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Full Length Research Paper

Ecotourism and its effects on wildlife of Pachmarhi Biosphere Reserve

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The present paper focused on ecotourism and its effects on wildlife. In the present scenario the ecotourism is a grooming sector in developing nations. However, its impact on wildlife and indigenous people has become a controversial issue. Pachmarhi Biosphere Reserve site explores the multitude of interactions that exist among the welfare of wildlife, conservation biology and socio-economy of the local people.

Key words: Environmental impact, ecotourism, biodiversity, flora, fauna, landscape ecology, protected area.

INTRODUCTION

Tourism, especially international tourism, is one of the world's fastest growing industries. The world has seen an "increase in international tourist arrivals from 25 million in 1950 to 664 million in 1999" (Griffin, 2002). People have always had a great desire to travel the world, to experience other environments, and to simulate foreign ways of life. In its most basic sense, tourism can be defined as "travel outside one's normal home…, the activities undertaken during the stay, and the facilities created to cater for tourist needs" (Dowling and David, 2003). However, this description is not as basic as one might think; rarely are the facilities created to cater for tourist needs discussed in tourism.

Nature tourism is the organized viewing of wildlife. Nature tourists pay a considerable amount of money to participate in viewing wildlife in their native countries and in foreign countries that promote nature viewing to attract the revenue of tourists (Moreno, 2005). The example of a sustainable use of wildlife in the Manu Biosphere Reserve and Puero Maldonado National Parks of Peru in (Groom et al., 2000), recognizes the benefits of ecotourism as it helps to educate people on the importance of conserving wildlife. The monetary gain from this industry serves to benefit the conservation efforts to manage wild habitats and provides an income for local people. The main goal of this study is to find key indicators and evaluate of ecotourism impact on wildlife of Pachmarhi Biosphere Reserve.

Study area

The total area of Pachmarhi Biosphere Reserve is 4981.72 km^2. It is located at Longitude 22° 11' to 22° 50'N and Latitude 77° 47' to 78° 52'E. It covers parts of three civil districts, viz., Hoshangabad (59.55%), Chhindwara (29.19%) and Betul (11.26%). It includes three wildlife conservation units viz., Bori Sanctuary (485.72 km^2), Satpura National Park (524.37 km^2) and Pachmarhi Sanctuary (491.63 km^2). These altogether has also been notified as Satpura Tiger Reserve (1501.72 km^2) (Annonymous, 1996).

The places worth being seen at and around Pachmarhi area, Priyadarshani point, Hondi khoh, Apsara vihar, Rajat prapat, Raj giri, Lanjee giri, Dutches fall, Sundar kund, Jatashankar, Chhota mahadeo, Mahadeo, Chauragarh, Dhupgarh, Pandav cave, Cave shelters. In Bori sanctuary, Churna, is a base for tourism. For a truly wilderness experience, the visitor can reach up to Neemghan through Panarpani gate. The flat land and good visibility along with rich wildlife makes excursions here unforgettable. Among them Mahadeo, Catacomb, Jumbudweep, Madai, Dorothideep, Jatashankar , Pandav caves, Bazar caves, Maradeo, Kaila khurd, Taptka pani, Kanjighat, Tamia, Rajat Prapat, Kharilanes are important from archaeological point of view.

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Table 1. Madai entrance to Pachmarhi Biosphere Reserve.

Year	No. of tourist		Amount of entry fees allocated
	Indian	Foreigners	
2000-2001	140,493	179	2,158,374
2001-2002	129,023	109	1,943,379
2002-2003	168,915	150	2,653,840
2003-2004	194,608	154	3,115,131
2004-2005	182,714	233	3,621,796
2005-2006	155,091	208	5,050,947
2006-2007	192,044	254	6,062,422
2007-2008	172,832	203	5,123,160
2008-2009	198,336	278	8,287,542

