

ENVIRONMENTAL MANAGEMENT: A CASE STUDY OF THE KEOLADEO NATIONAL PARK, BHARATPUR, RAJASTHAN (INDIA)

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ABSTRACT

The Present study of ECO management based the Keoladeo National Park, Bharatpur. It is named after Keoladeo(Shiva) Temple located in the centre of the park. It was earlier known as "Ghana" meaning dense forest with a wide diversity of habitats ranging from marshes, woodlands, scrublands, grasslands to denuded saline patches. It is a low lying area in the flood plains of river Banganga and Gambhir which are tributaries of river Yamuna covering an area of about 29sqkm. The Park is divided into 24 blocks demarcated by road and dykes for administrative convenience. The composite unit demarcated by a rubble boundary wall on all sides. Keoladeo National Park is an internationally important wetland site for massive congregation of water fowl making it an important wintering ground on the central Asian flyway for migratory water fowl from the palaearctic region. It has been the only wintering area for the central population of Siberian Cranes. It supports about 41 species of raptors, including the largest population of globally threatened greater spotted Eagle. The lesser spotted eagle nests in the National Park. Keoladeo National Park is situated in the alluvial plains of Bharatpur Geomorphologic – ally Bharatpur district forms part of Eastern Rajasthan plains. Lying east of Aravalli Hill range. The area is drained by Banganga and Gambhir rivers and comprises of vast alluvial plains with several depressions with changing hydrology of the watersheds both in the Banganga and Gambhir river basins. The system of natural wetlands has practically vanished, but another system of satellite wetlands exist which provides a large habitat to the local migratory as well as migratory water fowl. The subtropical climate of Keoladeo National Park encompasses a variety of habitats ranging from upland terrestrial to submerged aquatic. The entire flora consists of 373 species of angiosperms with 11 new additions to the parks list herbs constitute more than 55% of the floristic composition. The dynamic of the well and system and its strategic geographic location on the flyway of migratory birds all contribute to the diversity of life forms it supports. Savanna type vegetation exists mostly in Koladhar area of the park and comprises of the major dominant grass viz. *Vetiveria Zizanioides* and *Desmostachya bipinnata*. The dominant tree species recorded in this area are *Prosopis cineraria*, *Acacia nilotica*, *Alucophloca*, *Zizyphus mauritiana* and *Salvadora persica*. Low grassland occurring in certain part (mainly B,C,D and F blocks) of the park comprise of *Sporobolus helvolus* and *Cynodon dactylon* with scattered trees and shrubs.

Keywords: Environmental Management, Natural Wetlands, Scattered Trees, Geographic Location.

Introduction

The Present study of Environment Management based on the Keoladeo National Park, Bharatpur. It is named after Keoladeo (Shiva) Temple located in the centre of the park. It was earlier known as 'Ghana' meaning dense forest with a wide diversity of habitats ranging from marshes, woodlands, scrublands, grasslands to denuded saline patches. It is a low lying area in the flood plains of river Banganga and Gambhir which are tributaries of river Yamuna covering an area of about 29 sq. km. The park is divided into 24 blocks demarcated by roads and dykes for administrative convenience. The composite unit is demarcated by a rubble boundary wall on all sides.

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Keoladeo National Park is situated in the alluvial plains of Bharatpur. Geomorphologically Bharatpur district is a part of Eastern Rajasthan plains. The area is drained by Banganga and Gambhir rivers and comprises of vast alluvial plains with changing hydrology of the watersheds both in the Banganga and Gambhir river basins. The system of natural wetlands has practically vanished, but another system of satellite wetlands exist which provides a large habitat to the local as well as migratory water fowl.

The subtropical climate of Keoladeo National Park encompasses a variety of habitats ranging from upland terrestrial to submerged aquatic. The centre flora consists of 372 species of angiosperms with 11 new additions to the parks list herbs constitute more than 55% of the floristic composition. The dynamic of the well and system and its strategic geographic location on the flyway of migratory birds contribute to the diversity of life.

Savanna type vegetation exists mostly in Koladhar area of the park and comprises of the major dominant grass viz. *Vetiveria*, *Zizanioides* and *Desmostachyabipinnata*. The dominant tree species recorded in this area are *Prosopis cineraria*, *Acaclanilota*. *A leucophloca*, *Zizyphusmaurutina* and *salvadora persica*. Low grassland occurring in certain part (mainly B,C,D and F blocks) of the part comprise of *sporobolushelvolous* and *cynodondactylon* with scattered trees and shrubs.

