

## 23. Challenges of Ecotourism Development on Biodiversity and its Sustainable development Strategies

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### Abstract

Biodiversity is one of the most important issues. For this reason Agenda 2030 focused on sustainable development of biological diversity and also on 22 May 2016, UN secretary-general in his message on international day for biological diversity, highlighted that it is an important cross-cutting issue. According to the message of UN secretary-general, the lives, livelihoods and well-being of people in all over the world is depend on the benefits of biological diversity and its protection. The importance of protection of biological diversity is to that extent that Goal 15 obviously emphasized on the necessity of stopping its destruction and introduced its protection as an essential factor for eradicating poverty, providing food and fresh water and improves urban life.

Lack of protection of biodiversity cause direct and indirect pressure on it, for example: habitat loss especially fragile ecosystem, variation of surface and underground water flow, ground-water pollution, extraction of resources, erosion and sedimentation, biodiversity decline, and reduction its traditional and recreational usage for local communities. It is clear that considering long term ecotourism effect on biological diversity is costly and time consuming; hence developing countries have shown less inclination to do it. This study aims to present the experience of developed countries on negative effects of ecotourism and their solutions. According to the pressures of negative effect of ecotourism on wild life during long term, to enable ecotourism policy makers to find solution to protect biological diversity against destruction effects of ecotourism it can be useful to consider the sustainable ecotourism pattern of developed countries

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### 1. Introduction

The importance of biodiversity conservation to the extent that Goal 15 explicitly recognizes the importance of halting biodiversity loss and other Goals recognize the importance of biological diversity for eradicating poverty, providing food and fresh water, and improving life in cities. It is critical that we make progress in mainstreaming biodiversity and transforming how societies value and manage it [14]. Tourism is now of the most rapidly expanding sectors within the world's largest and fastest growing industry and is emerging as a growing sector of economic development. Yet tourism by the nature of the activities involved is considered by the natural resource base and infrastructure and by the pollution and other environmental impacts of tourist numbers. Large volume international tourism is primarily a phenomenon of the last fifty years and global mass tourism to develop on a large scale in the last two decades only. WTO (1991) statistics showed that at global level the number of tourist arrivals has risen from slightly over 25 million in the 1950s to 443 million in 1990. The World Tourism Organization (WTO) reported that tourist activity in terms of number of visits has risen by 7% each year, with an increase of 12.5% in receipts, excluding international air fares. During the decade there has been an average growth rate of 4% despite the world recession. Mass tourism is not without disadvantages. The impact of tourism, on the environment life, is often detrimental. This has been documented in a range of countries both in the north and south, rich and poor nations. Therefore, it is important to assess not only the nature of motivation and attraction but also the feedback between them [11]. The key benefits for conservation can be clustered into five areas including a source of financing for biodiversity conservation, especially in legally protected areas; economic justification

for protected areas; economic alternatives for local people to reduce over-exploitation on protected areas and wildlands and wildlife resources; constituency-building which promotes biodiversity conservation; and an impetus for private biodiversity conservation efforts[8]. Ecotourism has been regarded as a panacea for solving many of the environmental and economic problems of less developed nations. Yet, regardless of how socially and environmentally responsible ecotourism may be in theory, in practice it remains rooted in the tourism industry. The numerous problems associated with traditional tourism also occur in the planning, implementation and management of ecotourism projects . The following sections will examine the negative direct and indirect impacts ecotourism has been demonstrated to have on biodiversity. [2]