MATERIALS AND METHODS

The present study is the outcome of exhaustive field and tourist places survey undertaken for the period of one year from December, 2009 to 2010. The survey was conducted in the Hotels, Guesthouses, Rest houses, toll tax booth, bison lodge, Beefall, Dutchesfall, ApsraVihar, Rajendragiri, Bada Mahadev, Jatashanker, Chouragarh, Reechhgarh, Dhoopgarh, Pandav Gufa, Tawa dam, Madai and different villages of Pachmarhi Biosphere Reserve such as Panarpani, Badkachhar, Matkuli, Pagara, Bariam, Amkhedi, Neemghan, Singanama, Tekapar, Chaka, Pisua, Monhgaun, Kadari, Binoura, Kherghat, Parraspani, Rorighat, Kajari, Bori, Choorna, Badianhoni, Chhotianhoni, Tamia and Patalkot in various seasons.

Key indicators of ecotourism

In the process of evaluation of effects of ecotourism on Wildlife of Pachmarhi Biosphere Reserve, these indicators have been used:

(1) Old historic teak forest
(2) About 80 km long stretch of Tawa reservoir 204 sq man made lake.
(3) Geological formations
(4) Ethic geological heritage
(5) Richness of biodiversity of flora and fauna.
(6) Pleasant climate
(7) Beauty of landscape
(8) Waterfalls
(9) Sunrise and sunset point
(10) Many form of God Shiva
(11) Patalkote
(12) Anhoni (Badi and Chhoti).

RESULTS

Status of biodiversity

The study of the floral diversity in the area carried out by state forest research institute, Jabalpur in 1993, reported 1381 plant species, which comprise 8 species of algae, 22 of fungi, 83 bryophytes in 34 families, 71 pteridophytes in 16 families, 07 species of gymnosperms and 1190 species of angiosperms.

The faunal composition represents the Deccan Peninsular zone of biogeographic classification of India. Most of the Pachmarhi Biosphere Reserve is covered with dense forest vegetation and forms an ideal habitat for wild animals. Over 50 species of mammal, 254 species of birds, 30 species of reptiles, 56 species of butterflies and numerous other forms of animals are found in the area. The steep vertical scarps are home to numerous raptors like honey buzzard and black eagle and hawks. These forests have both grey as well as the red jungle fowl, which are usually found separately either in north or south India, respectively. Among the other birds represented are Malabar pied hornbill, Malabar whistling thrush and paradise fly catcher. The presence of numerous streams, dense foliage, wild flowers, woodland edges and damp patches attract numerous colorful butterflies including orange oak leaf, black rajah, great egg fly, blue pansy etc.

The structure and dynamics of tourists

The main structure and dynamics of tourist in investigated area is presented in the Table 1. Critics of ecotourism point to the potential harm caused by the intrusion of large numbers of people into wild habitats. The presence of nature tourists is seen to influence behavior or population parameters such as reproductive success and survival of the affected wildlife. These effects can be listed as being direct or indirect.

The main animals found are hyena, wild dog, wolf, fox, wild cat, jackal sloth bear, wild boar, gaur, sambhar, cheetah, barking deer, chinkaras, pythons, Indian giant squirrel, and flying squirrel. Poaching, hunting, illicit and uncontrolled felling and epidemic are the decimating factors for the wildlife management. The quality of richness and size of the territory is proportional to the strength of the male tiger. Habitat preference is distinctly shown by herbivorous animals. The Indian Gaurs, which is a very important animal of this sanctuary, shows a distinct seasonal habitat preference. They resort to local

migration within the sanctuary area due to change in food and water availability. Bird life is also varied specially in the area adjoining cultivation in the Bori region. Peafowl, grey jungle fowl, green pigeon, peacock are common in the forests while grey partridges, several kinds of quail and other water birds are seen in the cultivated area along the edge of Narmada plains. Fish of various kinds and also crabs are found in large numbers in the streams and rivers. In deeper holes even up to a great height crocodiles are reported to be seen in Sonbhadra River. In Pachmarhi region, green pigeon, blue rock pigeon various doves parakuts, peacocks, racket tailed drongo, golden orioles, the barbets, king fisher, Indian roller, night jar, red vented bulbul, red junlge fowl, golden backed wood pecker scarlet minivet crested serpent, eagle and floral diversity *Tectona grandis, Shorea robusta, Melastoma malabaricum, Murraya paniculata, Blumea lanceolaria, Isoetes panchanaii, Lycopodium cerenum* etc are found.