Problems in Achieving Objectives

Ajan Dam is the soul source of supply of the required 550 mcft. water. This dam is under the control of the irrigation department of Bharatpur. Water is procured by the park on payment basis of Rs. 1/- per 1000 cft. of water from the Irrigation Deptt. The full requirement is met only during years of good rain fall. In normal rain fall years about 450 mcft is supplied. Increasing human demand of water through the years especially in the Gambhir Catchment has made its adequate supply for the park uncertain especially in years of scanty rainfall and frequent droughts.

The 1980's witnessed a decrease infloods and increase in droughts and consequently the water received by the park also went down steadily in 2003. The construction of Pachana dam in Karauli in the upstream of river Gambhir was completed and its water holding capacity was increased from 450 mcft. to 2100 mcft. This prevented the flow of Gambhir River beyond the dam and stretch 100 km. of river between Karauli and Bharatpur dried up causing severe water crisis in the region. This has also resulted in release of less and less water from Ajan dam to the park and wetland dried out completely causing mortality of wild life in large scale. As a result 2004 was a complete drought year for the park. In 2005 enough water came from Ajan dam because on the floods situation in Bharatpur area. Again in 2006 and 2007 not a drop of water was released from Ajan dam for the park. Ground water had to be pumped out to save the existing life in the park during the spring and summer.

Environmental Landscape

The Keoladeo National Park and surroundings is a unique ecological system in the whole of Indo-Gangatic Wetlands. It is also Biogeographically important. In **1985**, the park was declared as world heritage site under the **world Heritage Convention by UNESCO**. This site was upgraded mainly due to the following reasons.

- This park is the first sanctuary for the migratory birds from the whole of Eurasia in the Indian subcontinent. From here they diverse to other areas and on their return journey also, they again assemble here before flying back to their respective places.
- For the species on the verge of the extinction like birds, insects, mammals and reptiles the park is the sole habitat.
- It is favourite hunting site for various species of predatory birds. Some of them follow the migratory birds to the park covering the distance of over 6000 kms.
- This site is the only winter habitat of the Seberian Cranes in South Asia.
- The park is very rich in biodiversity and contains 379 species of flowering plants including 96 wetlands species in small forest area of only 29 Sq.km.

The Three Splendored Seasons

The National Park has three major seasons consisting of wet Monsoon, cold winter and hot summer. These three seasons complete the annual bicycle of eco-system of the park and surrounding settlements.

Monsoon

The monsoon arrives in July and with the very first shower the dry vegetation turns green. The animals and birds become alive and kicking. Many species lay eggs in Aug-Sept. and get busy in guarding them. The birds make their nests at various places like tall trees, smaller trees, hollows of the trunks of the trees and floating nests in the water according to their needs, habits and convenience. What happens when there is likelihood of good monsoon, the open bill storks come in large numbers a week before the likely rains and red wattle lapwings lay their eggs on higher mounds.

Winter

In winter the chicks of monsoon breeders like storks (open bill, black necked, white necked, painted) cormorants, Indian Darter, Egrets, Hersons, Sasras, Cranes start growing. Moreover around 110 species of migratory birds from Europe and North Asia start perching here. Rare species of Siberian Cranes for which the park is known world over migrate to the park in winter, months of November & December. By the end of February or beginning of March the migratory birds start returning to their breeding places. By the beginning of April almost all the migratory birds go back.

Summer

Summer starts in the middle March and continues upto June. In this period only native birds are left in the park. Due to steep rise in the temperature, the area of lake starts shrinking and then barring some wet spots, the area becomes dry due to the intensity of heat and paucity of water. The fish die in large numbers and scavengers have enough to eat. The eagles feed on dead turtles. Due of extreme heat, the vast areas of the lakes change into backed mud and the upland tracks into dry grassland. May and June are the hottest months, the mercury touching 48°C. This is the breeding period of the resident birds and animals. Watching the large dry lands in the park at the height of the summer shows as if the life in the park has become still but with the onsets of first showers of monsoon the seasonal cycle restarts and everything becomes alive.

Water Management

The Gambhir water is the most desirable water for KNP as it supplied rich growth of zoo/phyto planktons and about 65 millions fish fry and fingerlings belonging to 57 fish species every year. Shortage in supply of this water is directly responsible for failure of breeding colonies of 15 species of the birds. Ajan dam does not supply water to the park in July if it does not receive enough water from Gambhir and if Ajan does not receive enough water from its own catchment, then also the park faces total drought like situation. Therefore, every effort should be made to ensure maximum and timely supply of the desirable water from Pachana and Ajan dam to the park.

