

# Ecotourism Development and Biodiversity Conservation in Sri Lanka: Objectives, Conflicts and Resolutions

Mangala De Zoysa

Department of Agricultural Economics, University of Ruhuna, Mapalana, Sri Lanka  
Email: mangalaxyz@yahoo.com, mangala@agecon.ruh.ac.lk

**How to cite this paper:** De Zoysa, M. (2022) Ecotourism Development and Biodiversity Conservation in Sri Lanka: Objectives, Conflicts and Resolutions. *Open Journal of Ecology*, 12, 638-666.  
<https://doi.org/10.4236/oje.2022.1210037>

**Received:** August 31, 2022

**Accepted:** October 8, 2022

**Published:** October 11, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc.  
This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

---

## Abstract

Biodiversity conservation and sustainably utilizing natural resources improve the benefits of ecotourism development. Ecotourism development makes values for sustainably using biodiversity creating economic development opportunities. This study reviews literature and reveals objectives, conflicts and resolutions for achieving biodiversity conservation through ecotourism development in Sri Lanka. This paper describes conservation objectives in terms of preserving and fostering biodiversity, habitat restoration and managing biodiversity, and making values for natural assets through ecotourism activities. Degradation and destruction of habitat, overexploitation and illegal extraction of species, emissions of greenhouse gasses for climate change, contamination and pollution of the environment, and spread of exotic species are identified as the main conflicts. Conservation resolutions are discussed on education and awareness-raising activities for biodiversity conservation, *in-situ* conservation and *ex-situ* preservation of species, integrating biodiversity into ecotourism development, integrating management of biodiversity and ecotourism, linking ecotourism industry and conservation organizations, ecotourism policy and legislations for biodiversity conservation, and imposition of rules and regulations. Policy solutions and building capacity among institutions and other stakeholders for governance and sustainable conservation of biodiversity are key for sustainable ecotourism development.

## Keywords

Habitat Restoration, Values for Nature Assets, Overexploitation of Species, Integrated Management, Policy and Legislations

---

## 1. Introduction

### 1.1. Background

Ecotourism is defined as responsible tourism in nature destinations while conserving ecosystems, habitats and the environment, and improving the benefits for the local community. The International Union for Conservation of Nature (IUCN) observes that biodiversity and ecotourism are mutually related where healthy ecosystems directly provide prosperity and services for most of the ecotourism activities while sustainable ecotourism provides synergies for biodiversity conservation. Ecotourism and biodiversity primarily focus on both development and conservation roles using protected areas that host resources of biodiversity [1]. Sustainable ecotourism typically regards biodiversity as public asset and concern strong correlation exists between the conservation of biodiversity and the profitability of ecotourism businesses [2]. Ecotourism enterprises aim to shift the use of natural assets and biodiversity from consumption to conservation [3]. The third Asia-Pacific Rainforest Summit [4] emphasized the important role of ecotourism that play in biodiversity conservation and commitments to the Convention on Biological Diversity (CBD), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Sustainable Development Goals (SDGs), Millennium Development Goals (MDGs), etc. Biodiversity conservation protects, uplifts, and manages biodiversity to derive sustainable benefits. Biodiversity is identified in three levels in terms of variability among ecosystems and ecosystem diversity, variability among species and genetic diversity, and variability among individuals of a population and among all the different populations of the same species [5]. Environmental sustainability minimizes the impact on biodiversity and ecosystems, and contributes to conserving and protecting species and habitats [6].