## 2. DIRECT BIOLOGICAL EFFECTS OF ECOTOURISM ON BIODIVERSITY

Ecotourists travel to spectacular and remote places where tend to be biodiversity-rich and fragile. Protection of biodiversity's importance is because of human interest in pristine areas and wildlife. Ecotourism is believed to be environmentally friendly and because of that they're precoutious about leaving the area as it was. It's negative impact is on disturbance of species and animal's behavior cause of human presence. Some of the negative impacts of tourism development including habitat loss, alteration of surface and underground water flow, ground-water pollution, extraction of resources, erosion and sedimentation, decrease in biodiversity, and reduced traditional and recreational use for local communities. There is an increasing cuveilinear relationship between number of tourists and the impact on environment especially in fragile areas such as coral reefs, desert, sand dunes or tropical forests. For making money ecotourism ventures must attract greater number of visitors that leads to physical and ecological damage. Tourism will increase jobs but will also increase intensity of land use, reduce native vegetation cover, increase sport and commercial fishing, and increase general ecosystem stress . [2]

One of tourist activity in about 118 maritime countries is recreational fishing that includes angling, gathering and etc. Despite the attractiveness of recreational fishing as a vehicle for sustainable economic development, in vulnerable ecosystems it can pose ecological risks. Unless recreational fishing is practiced responsibly, it can lead to a decline in fish stocks and habitat degradation. [10]

One of the attractions of ecotourism is observation wildlife for example when they are foraging ,nesting or caring their young and human presence among these activities will disturb their normal behavior . due to human presence breeding birds may leave their nests and eggs ,increase heart rate and losing weight. [2].

Sometimes helicopters are used for recreational purposes, too much noise and different sounds disturb the lives of sea birds . Birds afraid of the sound then they leave their nest and eggs and can lead to loss of eggs.[13]

In south island of new zeland tourists often come to see the breeding sites of yellow-eyed penguins (*Megadyptes antipodes*). The adult penguins that foraged food, return in the evening to feed their young. But in the presence of humans, they 'll delay their returning that leads to reduce the amount of food of young in their critical growth period that will cause their losing weight and reducing survival in the long-term. [2].

Muller and colleagues (2004) showed that animals in different stages of development responded differently to human presence. They determined that adult hoatzins (*Opisthocomus hoazin*) in the Cuyabena Wildlife Reserve in Ecuador became accustomed to humans and were not negatively affected by their presence. However, both nestlings and juveniles showed an increase in stress levels, as evidenced by higher concentrations of plasma corticosterone. The chicks observed by Muller and colleagues in the ecotourist-exposed sites tended to have a lower body mass. They hypothesized that this was the result of the chicks' repeatedly elevated levels of corticosterone, a steroid known to metabolize fat and protein reserves. Even if one ecotourist boat per day elicits hormonal stress reactions, juveniles will accumulate a considerable number of such disturbance events in the weeks after they had left the nest. Over time, the impacts that occur during early developmental stages may result in fewer chicks surviving to adulthood .[2].

Whalewatching defined by the International Whaling Commission (IWC) as any commercial enterprise which provides for the public to see cetaceans (whales, dolphins and porpoises) in their natural habitat, is one of fastest growing tourism products in the world. However, there is concern that whale watching is detrimental to the target species. Numerous studies have shown that cetaceans exhibit behavioral changes in response to whale-watching boat traffic. Some of these behavioral changes involve inhibiting biologically important behaviors such as feeding and resting. There is convincing evidence for some species that these can translate into population-level effects such as reduced reproductive rates. Whale watching can also cause direct mortality through collisions between vessels and animals.[3]

Watkins (1986) researched in Cape Code ,Massachusetts, USA, over 30 years. He compared whale behaviour before and after initiation of whalewatching and found whales responded primarily to underwater sound, light reflectivity and unexpected tactile sensation. The rate of habituation was often rapid, but varied with individual and stimulus, and different species had different responses to vessels. He suggested that changes in whale behaviour have been gradual and therefore emphasised the need for long-term monitoring. Blane and Jaakson (1994) recorded avoidance responses by

belugas (*Delphinapterus leucas*) to tour boats in the St Lawrence River, Quebec, Canada. These included bunching together, longer dives and shorter surfacing time. Researches showed whalewatching vessels affected the behaviour of humpback whale (*Megaptera novaeangliae*) migrating through Hervey Bay, Australia, specially in the case of whales with calves. Hector dolphins (*Cephalorhynchus hectorii*) readily approached dolphin boats but their behaviour changed, with less frequent approaches. [4]

Mastny's research showed whale-watching boats pursue whales and dolphins and may even encourage petting, altering the animals' feeding and social activity. In the Caribbean, some sharks, manatees, and other marine species have lost their natural fear of people because tour guides feed them to ensure that they will remain in tourist areas. [2].

