

Conservation of Biodiversity and Sustainability of the Tourism Industry of Sri Lanka

Abstract

Sri Lankans have a strong traditional culture in the conservation of nature. Sri Lanka is regarded as a strong hot spot in biodiversity. There are historical evidences to support the fact that the ancient rulers of Sri Lanka have taken steps to preserve the environment, including its flora and fauna. But today, the human activities pose a great threat to biodiversity of any ecosystem. Therefore, global attention is vital to preserve this invaluable gift of the nature. Tourism is a global economic activity dependent on natural ecosystems and its diversity. Therefore, conservation of natural eco-systems and their biodiversity is vital for sustainable tourism in Sri Lanka.

Introduction

Biodiversity or Biological Diversity is the variability of fauna and flora found on the planet. According to the Convention on Biological Diversity, biodiversity is "the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems". Genetic Diversity within species is a heritable characteristic of an organism. Species Diversity refers to variation between species, or to the variety of life forms. Ecosystem Diversity means the variation among ecosystems.

Sri Lanka, a small island in the Indian Ocean, has an invaluable

diversity of flora and fauna. The topography, different types of soils and prevailing weather conditions enhance her wonder of biodiversity. The secret behind this wonderful biodiversity is ecosystems diversity of forests and related ecosystems, inlands, wetlands, coastal and marine traditional agricultural ecosystems and colonial estates.

Biodiversity in Sri Lanka

Arthur C. Clarke expressed his feeling about Sri Lanka. "The island of Ceylon is a small universe; it contains as many varieties of culture, scenery and climate as some countries a dozen times its size. But if you are interested in people, nature, history and art – all things that really matter – you may find as I have, that a lifetime is not enough" (Silva, 2010).

Flora Zelylanica is the first natural exploration in Sri Lanka, which was done by Carolus Linnaeus in 1974 (Pethiyagoda, 2007). Sri Lanka is a wonderful tourist destination where every square mile is rich in unique natural properties in her 65,610 km² territory, a paradise of flora and fauna. Wildlife sanctuaries, forest reserves, bird sanctuaries, wetlands and mangroves, and vegetation are the major natural resources of biodiversity in Sri Lanka. So, Sri Lanka has been identified by the environmental

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activist group, Conservation International, as one of the 25 biodiversity hot spots in the world "Earth Angels". For an example, Kumana wetland cluster is the fifth wetland of international importance.

Varied ecosystems in the country (Figure 1), support vegetation of more than 3,368 species of flowering plants, of which 26 percent are endemic and 314 species of ferns, of which 57 are endemic. The diverse ecosystems provide habitat for over 357 invertebrates, of which 41 are endemic. Among vertebrates, 65 fresh water fish species are indigenous to Sri Lanka (Table 1) (Biodiversity Conservation in Sri Lanka, 1999).

