BIODIVERSITY CONSERVATION WITH SPECIAL REFERENCE TO KANHA TIGER RESERVE

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Introduction

The concept of biodiversity conservation can be regarded as Man's most providential and timely awakening to the protection and management of the fast disappearing life forms from this planet. Though the extinction of biological species has been a predictable phenomenon of evolution since life first appeared on the planet, scientists believe that the present deterioration of natural environments is responsible for this unprecedented rate of extinction of species in earth's history. Biological diversity encompasses, apart from the number of species of microbes, plants and animals, the genetic variation within each species along with the variety and complexity of habitats and ecosystems that support and are supported by these species (Anon., 1992).

The Indian Context

India's immense biological diversity can be attributed to the vast range of physiography and climatic situations resulting in a diversity of ecological habitats. Rodgers and Panwar (1988) have classified the country into 10 biogeographic regions, and India is one of the 12 identified mega-biodiversity centres with two of the 18 identified hot-spots - the Eastern Himalayas and the Western Ghats (Anon., 1994). The description of India's floral and faunal richness cannot be exhaustive as a report (Anon., 1994) broadly suggests that this biodiversity includes over 45,000 plant species, representing about 7% of the world's flora; about 81,000 animals species, representing about 6.4% of the world's fauna, and a great many germplasm resources and several hundred species of wild crop relatives distributed all over the country.

The biotic pressures, resulting in the modification, degradation and, finally, loss of habitats, is the primary cause of the loss of biodiversity in India. The phenomenon of habitat loss poses a great threat to a wide range of animal and plant species and can well be attributed to the clearing of forests for urbanisation, agricultural expansion and industries, recurrent fires, and human and livestock pressures etc. Not only the above decrease the overall population of many species, but also disturb their distribution patterns and restrict them to smaller isolated sub-populations, accelerating their extinction. Over-exploitation and poaching of and illicit trade in wildlife species also threaten biodiversity by bringing the species to the verge of extinction. However, extinction is not effected by a single reason but by the cumulative effect of a host of causes, and the loss of one species may trigger off the loss of other dependent species, the earth's biodiversity being interlinked.

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Kanha - A Promising Biodiversity Centre

The Kanha Tiger Reserve, situated in Mandla, Balaghat and Rajnandgaon Districts of M.P., is part of the Central Indian highlands with the Vindhya in the North and the Satpura in the South, sprawling around 500 km across the State of Madhya Pradesh. This geographical sub-region holds extensive forest belt and harbours nearly half of the total forests and wildlife habitats in India.

The glorious conservation history of the Kanha dates back to the early thirties when part of the current Reserve was declared a Wildlife Sanctuary. The passing years bore witness to the area growing steadily in extent and status and became a National Park in 1955 and a Tiger Reserve in 1973. The Kanha Tiger Reserve consists of two zones, namely the core zone (940 km^2), free from biotic disturbances, and the buffer (1005 km^2), treated as a multiple use area.

According to Champion and Seth (1968) the Reserve has the following forest types:

(1) Moist Peninsular Sal Forests - 3C/C2
   A. High level Sal - 3C/C2 C1
   B. Low level Sal - 3C/C2 C1
   C. Valley Sal - 3C/C2 Cii

(2) A. Southern Tropical Moist Mixed Deciduous Forest - 3A/C2a
   B. Southern Tropical Dry Deciduous Mixed forests - 5A/C3

Considering the fact that the identification and prioritisation of important centres of biodiversity are necessary at the national level, the Kanha can justly be regarded as one such centre. The long history of stringent protection against biotic pressures and a range of ten diverse habitat types (Kotwal and Parihar, 1989) within the broad forest types along with the positively oriented surrounding villages in the buffer zone ensures the status of the Kanha as a promising centre of biodiversity. Besides an endemic population of hard ground Barasingha and a viable population of the highly endangered Indian Tiger, the Reserve also harbours a wide range of faunal species some of which figure prominently in the IUCN Red List (Anon., 1988). These species include *Cuon alpinus, Vulpes bengalensis, Melursus ursinus, Lutra perspicillata, Panthera pardus, Panthera tigris tigris, Bos gaurus* and *Python molursus*. There are 36 species of mammals and several of reptiles (Kotwal and Parihar, 1989). Lal *et al.* (1986) reported that there are 609 species and 10 varieties of angiosperms belonging to 386 genera and 104 families, and 17 species of pteridophytes belonging to 11 genera and 9 families. The above flora of the Reserve also includes around 50 species of aquatic plants and 18 species of rare plants. The Reserve is also rich in avifauna and Newton *et al.* (1986) reported that there are over 225 species of birds. Panwar (1991), however, suggested that the total number of bird species is close to 300. The fact is that there is still ample scope for intensive floral, faunal and entomological surveys to assess the endemicity potential of the Reserve before pronouncing upon the same with any finality or precision.