Polar bears (*Ursus maritimus*) in Manitoba are an integral part of the Canadian ecotourism industry. Polar bears feed mostly in the water to store energy and live off of their fat reserves while on land. Baydack and Dyck (2004) analyzed the changes in vigilance behavior of resting polar bears due to human presence. Their study found that unnatural stimulus from only a few tourist tundra vehicles elicited significantly higher vigilance behavior and consequently decreased the bears' time spent resting, which in turn could result in higher metabolism and heart rates, thus depleting their limited energy reserves. Additional increases in vigilance, could have an effect on individual fitness if bears tend to stay in tourist-rich areas for a prolonged period of time, especially if individual bears are exposed repeatedly to these stimuli. [2]

The impacts of poaching, particularly of top predators, include the disruption of the trophic structure within ecosystems, and clearly affect the habitats of these ecotourism areas. [2]. In the forest-tundra areas of the Arctic, tourism, including sport hunting and fishing, attracts moderate though increasing numbers of visitors. This places additional pressure on the region's resources, sometimes leading to conflicts between local and visiting hunters. The forest-tundra in general has a low tolerance for trampling. Even the temporary presence of humans often leaves a lasting impact. [13]

Diving as a leisure activity is one of the export opportunities that has increased significantly over the last 30 years, but concerns have been raised over the impact of dive tourism on marine biodiversity. For example, large-scale diving activity in the Red Sea has had a direct negative impact on corals including increased sedimentation and broken and damaged corals [10]. Snorkeling activities showed a low level of contact with the benthos at the sites monitored. On the other hand, during SCUBA diving\*, a high level of contact with the benthos was observed. Actions taken to improve the conduct of divers could result in a decrease in these occurrences, especially in zones with fragile benthos. We recommend that special attention be paid to visitor behavior when near white-tipped sharks, whale sharks, marbled rays, stingrays, and green sea turtles, as these are the species that are most pursued and most show evasive behavior [1].

### 3. Indirect Effects of Ecotourism on Biodiversity

Even at its best, ecotourism has indirect effects on biodiversity. Habitat loss, through fragmentation, degradation, or total destruction, is the primary cause of the loss of biological diversity worldwide. Some of these indirect effects are improper solid waste disposal, depletion of water resources, deforestation and overgrazing, and visual pollution, erosion of paths and trails, and increased greenhouse gas emissions from air travel. Many tourist facilities in the developing world possess limited or no sewage treatment facilities, in part because of weak environmental legislation or a lack of money, monitoring equipment, and trained staff. A 1994 study conducted by the Caribbean Tourism Organization revealed that hotels in the Caribbean region released 80–90 percent of their sewage directly into coastal waters, near hotels, on beaches and around coral reefs and mangroves without adequate treatment. [2]

The increasing proliferation of plastic, metal, and glass has been exacerbated not only by careless disposal of trash, but also by the increased non-biodegradable litter. In 1996, a recently formed local NGO has organized a cleaning campaign in the trail route and they can fruit juice and 100 kg of bottles during fall season. [11] Garbage, waste, and pollution are significant problems for many tourism operations, especially as decomposition is slow and waste remains visible atop the permafrost in many Arctic areas [12].

