreational spot in Bhubaneswar. The length and breadth of the tank are 130 m and 45 m respectively. The maximum depth varies between 3-6 m the tank is solely fed by rain water.

#### **Vanivihar Lake**

Vanivihar lake is an wetland habitat located inside the campus of Utkal University by the side of NH-5. It is a natural and permanent shallow fresh water body with a water spread area of 27,000 Sq. m. The depth of water in the lake is only 1.2 – 1.8 m. in most part of the year but reaches 3-4 m in rainy season. It is constantly fed by springs in the up stream (Jayadeve Vihar) and the domestic waste water from Jayadev Vihar, Acharya Vihar, Unit-IX Regional Research Lab., Utkal University, Salia Sahi etc.

### **7. GROUNDWATER RECHARGE AREAS**

The ground water condition in area is mainly controlled by the geological setup. In Bhubaneswar the lateritised, fractured and weathered Athgarh Sand Stone from the shallow phreatic zone, which is tapped by dugwells and shallow tube wells. Ground water occurs both under water table condition in the shallow aquifers and under semi-confined to confined conditions in deeper aquifers. Table 6.2 depicts the hydrogeomorphological features and the ground water prospects in the City.

**Table 6.2**  
**Hydrogeomorphological features and the ground water prospects**

Sl.	Land Form	Lithology	Groundwater Potential	Hydromorphological Characters
A	Flood Plain	Medium to coarse sand, clay and silt	Very good	Plain and low land recharge area
B	Drainage Channel	Fine to coarse sand, with clay	Very good to good	Low laying depression serves strom and drainage channel, infiltration zones
C	Pediment	Athgarh sand stone and shale capped by laterite of places	Moderate to good	Infiltration through joints and fractures, discharge area, groundwaters occur along the structurally weak plains, like lineaments and intersection of lineaments.
D	Residual hill	Athgarh sand stone	Poor	Mainly run off zone, isolated hills with limited areas.

*Source: Greening Bhubaneswar, Intach*

Apart from these the area is also having number of lineaments. In the area prominent lineaments have been picked up through visual interpretation, 1. N-S, 2. NE-SW, 3. NW-SE, 4. E-W. The depressions of the city follows E-W trending lineament. Springs namely at Kedar Gouri and Baramunda are seen in this depression. These structural signature are significant from hydrogeological point of view. These are suitable for construction of tube wells. Intersection of lineaments form good locally for groundwater targeting. The ground water resources and the recharge areas are shown in Map-----.

## 8. Other Scenic Places

### Pathanisamanta Planetorium

Named after the famous astronomer of Orissa Pathani Samanta, this planetorium equipped with latest techniques provides a regular presentation of programmes on astronomy, astrophysics and space research. This is located at Acharya Vihar Chhak on NH-5.

### Regional Science Centre

A short distance away from the planetorium, this is one of the few science centres located at various places in India. With a view to popularize science and its use, this centre has some interesting models (indoor and outdoor) exhibiting some of the governing factors of the universe.

### Ekamrakanan

Spread over five hundred and twelve acres of precious land, Ekamrakanan is the garden where in the flowering season the rainbow seems to have descended. The Regional Plant Research Centre is the organization set up here for development of horticulture, tissue culture, biomass, timber and rare seasonal plants. With a collection of five lakh plants belonging to 1050 species/varieties/hybrids of cactus, this centre has undoubtedly the finest and richest collection of the group. The centre has an outlet for sale of plants to institutions, nurseries and individuals and provision for exchange of materials with botanical gardens in the country and abroad. There is also a huge rose garden of wide varieties and a man-made lake. This is close to NH-5 near Nayapalli, IRC village.

### State Museum

Orissa State Museum has a special charm of its own. It has rich collection of scriptures, coins, copper plates, stone inscriptions, armoury objects, rare palm leaf manuscripts numbering around fifty thousand, lithic and bronze age tools, natural history, geological objects, paintings anthropological specimens and traditional folk and musical instruments. A visit to this place gives us a detail picture of Orisya culture, people and heritage. The museum remains closed on Mondays.

**Summary of Observations**

1. The existing reserve forest within the city is to be protected from land use conversion.
2. Extensive plantation is required to be carried out covering the entire Bhubaneswar city for providing the functions of landscaping, micro climate control, control of pollution, buffer to sensitive areas such as monuments and sources of pollution including industrial areas and transportation corridors and recreation.
3. The monuments form an important source of heritage and have a very high tourism potential. However, the spaces within the monuments and outside are to be properly planned so as to ensure their protection and to put to tourism use.



4. There is a need to look at the possibilities of upgrading the existing parks and creating more parks within the residential areas and in their close proximity so as to provide accessibility to nature to the residents. Also recreational areas are to be created for both residents as well as tourists. The recreational areas for tourists are to be properly planned and provided.

5. Several areas in Bhubaneswar having potential for developing plantation especially those along the river banks, in the industrial area, along the major roads, bypass roads, railway lines, along drains, within and around monuments and in the institutional areas. The areas that are lying vacant and can be changes to organized parks are : Saheednagar, Rasulgarh Jayadev Nagar, Behind Kalpana Cinema Hall Junction, In front of B.J.B College. (Arts Block),

**Ground Water Potential/Resources**      **EMP - Bhubaneswar**

**Heavy construction on the drains and the recharge zones**

Neelakantha Nagar, Saheednagar Opposite Plot No.303 & 308, Bargarh Housing Scheme and near over bridge at Jaydev Nagar.

6. Unorganized development is more on agricultural land than the formal development and rate of growth of unorganized development is very high than planned/project based development. The fertile tracts of Daya and Kuakhai river is rapidly being put to brick kiln and construction use.
7. The lakes and the drains are being used as dhobighats, vehicle washing, fishing and open defecations. This is leading to growth algal bloom and eutrophication. . Also, indiscriminate dumping of garbage, other solid waste materials and construction rubbles have added to the pollution and siltation problems in the lakes.
8. Most of the lakes and the water bodies are located adjacent to the valley areas and the drainage area. The wastewater from the residential areas are reaching to the lakes and the ponds and polluting the water bodies. Also, due to the lack of sewerage system, the sewage is allowed to the roadside drains, which ultimately reaches the water bodies.
9. The wetlands and the natural drains are facing maximum conversion and encroachments. Large-scale construction (especially for housing, roads and slums). is being carried on the drainage area. These natural drains and the wetlands are natural recharge zones.
10. The large-scale encroachments of the lakes and ponds are affecting the lakes and the flora fauna thereby, affecting the ecology.
11. Thus, it is clearly demonstrated that there has been a large development in locations, which are flood prone and thereby marginally suitable for settlements. The development is going on a fast rate without any proper attention to green zones creation, sewage networking and natural drainage pattern.