Biodiversity Conservation Practices

The conservation practices in the Reserve aim at the maintenance of species diversity and the prevention of species extinction, being central to the biodiversity conservation. The Kanha is an example of

in-situ conservation where species are preserved as part of a functioning ecosystem. Biodiversity conservation in Kanha involves an effective combination of protection, the species-specific and habitat-specific approaches, and the park-people cooperation. As conservation areas in India are much smaller than those in African countries, and are under constant threat of biotic pressures, there has to be a sound and an all round strategy for effective conservation practices.

Protection

Biodiversity should not be regarded as the outcome of complete protection which is only part of the strategy. Leopold (1949) opined that the best definition of a conservationist is not written by a pen but with an axe. However, it also has to be realized that "what cannot be protected cannot be managed". This maxim is more relevant today than it was about 50 years back. Therefore, the Reserve is known to have adopted a protectionist attitude for a long time with its reliable communication system, strategically placed forest camps and intensive patrolling by the ever-vigilant staff, resulting in an appreciable increase in wildlife populations, and intrusion and encroachment well under control. Protection plays a very important role in biodiversity conservation in a country like India with its inherent demographic and economic problems.

The Species-Specific Approach

Though the conservation practices in the Reserve aim at maintaining the overall ecosystem diversity, there are some high priority species which require special treatments owing to their highly endangered status and specialized habits.

The Reserve supports a seriously threatened world population of hard ground Barasingha, endemic to the Kanha and a sub-species of the Terai Swamp Deer (C.d. duvauceli). Though this endemic species has adapted itself to the hard ground conditions of the Reserve, it is partial to water bodies, swamps and tall grass cover required for its survival (Gopal, 1995). Under its recovery/conservation plan all the three meta-populations (Gopal, 1995) are monitored daily, and the habitats and microhabitats improved and modified to facilitate its speedy recovery.

The Tiger is another flagship species in the Reserve which is also seriously endangered and its conservation in its range of countries has become a burning issue the world over. The effective conservation of Tigers in the Reserve also requires specific approaches to facilitate their safe dispersal in large forested area under the core-buffer strategy, and ensuring the survival of strayed and free ranging individuals within the contiguous forest. The Tiger population is monitored regularly using scientific methodology for the evaluation of managerial efforts. Long-term ecological studies are also under way to gather important information on densities, social organisation, prey-predator relationship and other ecological parameters. Intensive patrolling is also done all the year round to protect the Tiger from all forms of hunting.

The Habitat-Specific Approach

Scientists believe that small disturbances lead to highest species diversity, whereas large disturbances decrease natural species diversity. This approach in the Reserve ensures that important habitat types are managed properly to suit the requirements of

respective wildlife species. The famous Kanha meadows are assiduously and methodically maintained by eradicating the obnoxious weeds such as *Cassia tora* and *Lantana camara*, thus lessening the competition with palatable grass species fed upon by herbivores. These anthropogenic grasslands, the sites of relocated villages, represent an "arrested" stage of ecological succession (Kotwal and Parihar, 1989), which now under favourable conditions favour the succession further towards a climax community. This results in the infestation by woody species such as *Butea monosperma, Lagerstroemia parviflora* and *Diospyros melanoxylon*, and if not eradicated in time, disappearance of grasslands so beneficial to the herbivores.

Water resources development is also a key aspect in the conservation of habitats for water dependent species (Sale and Berkmuller, 1988). This is also used as a tool to regulate animal use of habitats and thus manipulate the condition of habitat itself.

Fire is regarded as a very effective management tool for grasslands. All the grasslands of the Reserve is under the prescription of a burning regime and the burning is carried out accordingly to either avoid the repeated burning of a particular grassland, or of grasslands already subjected to heavy grazing pressure, and thereby providing them with more palatable grasses fed upon by a wide range of herbivores species in the Reserve.