Research to date describes impacts of marine debris on 663 species. Over half of the species assessed document entanglement in and ingestion of marine debris. When considering the types of material reported, three quarters of all studies reviewed described encounters involving plastic debris. Of the 120 marine mammal species listed on the IUCN Red List 54% are known to have been entangled in or have ingested plastic debris. Microplastic as one of the top global emerging environmental issues. Plastic particles breaking down into nano-sized particles may also impact the bottom of the food web upon which the ocean and global climate depend. Nano-polystyrene beads can inhibit photosynthesis and cause oxidative stress in algae. Other research indicates plastic debris can absorb persistent organic pollutants (POPs)

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\* self-contained underwater breathing apparatus

from the ocean and that these chemicals can reach high levels of concentration. [5].

Evidence shows that severe degradation of the environment has occurred in the trail route and some parts of Sikkim Himalaya as a result of tourism. If visitor number increases and physical environment will be more severe. In the trekking corridor, one of the major impacts are trailside litter. The Yuksam-Dzongri-Goechha La trail route is facing serious trail erosion problem during the rainy season, resulting from excessive wood cutting, over use because of hiking and heavy grazing. [11]

The diminished availability and quality of water sources for human consumption indicates that water resources in this area have not been well managed and could lead to the degradation of aquatic ecosystems if the increased demand for water sources results in the usage of naturally occurring lakes or streams for drinkable water. [2]

Global climate that results in large part from increased burning of fossil fuels as a source of energy, change alters habitats and the distributions, ranges, and demographics of many populations. In a study of the global effects of ecotourism in Seychelles, Gossling (1999) examined the ecological footprint of air travel to this ecotourism location and found that 97.5% of the ecological footprint of tourists traveling to Seychelles was due to air travel greenhouse gas emissions. In another study by Gossling and colleagues (2002), the researchers concluded that the contribution of tourist transport by air to increased carbon dioxide emissions should be calculated when considering the costs of ecotourism, and they noted, that this cost is substantial. It is important to note that the great distances traveled by air by ecotourists are contributing to the increased greenhouse gas emissions, global warming and climate change, and indirectly to habitat quality. [2]

Boating activities are one of the causes that threaten seagrass meadows and the ecosystem services they provide. Mechanical destruction of seagrass habitats may also trigger the erosion of sedimentary organic carbon (Corg) stocks, which may contribute to increasing atmospheric CO<sub>2</sub>. The study on rottness island, western Australia from 1930 onwards showed that the Corg stores have been compromised by the mooring deployment, which involved both the erosion of existing sedimentary Corg stores and the lack of further accumulation of Corg. [10]

A study was set up in summer 2004 in the marine reserve of Cape Creus (Mediterranean Sea) to estimate the environmental impacts of boating showed that the large numbers of recreational boats (most of which are motor powered) that can be found affect the marine environment and on average, between six and 34 shoots were destroyed during an anchoring cycle depending on the anchor size. Even though we cannot assess the loss of these meadows due to anchoring because we have not evaluated how many shoots are being destroyed during an anchoring cycle and shoot density is unknown, our results indicate that *Posidonia oceanica* meadows are suffering from mechanical damage caused by anchors because half of the recreational boats are deploying their anchors on them. Heavier anchors, which are used by larger boats, sunk deeper into the seagrass mat during lock-in and inflict more damage to *P. oceanica* meadows. [7]

Nature tourism has great potential for negatively impacting animals as tourists seek out rare and spectacular species. Ecotourism-induced stresses on animals may result in changes in population densities, species composition, and community structure. Tikal National Park is visited extensively by tourists, most of whom are concentrated around the Mayan ruins. Potential impacts of tourism in Tikal were evaluated by comparing the population densities of select species of mammals and birds in two regions of the park, with and without tourist traffic. Densities were estimated using visual line transects and distance sampling methods. Trends show the impact of ecotourism is species specific, with some species increasing in density, some decreasing, and others unaffected. However, trends do show that the effect of tourists on animal densities appears to be species specific. Some populations increase in areas with tourist activity, some decrease, and some show no apparent difference. Habituation of animals in the ruins due to human presence and a probable decrease in predation pressure on these animals are likely causes of their increased densities. This in turn may have secondary effects on the species composition of the ecosystem, including the flora, due to changes in distributions of herbivores and of seed dispersers [9].