Dholpur- Bharatpur Drinking Water Project

The state public health engineering department prepared a drinking water project namely Chambal Dholpur-Bharatpur drinking water project. This project will divert Chambal river water to Mallah of Bharatpur through a 110 km long pipeline for domestic purpose with a portion legally earmarked for the diversion to the KNP. 310 mcft for the first four year then 62.5 mcft pr annum there after as per the condition laid down by the central empowered committee of the Honable Supreme Court of India. Fabrication of this project started in 2004 and was supposed to supply water in 2006 but could not be completed as its execution got held up mid way due to some technical problems. The project is likely to be completed by July 2010 only. Close monitoring of the progress of this project is very important to ensure the timely completion of the work.

General Prescriptions

- It should be ensured that the optimum quantity of water i.e. 550 mcft, required for flooding the park is obtained in the month of July every year.
- The time of flooding should be minimized. The intake capacity of the park through Dakan Mori is 8 million cubic feet per day. There can be an increase by redesigning Bees mora from where the intake would increase to 20 mcft per day.

- The canal between Aghapur gate and Dakan Mori should be maintained properly to prevent losses. The canal from Dakan Mori to the park has weak banks, which need to be repaired and strengthened, so that intake of water in the park per day can be increased. The work is to be taken up with the help of the Irrigation Deptt.
- The positions of the existing sluice gates on the main canal are old ones. The water takes very long time to reach certain blocks like Kadam Kunj, Piri Ka Patt etc. Therefore a repositioning of gates should be considered.
- In case of drought, shallow bore wells should be dug where there is a possibility of getting sweet water. Water should be pumped out and its quality tested regularly and recorded in order to ensure water of desirable quality only. The existing abandoned perennial wells in the park should be cleaned and the water is to be utilized.
- In case of excessive rainfall or cloud burst, the flow of water into Ajan dam should be closely monitored and the sluice gates at Bhainsa Mori (near ChorKolu) should be opened fully and the water should be allowed to flow without obstruction. In year of normal rainfall, the water may still be flushed out from the park but only after ensuring optimum supply to the park from Ajan dam and other sources and then again the well has to be filled.
- The cross drain pipes placed under many dykes for flow of water get damaged in due cross of time. They have to be replaced or repaired as and when the situation demands.
- Since Gambhir and Banganga are the main tributaries to the Ajan dam and catchments of these rivers have degraded in last two decades. Therefore it will be advisable for the forest department to take here suitable watershed works under any department schemes.
- In order to provide shelter and adequate aquatic habitat for fish and turtles, some deeper water bodies should be maintained and new deep water bodies should be created to retain water in these depressions during summers.
- KeoladeoDiggi, near DabriwalaKua, near boating platform, Gupt mori B Block deep water body to be created, Kadam Kunj water may be filled in the depression with shallow bore well already created, Sapan Mori.

Protection from Pollution

- **Water Pollution:** Keoladeo National Park is an artificial ecosystem where water is filled into the marshes every year from Ajan Bandh which receives water from many cultivated fields. In this process the excessive chemicals from fields get dissolved in this water which effects the aquatic vegetation and associated flora and fauna. The water inside the park should be analysed for pesticide residues and other chemicals after every release of water from Ajan Bandh.

It is proposed to conduct an integrated post management programme in the catchment area of Ajan Bandh and in Village adjoining Keoladco National Park in collaboration with the agriculture department and National Mustard Research center, Bharatpur.

- **Air Pollution:** An air monitoring station has been set up in the park by Mathura-Refinery to study the variations in SO_2 concentration in the air. The observations reveal that the SO_2 concentration is less than $38/\text{m}^3$ in the air which is under permissible limit.
- **Noise Pollution:** No vehicles of tourists should be allowed in the core/bird watching zone. Park authorities should move in silent vehicles like Gypsy or Battery operated vehicles to minimize the disturbance.

Education and Awareness

- The tourists are to be given an initial orientation about the park by means of a comprehensive brochure provided at the time of the purchase of entry ticket.
- In order to reduce vandalism, volunteers have to be trained, who can educate the tourists. The rickshaw pullers and guides can prove to be the best in educating tourists apart from sign boards being erected at vantage points.
- A large number of tourists hire guides or rickshaws who in turn make them better aware of how to do their bit for the conservation. These volunteers have to be trained at regular intervals.
- Nature awareness camps have to be conducted for young people, school and college students, contribute at various levels for the cause of conservation of our natural heritage.

- All the information about the park including published research work and facilities available to the tourists should be displayed in the website of the park.
- A park interpretation expert should be employed who will look after the interpretation centre and the library.
- Nature camps for students, teachers, lawyers and media be regularly organized by utilizing services of NGO's
- Informative as well as pictorial brochures and other material should regularly published for distribution to the participants of nature camps.

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