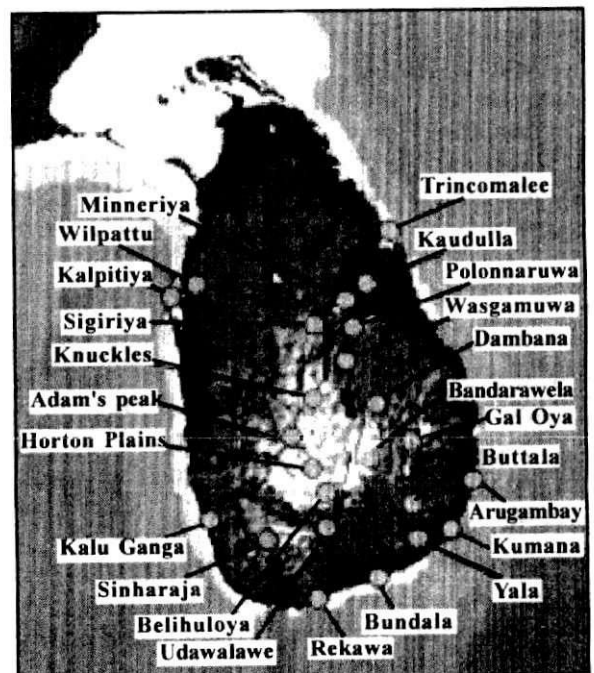


Figure 1: A map of Sri Lanka showing its hot spots of biodiversity

Table 1: Diversity of Fauna in Sri Lanka

Invertebrates	Number of species	Number of endemic species
Inland waters		
Rotifer	140	
Crustacean	186	11
Mollusks	31	12
Mayflies	Incomplete documented	18
Marine		
Corals	More than 180	
Crabs	More than 200	
Terrestrial		
Arachnids (species)	400	
Butterflies	242	14
Mosquito	139	
Carbide beetles	252	127
Land snails	266	201
Vertebrates		
Fresh water fish - indigenous	65	Half of it endemic
Fresh water fish - introduced	22	
Amphibian	53	3
Reptilian		
Crocodiles	2	
Marine turtles	5	
Tortoises	3	
Snakes	92	Half of it endemic
Agamid lizards	14	10
Monitor lizards	2	
Skinks	21	17
Avifauna		
Birds	435	23
Terrestrial mammalian	86 indigenous 10 introduced	12
Bats	30	
Rodents	23	1
Carnivores	14	
Artiodactyls	7	
Shrews	6	2
Primates	4	
Elephant	1	
Marine mammals	38	

Source: Biodiversity Conservation in Sri Lanka, 1999.

Other than the aesthetic value of natural flora and fauna, Sri Lanka is proud of having a rich crop genoplasm, consisting of more than 2,500 indigenous varieties of rice, which are tolerant to pests and diseases and adverse climatic and soil conditions. Some of the varieties have been identified as having aromatic, medicinal and nutritional properties. Other than rice, pepper, cardamom, betel, chillies, legumes, yams, citrus,

mango, banana and many vegetable crops possess several genotypes.

Biodiversity and Tourism

Tourism is the one of the world's growing industries associated with the existing diversity in different ecosystems, flora and fauna. The diversity is a key factor contributing to the growth and sustainability of tourism industry. Especially, the tourism industry of tropical and developing countries highly depend

on what they possess unique in their natural environments. Environment makes up the geographic location, climate and weather, land forms and topography and biological components like vegetation and wildlife.

Eco-tourism and nature tourism are popular types of tourism highly dependent on nature and its diversity. Many definitions can be found in literature regarding "eco-tourism" and "nature tourism". Many people use the same definition for both eco-tourism and nature tourism. The World Tourism Organisation (WTO) has defined this activity at two levels; nature tourism is a form of tourism in which the main motivation is the observation and appreciation of nature while eco-tourism is a form with the characteristics of all nature-based forms of tourism and is carried out in a way that takes special precautions for maintaining the natural environment of the tourist destinations.

Eco tourism in Sri Lanka is defined as responsible travel to natural and cultural areas that conserves the environment of such areas and sustains the well-being of local

people, with the objective of conservation and restoration of natural resources, promotion community involved tourism development, promoting investment on conservation of ecological resources and utilisation of ecotourism as a tool for conservation and rural development. Government of Sri Lanka has accepted ecotourism as a niche segment of Sri Lanka Tourism and guidelines for ecotourism development have been

formulated in three areas, i.e., location, site development and operations. Construction of eco-resorts and eco-lodges, identifying potential and available areas for eco-tourism programmes, and encouraging eco-tourism activities around privately-owned resources are prioritised areas to support the eco-tourism objectives (Sri Lanka Tourist Board, 2003).

Today, the fashion of enjoying the sun and beach is fading away. The sun and beach is not sufficient to satisfy tourists and to maintain sustainability of the tourism industry. New travellers want to experience of the nature, culture and tourist activities to make their holidays more pleasurable and worthwhile. Most of the travellers want nature to be more prominent in their vacations. The World Tourism Organisation (1998) has estimated that twenty percent of the world's travel in this decade will be nature related. This is a great opportunity for Sri Lanka as a developing country to open doors to remote communities to gain benefits of booming tourism industry.

A Survey on foreign tourist arrivals to Sri Lanka (2009) revealed that the environment was the leading influential factor to visit tourists to Sri Lanka. The Highest proportion of tourists ranked the environment as their first, second and third influential factor (Table 2). Nearly 81% of tourists visited Sri Lanka to spend their holidays while about 13 per cent came for business matters. Yala national park was the most visited national park, which was 57% during the semester of 2008 September to February 2009. Elephant was rated as the star of Sri Lanka's wild life by nearly 62% respondents while 11% were interested in birds.

Table 2: Ratings of influential factors to visit Sri Lanka

Factor	Order of priority as a Percentage		
	1	2	3
Environment	31.86	48.49	41.41
Culture	9.76	16.44	21.89
Social	22.96	19.97	15.49
Business	9.7	0.67	1.01
Previous experience	3.04	3.86	5.05
Promotion	1.38	0.67	0.34
Education	0.75	0.34	0
Other	20.55	9.56	14.81

Source : Survey of departing foreign tourists from Sri Lanka, 2009.