### 1.2. General Context

Ecotourism has become a promising driver of achieving conservation goals, socioeconomic transformation and economic development in many biodiversity hotspots [7]. According to World Tourism Organization, sustainable ecotourism development is specifically focused on ecological sustainability with the conservation of indispensable ecology and biodiversity [8]. Ecotourism is a supportive frontier of the utilization of biodiversity of bio-ecological resources to bring people to natural ecosystems concerning socio-ecological aspects [9]. Biodiversity is an integral environmental component essential for ecosystem functions and services required for sustainable ecotourism development. Biodiversity conservation that protects and manages habitats, ecosystems and species in protected areas is vital for ecotourism development. Biodiversity conservation is essential for sustainably utilizing natural resources to improve the economy and support the livelihoods of communities through ecotourism. Conservation of biodiversity through preserving, protecting and improving is essential for the development of the ecotourism industry. Ecotourism development in parks, protected areas and fo-

rested areas make values for biodiversity containing important ecosystems, habitats and species, and sustainable use of biodiversity creates economic development opportunities. The funds generated by the visitation of ecotourism are used for biodiversity conservation. Direct fees to secure more revenue derived from biodiversity by attracting visitors to the natural settings and indirect benefits using the revenues to fund biodiversity conservation and economic development are the fundamental goals of ecotourism [10]. The practice of travelling tourists to remote pristine natural ecosystems often threatens environments and faces great challenges to conservation efforts. Tourism and recreation with rising and expanding global economies threaten uncountable biodiversity held by forests lands on the planet [11]. Ecotourism threatens biodiversity values and creates tensions between ecotourism development and biodiversity conservation thus rarely achieving the correct balance [12]. Empirical evidences of achieving positive outcomes of ecotourism on biodiversity are limited and mixed in rapidly developing ecotourism in worldwide biodiversity hotspots [7].

Ecotourism developments in areas with natural attractions of biodiversity are often environmentally sensitive. Disastrous habitat degradation and biodiversity loss may result from unplanned or inappropriate development and misuse of natural resources [13]. Ecotourism activities oriented towards economic outcomes may entail negative strong impacts on ecosystems and loss of biodiversity in forest reserves. Ecotourism in developing countries relies on extraction-based land uses for economic development, which may lead to biodiversity losses and environmental degradation [7]. [14] has identified numerous outcomes and potential actions, and indicates the strong significant role of ecotourism plays in the conservation of biodiversity in developing countries, after systematically reviewing a large number of literatures. Unsustainable ecotourism practices in response to growing market opportunities, and excessive visitors travel in natural areas create undue pressure on pristine ecosystems and damage biodiversity [15]. Commodity chains of ecotourism driven by the interest of tourists and entrepreneurs who are partly idealists and partly businessmen have less possibility of successfully achieving the twin goals of ecotourism development and biodiversity conservation [16]. Under existing threats of land use change in large-scale for primary industries and competitive commercial tourism sector, conservation of biodiversity is urgent but insufficient and underfunded [3].

### **1.3. Sri Lankan Context**

Ecotourism is a growing and devoting a segment of tourism that is one of the largest industries in Sri Lanka. The country is a hugely popular global tourist destination; tourists can see the diverse array of easily accessible ecosystems and more wildlife within a short period. Ecotourism is becoming an ever-growing sector of the tourism industry in Sri Lanka with raising global interest as a greener and listed fewer than 25 global biodiversity hotspots. The country is home to 189 out of the world's 377 plant families as a global biodiversity hotspot. Sri Lanka is an island nation that hosts over 120 species of mammals, 171 species

of reptiles, 106 species of amphibians and 227 species of birds, with the incredible number of endemic species and biodiversity. Sri Lanka covers second-highest protected areas in Asia including eight UNESCO World Heritage sites and five Ramsar wetlands. Many protected areas with high levels of biodiversity, endemism and high environmental values are still underutilized for ecotourism [17]. Ecotourism in national parks, wildlife sanctuaries, forest reserves and protected areas has become the fastest growing sector in tourism industry in Sri Lanka [18]. The sector draws pristine nature assets of biodiversity for a variety of tourism activities. Biodiversity in Sri Lanka promote eco-tourism as a significant income generator in the form of revenue from National Parks and other wildlife reserves contribute directly to the national economy. Varied and unique natural assets of ecosystems and biodiversity in ecotourism destinations have attracted around 52 percent or 1.1 million of 2.3 foreign tourists who visited Sri Lanka generating more than SLRs. 2 billion in 2018 [19]. Unchecked and unsustainable ecotourism extended to remote and untouched pristine ecosystems in protected areas and forest reserves challenging both biodiversity and ecotourism in the country. Conservation of biodiversity and management of protected areas are integrated components for the sustainable development of ecotourism in Sri Lanka. Many issues and challenges in achieving biodiversity conservation require a combination of solutions in order to be finding the most effective solution for given destinations of ecotourism. An empirical analysis of the achievements of economic development goals and concurrent biodiversity conservation goals of ecotourism is of vital importance to build an evidence base ecotourism development in Sri Lanka. Hence, this study attempted to assess objectives, conflicts and resolutions of ecotourism development and biodiversity conservation in the management of ecotourism destinations in Sri Lanka.