Direct effects

Nature tourism can have direct effects on species, communities and populations by influencing their feeding, reproductive and social behaviors Medina, 2005. Whale watching along the west-coast of North America is based on the migratory route of gray whales. Whale-watching allows the visitors to approach whales by boat with disruptive effects on feeding and separation of calves from mothers (Hashimoto and David, 2004). It is also likely that the noise made by propellers and boat engines interferes with the sound-communication systems of whales (Edington and Edington, 1986) observed the effects of nature tourism on American flamingos in Yucatan, Mexico. The operation of motorized tour boats was seen to result in decreased feeding time and increased alert behavior in response to the tour boats (Galicia et al., 1997).

Ecotourism activities affect populations of Megallanic penguin populations. Human visitation to nesting sites of Megallanic penguins caused changes in behavior in both adults and chicks, such as higher predation of nests, lower hatching rates of eggs, increased abandonment of nests, retarded chick growth and higher mortality rates (Fowler, 1999). Klein (1995) observed effects on water bird communities in the Ding Darling National Park. There was a marked difference between the behavior of water birds that used the reserve as a feeding and breeding ground to those species that used it as an over-wintering site. The migratory birds were clearly unaccustomed to the humans and fled at the mere site of humans and cars.

Indirect effects

Indirect effects of ecotourism are: Loss of vegetation, pollution of air, streams and terrain caused by tourist support facilities, loss of camouflage, increase in predation, intra/inter-specific competition and introduction of pests (Cole and Landres, 1995). The indirect effects are not as conceivable as the direct effects and can cause long-term damage to wildlife habitat which can directly affect the survival of wildlife. Indirect effects are a result of poor management and regulation of ecotourism coupled with socio-economic factors. In Nepal, Yonzon and Hunter (1991) and Haysmith and Hunt (1995) reported a chain reaction effect on red pandas by a tourism-driven market for local cheese. In an effort to meet the demand for cheese production, local cattle overgrazed large areas causing habitat destruction for the red panda population. These effects are largely due to economics of the industry that is governed by the consumptive behavior of the tourists (Haysmith and Hunt, 1995).

Current problems

Authors would like to look at the effects of ecotourism in developing countries. Most of the world's natural rain forests that are found in tropical ecosystems are home to a large proportion of endemic flora and fauna species. Most tropical countries are found in South America, Africa, South and South-East Asia. Natural forests are being encroached by an expanding population and by the use of biological resources for economic development (timber, poaching etc.). The development of ecotourism can help save forest lands by encouraging a non-consumptive use of wildlife while generating valuable foreign income. However, the development of ecotourism can create an unequal distribution of income contributing to socio-economic problems, affect wildlife and indigenous people and conflict with conservation efforts. The stake-holders of the tourism industry are a few leading tour companies that collaborate with lodges and tour groups. Therefore, the local communities do not benefit from the revenue. Local people may create a market for poaching and other forest products to sell to tourists and contend with the tourism industry (Benson and Clifton, 2004). A tourism industry needs to be supported by building suitable infrastructure. The construction of roads, buildings and introduction of electricity can result in fragmentation of wildlife and habitat destruction. The use of vehicles for transportation can disturb wildlife directly through noise and overuse of critical areas such as nesting areas, feeding grounds and water holes. Indirect effects can result in habitat degradation through pollution and alteration through trail cutting (Groom et al., 2000). Conservation efforts to protect valuable wildlife and their forest habitats may conflict with the interests of local communities. Therefore, intentions of conservation can be misunderstood by the local communities (Crouch and Scott, 2003). Such conflicts can result in a lack of trust and cooperation between local communities and conservationists.