Figure 2 shows the trend of foreign visitors to the wild life parks in Sri Lanka from 1986 to 2010. The total revenue from foreign visitors to wildlife parks has increased by nearly 98% from 1986 to 1996, nearly 72% from 1996 to 2006 and nearly 56% increase from 2006 to 2010. Table 2 provides more details on the contribution of sixteen natural ecosystems, especially the national parks towards the growth of tourism industry in Sri Lanka.

Sri Lanka Tourist Board statistics provide evidence for that the tourists' interest on nature based tourism in Sri Lanka has increased. The government endeavours to promote nature based tourism while curtailing the erosion of bio-diversity.

Erosion of Bio-diversity

At the beginning of civilisation, human communities systematically

organised surviving patterns while utilising natural resources carefully which led to a sustainable community-ecology relationship. They identified the diversity within the same species of flora and fauna, as their medicinal, nutritional, aromatic properties and many more unique values. Those genotypes were utilised for the betterment of human beings, and at the same time, they were allowed to thrive in there natural habitats and protected for a sustainable ecosystem.

The use of natural resources for commercial farming and plantation agriculture, deforestation, land fragmentation, screening high-yielding genotypes, trends in industrial development etc. have direct and increased impact on the erosion of bio-diversity and pose a threat to nature tourism. Tourism industry also causes environmental

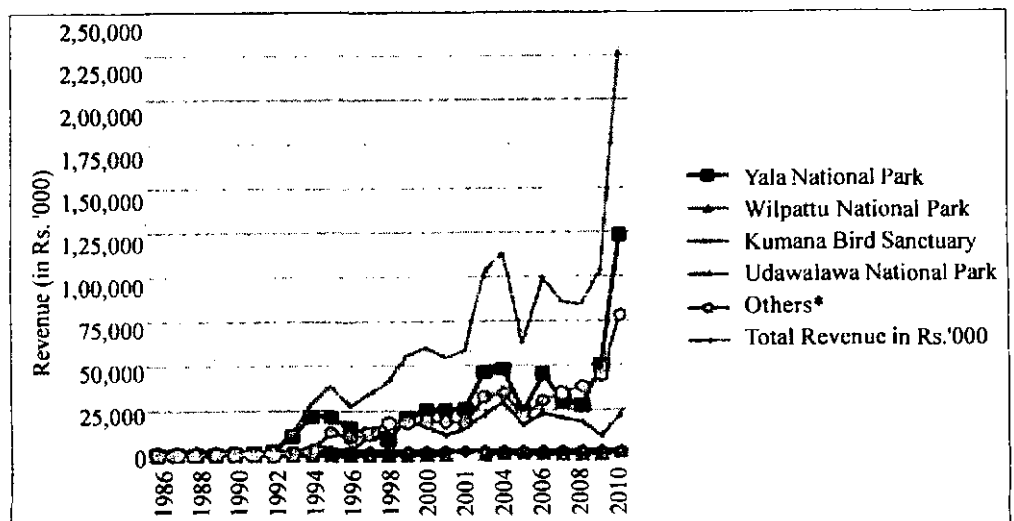


Figure 2: Revenues from Foreign Visitors to National Parks of Sri Lanka
Source : Sri Lanka Tourism Annual Statistical Report 2010.

pollution and greenhouse effects, especially when their levels exceed the carrying capacity of ecosystems due to over crowding. In future, this situation will be further accelerated by the heavy use of genetic modification technology in agriculture. There is a cumulative threat of all these factors to disappear most of the endemic fauna and flora rapidly which is an irreversible loss to the whole world.

Healthier ecosystems and diverse flora and fauna species can withstand climate change impacts better. The climate changes arise as a cumulative result of unplanned human activities is another major threat for ecosystems and tourism development worldwide. Hence, the bio-diversity is considered as the most vulnerable asset of tourism.

Conservation of Biodiversity in Ancient Sri Lanka

Though the biodiversity and its conservation are broadly discussed worldwide as a new concept, safeguarding of fauna and flora has a long history dating back to over 2500 years. In the Buddhist history, there are many evidences of having bio-diversity conservation concepts;

for example, the first Dhamma Dheshana of the Lord Buddha was held at Isipathana Migadaya at Baranasee, which was a sanctuary of dears. Another most interest example from Buddhist culture is one of the higher ordinate *seela* (*upasampada seela*) which prevents the destruction of trees (flora) by the higher ordinate monks.