The beneficial effects of the above conservation practices indicate that human intervention has to play an important role in biodiversity conservation to maintain the equilibrium resulting from the years of their dependence on the Reserve before their relocation outside. However, now the above disturbances have to be in the form of corrective managerial input and be applied judiciously.

The Park-People Cooperation

Apart from scientific knowledge of biodiversity conservation, there are also other factors which determine the success or failure of conservation efforts. These factors include the social, cultural, political and economic attitudes adopted by the stake-holders of the surrounding villages of the buffer zone towards the practices of biodiversity conservation. The Kanha management has had to tread very carefully in confidence building measures, as the unpleasant memories of the relocated villages are still fresh in some people's mind, and they tend to take a sceptic view of the proposed eco-development. However, the management has been successful in putting the commitments of the socio-economic upliftment across to the stake-holders. The managerial efforts have reflected in a spontaneous response to the formation of many village level committees for Joint Forest Management and the implementation of eco-development projects in the villages. The park-people cooperation approach has resulted in a positive change of the majority of people's attitude towards conservation of the Reserve and will definitely go a long way in biodiversity conservation.

SUMMARY

Kanha Tiger Reserve is one of the most promising centres of *in-situ* biodiversity conservation in the country. The reserve harbours, besides a wide spectrum of wildlife species, including some which figure prominently in the I.U.C.N. list of the threatened species, an endangered population of the hard ground Barasingha (*Cervus duvauceli branderi*), a sub-species endemic to the Kanha, and the Tiger (*Panthera tigris tigris*). Over the years the wildlife management practices for the conservation of wildlife in general and the above two flagship species in particular have proven very effective in reducing to a great extent the adverse effects of the known proximate causes of the loss of biodiversity in the Wildlife Reserve. The long history of managerial input and intervention, involving an appropriate combination of the habitat-specific and species-specific approaches along with the park-people cooperation and stringent protection, has contributed tremendously to the understanding of biodiversity conservation which emphasizes that calculated and small disturbances lead to the highest species diversity, whereas large and hasty disturbances cause a decrease in natural species biodiversity.

कान्हा बाघ संरक्षित क्षेत्र के विशेष संदर्भ में जैवविविधता का संरक्षण

राकेश शुक्ल

सारांश

कान्हा बाघ संरक्षित क्षेत्र देश के उन अति उत्साहप्रद स्थानों में से एक है जहाँ जैवविविधता का सरंक्षण वहीं का वहीं किया जा सकता है । अनेक प्रकार की वन्य प्राणि जातियों के अलावा, जिनमें कुछ ऐसी जातियाँ भी सम्मिलित हैं जिन्हें आइयुसीएन की संकटापन्न जातियों की सूची में विशेष स्थान मिला हुआ है, इस संरक्षिन क्षेत्र में कठोर भूमि पर विचरण करने वाले बारहसिंघे (*सेर्वुस डुबौसेलि ब्रैण्डरी*) की संकटापन्न संख्या, जो कान्हा में ही पाई जाने वाली उपजाति है और बाघ (*पैन्थेरा टाइग्रिस टाइग्रिस*) भी पाए जाते हैं । विगत वर्षों में वन्य प्राणियों के संरक्षण के लिए सामान्यरूपेण तथा ऊपर बताई दो प्राणि जातियों के लिए विशेषरुपेण वन्य प्राणि प्रबन्ध प्रक्रियाएँ विशेष रूप से अपनाई गई हैं । इस संरक्षित क्षेत्र में वन्य प्राणियों की जैवविविधता कम होने के ज्ञात अनुमानित कारणों के कुप्रभावों को बहुत हद तक कम करने में ये प्रभावकारी सिद्ध हुए हैं । प्रबन्धगत निवेशन और हस्तक्षेप के लम्बे इतिहास से, जिसमें उपयुक्त मात्राओं में प्राकृतावास-विशिष्ट और प्राणि जाति-विशिष्ट दृष्टियों का संयोजन अपनाना रहा है और उसके साथ उपवन के लोगों के सहयोग और कार्यवाही से संरक्षण कराने पर जैवविविधता संरक्षण को ठीक-ठीक समझने में बहुत सहायता मिली है जिसमें इस बात पर जोर दिया गया है कि नपा-तुला और अल्प मात्रा में विघ्न डालना जातियों की विविधता अधिक बनाता है जबकि जल्दबाजी और अधिक मात्रा में विघ्न डालने से प्राकृतिक जातिगत जैवविविधता में कमी आती है ।

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