Why is it a problem?

Madhya Pradesh governments lack guidelines and regulations that protect natural resources from negative effects of ecotourism. The inability to enforce the law on the consumptive use of forests can result in an unchecked depletion of natural resources the country depends on.

Regulations

Regulations need to reflect the value of forests and wildlife while also considering the need to sustain lives of indigenous people. The regulations should also try to minimize the impact of ecotourism on the welfare of wildlife and native communities. Most developing nations are facing economic problems and civil and political strife. The fickle nature of politics in most developing nations (Zaire, Peru, Sri Lanka, India etc) together with a multitude of other problems makes forest and wildlife protection seem like a needless endeavour. Presently, conservation groups such as NGO's, UNESCO, World Wildlife Fund (WWF) and Sierra Club are trying to implement the conservation of priority species and ecosystems (Johnson, 1995). The scientific knowledge in wildlife welfare and ecosystems are concentrated in educational institutions. Local governments have some regulations on protecting forests; however, most regulations are not implemented. Therefore, conservationists need to contend with the priorities of different groups together with funding problems when setting priorities to protect wildlife and their habitats.

DISCUSSION

In 1971 the annual tourist inflow to Pachmarhi was about 4,500. This has increased to about 66,000 in 1992. Presently the inflow of tourist is around 75,000 to 80,000. Domestic tourists mostly visit Pachmarhi. Maximum number of tourists visits in the month of May. However, April, May and June prior to on-set of monsoon and October to December after rainy season are the main tourist inflow months. Mostly people from Maharashtra, Gujrat and West Bengal visit the area. The people visiting the area can be grouped in two categories, viz. students, and general tourists. In addition, annually around 3-4 lakhs of piligrims flock the shrines of Mahadeo and Nagdwari during Shivratri and Nag Panchami festivals. During these festivals, people travel along the roads enmasse, camp over night, cook their food and defecate as per their convenience, creating a lot of environmental problems. Therefore it is necessary to regulate the activities of the piligrims. Being the only hill resort in the state, the number of tourist arrivals has increased considerably during the last decade. The growth of tourism has resulted in negative impacts like pollution of water at tourist's spots, vandalism littering and problems of garbage disposal. The increase in tourist arrivals has also resulted in the increase in the number of hotels and tourist lodges. This has led to migration of labour from neighbouring villages and the mushrooming of Shanty towns. There has been a substantial increase in vehicular traffic on Pachmarhi leading to air emissions and noise pollution. If ecotourism is to benefit wildlife and the tourism industry, measures need to be taken to study the long-term effects of nature viewing on wildlife ecosystems, dynamics of the wild species and their environment, and a thorough knowledge of the wild species and their behavior. Further, there should be a strict regulation of ecotourism activities with the understanding of the participants and their willingness to cooperate to ensure the preservation of wildlife and their habitat. In developing countries, ecotourism should encourage the involvement of local communities in the industry to practice stewardship of their natural resources. Raising children with the knowledge about the costs and benefits of ecotourism puts them at a great advantage for generations to come, making continuing a sustainable tourism practice much more likely (Wearing, 2001; Weaver 2002). A universal program would be able to set rules and monitor the progress of ecotourism around the world. Monitoring would not have to be an elaborate process, however; monitoring “can occur through a range of formal and informal means, including informal conversations, group discussions, and questionnaires” (Wearing, 2001).

Steps to success

(1) Set biodiversity priorities that link with conservation goals.

(2) Clarify local, national and global bio-diversity conservation priorities.

(3) Involve those responsible for implementing conservation actions: Government agencies, NGOs, local universities and local communities.

(4) Give local people economic incentives to protect wildlife ecosystems.

(5) Involve government policy makers in conservation efforts to declare protected areas and enforce regulations.

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