The discharge of bilge water, which can contain gasoline and oil that are toxic for many organisms, and motor noise, which disturbs fish and other wildlife such as seabirds and marine mammals, may threaten the marine environment of Cape Creus (Mediterranean Sea). In addition to this, pollutants from vessels such as sewage, toxic antifouling and grey waters can adversely affect water quality and health of organisms. [7]

True ecotourism models minimally impact the environment in Botswana.

Botswana is unique in that most of its biodiversity remains intact, with a higher percentage of its total landmass conserved than any other country. Botswana achieves this level of protection primarily through ecotourism, which operates at several levels in working toward biodiversity conservation. Government policy on tourism aids ecosystem conservation in Botswana by employing a high-income, low-volume tourism policy.

Botswana has used ecotourism as a tool for biodiversity and grassland conservation. The ecotourism industry in Botswana is diverse and exploits a range of activities other than large-mammal "game viewing." Private protected areas also play an increasingly important role within the ecotourism industry of Botswana and in particular within the Kalahari. Many private landowners in grassland-dominated systems in which "big game" are absent successfully converted from

livestock ranching to ecotourism. Cattle producers on private protected areas have experienced limitations to efficient beef production and have developed other forms of income in particular, but not exclusively, ecotourism. These private protected areas vary in size from 60 km up to 600 km, with ecotourism taking many forms, such as photographic, cultural, and archeological. Other ventures have included ostrich (*Struthio camelus*) farming, crocodile and fish farming, game farming, hunting, and collecting and selling natural resources products such as honey, wild fruits, and medicinal plants. [6].

#### 4. Conclusions and recommendations

According to the new report, produced jointly with the International Ecotourism Society, there are serious concerns that the rapidly growing tourist industry is promoting environmental degradation by putting extra pressures on land, wildlife, water and other basic necessities. The following are some of the suggestions for fostering sustainable tourism development :

- Planning is one of the most important factors to achieve sustainable ecotourism. Tourism development planning is often directly response to unwanted effects, especially at the local level. It's important that planning potentially minimizes the negative impacts and maximize economic returns in tourist destination on long-term.
- Fund research on ecotourism's developmental and environmental impact. Information is needed to demonstrate to decision-makers the economic contributions nature tourism can make. Better understanding of the impact of ecotourism (such as in resort development) is needed to regulate and enforce against environmentally damaging investments.
- Education is a crucial ingredient in strategies for integrating biodiversity conservation and ecotourism. Customers, tour operators, and local guides all need to be educated about proper behavior and practices in environmentally and culturally sensitive areas.
- Conservation biologists can help engage societies in conservation efforts by striving to achieve three goals: adjusting the public's perception of biodiversity, increasing public participation in biodiversity conservation, and encouraging ecotourism by tour packages to develop conservation and local.
- In coastal areas, It is necessary to ensure the sustainable tourism with particular regard to the principles of Integrated Coastal Zone Management to protect vulnerable areas such as small islands, coral reefs, coastal waters, mangroves, coastal wetlands and beaches.
- Ecotourism needs to be well planned and managed with the aid of spatial information technologies such as Remote Sensing (RS), Geographic Information System (GIS) and Global Positioning System (GPS).
- Recreational carrying capacity is a necessary technical management tool for the public use of recreational areas and sustainable use of resources special for fragile areas that are promoted as tourist attraction.
- A joint management within all responsible departments (Forest, Tourism, Environment & Local govt.) required for monitoring, evolution and development
- Guidelines and selected good practices to conserve these unique wilderness areas through the regulation and management of tourism.
- It is important annual monitoring and to analyze population dynamics of the megafauna species targeted .



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