In Sri Lanka, conservation of bio-diversity is as old as the recorded history of the country. "*Mahawansa*" shows, that there was preservation of wildlife in defined areas. For instance, King Devanampiyathissa affirmed an animal sanctuary in the third century BC. Another evidence for wildlife conservation and sustainable use of forests is, that King Keerthi Nissanka Malla proclaimed that no animal should be killed within a radius of seven *Gau* (One *Gau* is equal to 35.7 km) of the sacred city of Anuradhapura. The conservation of bio-diversity in ancient Sri Lanka was ingrained in cultural and religious aspects. The ancient rulers of the country paid special attention to protect those preserved environments, such as, monarchs, sanctuaries, forests and even "urban nature reserves" in ancient Sri Lanka; in today's milieu, those are the protected areas,

(Biodiversity Conservation in Sri Lanka, 1999). Figure 3 shows ruins of an ancient monastery located in Ritigala forest; offering forest for religious purposes is also considered as a measure of conserving the nature.

Tammita Delgoda (1997) described in "*Sinharaja*" about the conservation of biodiversity of Sri Lanka in detail, "the time of Sinhala Kings, forest and animal life were an important part of the social fabric. For example, Udawatthakale, was a reserved forest where people were not allowed even to gather firewood. Forests were also owned by the king, and considered a Crown property or *Rajasanthaka*. Any kind of activity within these lands was strictly prohibited. In those protected areas, any kind of cultivation, felling trees, hunting or fishing were strictly prohibited, and severely punished, if not adhered to. A *Kale Korala* was appointed by the king to enforce laws regarding forest conservation. All elephants were regarded as the property of the Crown, and killing an elephant was considered as a crime. Conservation of fauna and flora was also a part of their way of life."

Table 3: Revenues from Foreign Visitors in 2010 to Wildlife Parks by Location

Location	Foreign Tickets		Local Tickets		Total No. of Visitors	Total Revenue (Rs)
	No. of Visitors	Revenue (Rs)	No. of Visitors	Revenue (Rs)		
1. Yala National Park	73,580	123,850,107	179,965	10,274,270	253,545	134,124,377
2. Wilpattu National Park	912	1,503,635	16,156	876,140	17,068	2,379,775
3. Kumana National Park	400	445,750	19,201	820,516	19,601	1,266,266
4. Udawalawa National Park	15,560	22,718,483	46,752	2,536,968	62,312	25,255,451
5. Horton Plains National Park	21,846	36,646,400	144,892	7,763,760	166,738	44,410,160
6. Bundala National Park	3,703	4,183,437	5,920	228,700	9,623	4,412,137
7. Wasgamuwa National Park	451	443,500	19,916	726,380	20,367	1,169,880
8. Minneriya National Park	13,479	22,602,970	26,714	1,604,320	40,193	24,207,290
9. Kaudulla National Park	13,085	14,679,537	16,731	652,670	29,816	15,332,207
10. Lunugamvehera National Park	20	21,582	3,601	140,780	3,621	162,362
11. Gal Oya National Park	32	17,055	1,480	69,110	1,512	86,165
12. Horagolla National Park	1	1,145	2,752	104,760	2,753	105,905
13. Maduru Oya National Park	0	-	23	5,600	23	5,600
14. Angammedilla National Park	0	-	1,712	65,890	1,712	65,890
15. Galwaysland National Park	129	135,636	1,271	47,590	1,400	183,226
16. Lahugala National Park	0	-	179	6,780	179	6,780
Total	143,198	227,249,239	487,265	25,924,234	630,463	253,173,473

Source : Sri Lanka Tourist Board, 2010.

During the colonial era, dramatic change occurred in the lifestyle of Sri Lankans, which led to erode the biodiversity there in the country.

Current Trends in Conservation of Biodiversity

Conservation of fauna and flora is done by two methods: the first is ex-situ conservation, which is carried out only to a very limited extent in Sri Lanka. The plant genetic resources centre at Peradeniya is the only institution established for this purpose. The second method is in-situ conservation, i.e., preservation of genotypes in their original ecosystems.

Conservation of biodiversity or wise management is a one of the Millennium Development Goals (MDGs), and it targets at achieving a significant reduction in the rate of bio-diversity loss by the year 2010. Sri Lanka, a rich biodiversity destination has dozens of laws and regulations focused at protecting her natural wealth, but their implementation is inadequate. Increased community involvement in conservation is vital in this regard. Eco-tourism would be the best strategy to increase the interest of community.

The Convention on Biological Diversity is an international body

working towards arresting the erosion of bio-diversity worldwide, and catalyses the responsible parties to play their role in relation to this matter. In 1998, Sri Lanka prepared a framework of action for the conservation of biodiversity to preserve natural flora and fauna of the country with the

involvement of Ministry of Forestry and Environment, and the task was facilitated by the Convention on Biological Diversity. Many government and non-governmental agencies, including Forest Department, Coastal Conservation Department, Department of Wildlife Conservation, Central Environmental Authority, and Department of Agriculture, Botanical Gardens and Zoological Gardens are involved in sharing their responsibilities of preserving the natural ecosystems with their flora and fauna.

The identification of biodiversity regions is important for conservation. In Sri Lanka, terrestrial bio-regions are demarcated based on climatic and geo-physical classifications, the distribution pattern of flora and fauna and biodiversity density of different areas of the country. The

criteria used for determining terrestrial bio-regions are, degree of threat, population density, development pressure, biodiversity based on available data, economic potential based on road network, forest coverage and watershed value. Fifteen terrestrial and coastal bio-regions were



Figure 3: Ritigala Ancient Monastery

identified based on the above-mentioned criteria.

There is a possibility of using tourism as a solution to loss to biodiversity due to human activities. This can be achieved through raising awareness of the endangered genotypes and by providing incentives for communities who are involving in conservation of these threatened areas (WTO, 2010). Ecotourism can be upgraded by habitat mapping, increasing availability of information, training naturalists, development of interpretation skills, designing hotel gardens and providing sustainable waste management solutions. Sustainable eco-tourism projects should be promoted to protect species, manage and restore habitats and promote the sustainable use of natural resources. Dissemination of knowledge, setting standards and identifying tools for biodiversity conservation are the areas to be addressed to ecotourism culture.

Sri Lanka still focuses on nature tourism rather than ecotourism. Ecotourism is the most appropriate type of tourism in Sri Lanka, where six sites have been designated as World Heritage Sites by UNESCO (United Nations Educational, Social and Cultural Organisation) Sri Lanka offers diverse opportunities for nature lovers to widen their experience through wildlife safaris, bird watching, hiking, trekking (Figure 4), photography, cycling, and many more. An ecotourism model for Sri Lanka should be formulated



Figure 4: Trekking in Sinharaja rain forest

to promote tourism and protect important habitats by working with local communities and tourism-related organisations.

Sustainable tourism can directly contribute to biodiversity conservation by—

(i) Introducing less destructive livelihood alternatives to local communities in buffer zones controlling intensive use of forestry and other natural resources, monoculture, hunting etc. For example, Kandyan home garden and, spice garden concepts avoid monoculture and those are strong tourist attractions in Kandy and Matale districts,

(ii) Providing an incentive for landowners in threatened ecosystems to permanently conserve biodiversity-rich properties, and

(iii) Raising visitor awareness, motivating community involvement in conservation issues.

National Eco-tourism Policy emphasises the following areas:

(i) Tourism development and marketing should highlight the country's distinctive religious traditions, cultural and historic and attractions, and its natural beauty and diversity,

(ii) Tourism development should promote the conservation and enhancement of Sri Lanka's natural environment and its historical, social and cultural avoiding any harmful effects,

(iii) Tourism should result in optimal economic benefits to Sri Lanka's economy by way of maximum net foreign exchange income spreading of development through the country and creating significant employments for Sri Lankans, and

(iv) A program of community education, consultation and active participation should be ensured (Sri Lanka Tourist Board, 2003).

To ensure long-term impacts of sustainable tourism on biodiversity conservation, introduction of innovative management systems with special focus on tourism related uses of eco-sites, along with capacity building systems is vital. A consultative process with key stakeholders should be facilitated to ensure their active participation in sustainable tourism of their eco-sites.

Conclusion

Ecosystems with different species of flora and fauna are vital for the functioning of global life-supporting systems. Sustainable use of natural ecosystems while maintaining their diversity are major requirements for sustainable tourism. Tourism should be recognised as a natural resource dependent industry. Poorly-managed tourism leads to erosion of bio-diversity, which in turn will adversely affect the tourism industry. Tourism industry in developing countries is highly affected by this situation. The conservation of biodiversity is crucial for tourism, and the tourism has potential to promote preserving biodiversity worldwide. The future of the tourism of Sri Lanka and its contribution to uphold large number of people involving in tourism depends, to a large extent, on the conservation and wise management of her biodiversity, which is the most valuable asset of tourism of Sri Lanka. The payback of sustainable tourism of social recognition, income opportunities, can provide a strong incentive for communities to protect their natural ecosystems. To ensure that, the distribution of incentives among local communities who directly contribute for this process, should be fair. Sri Lanka will be able to maximise the benefits of tourism, such as increasing investment, job creation and foreign exchange earnings, while minimising negative effects and environment degradation.

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