## 2. Methodology

Past and present conflicts threatening integration of ecotourism development and biodiversity conservation in Sri Lanka are being highly concerned due to the prevailing political, economic, social and environmental consequences. Hence, exploration of possible resolutions to manage conflicts and sustainably integrate ecotourism development and biodiversity conservation has become a paramount importance. This study reviews literature including research papers, reports searching the internet and electronic databases written on complexity and mutuality between ecotourism development and biodiversity conservation in Sri Lanka and elsewhere. The literature search was based on the main key words of ecotourism and biodiversity, and identified publications related to the study. The peer-reviewed and grey literature on ecotourism development and biodiversity conservation were reviewed to identify biodiversity conservation objectives of ecotourism, to analyze conflicts of ecotourism development and biodiversity conservation, and to develop resolutions for ecotourism development and biodiversity conservation in Sri Lanka. The conservation objectives of integrating ecotourism development and biodiversity conservation are examined in terms of

preserving and fostering biodiversity; habitat restoration and manage biodiversity, and making values for nature assets through ecotourism activities. The conflicts threatening the integration are analyzed based on degradation and destruction of habitat; overexploitation and illegal extraction of species; emissions of green house gasses for climate change; contamination and pollution of environment; and spread of exotic species. The possible resolutions to manage conflicts and sustainably integrate ecotourism development and biodiversity conservation are explored through education and awareness-raising activities for biodiversity conservation, *in-situ* conservation and *ex-situ* preservation of species, integrating biodiversity into ecotourism development, integrating management of biodiversity and ecotourism, linking ecotourism industry and conservation organisations, ecotourism policy and legislations for biodiversity conservation, and imposition of rules and regulations.

### **3. Biodiversity Conservation Objectives of Ecotourism Development**

#### **3.1. Preserving and Fostering Biodiversity**

Ecotourism is fundamentally dependent on the ecosystems' services and basis for the ecosystems provided by biodiversity. According to the World Tourism Organization, a United Nation's Specialized Agency (UNWTO), preservation of biodiversity and natural resource, and ensuring essential ecological processes while utilizing ecosystem assets at optimum level are key elements of sustainable ecotourism development. Ecotourism in Sri Lanka is a rapidly growing niche sector providing opportunity for tourists to enjoy multifaceted attractions including unparalleled incredible biodiversity. According to the Sri Lanka Tourism Development Authority (SLTDA), international passengers travel to Sri Lanka has been recorded as 6,838,540 in 2019 from which the majority 58.38 percent were tourists and 83.20 percent of the tourists were visiting for the purpose of pleasure and holidays preferably in ecotourism destinations [19]. Rich biodiversity is a catchphrase that attracts more tourists for green travel in sustainable ecotourism destinations of the country. Observability of charismatic species of wildlife within small protected areas in the island country in short period has become one of the highest attractions. Wildlife in Sri Lanka included with 88 mammal species from which 21 are threatened with extinction and several species including elephant, cheetah, leopard and monkeys are protected. Identified species diversity, endemics species and threatened endemics plant and animal species in Sri Lanka are presented in **Table 1**. According to the UN Environment Program, the National Red List of Sri Lanka in 2012 counts 253 land snail species, 245 species of butterflies, 240 birds, 211 reptiles, 748 vertebrates, 1492 invertebrates, 336 pteridophytes and 3154 flowering plants.

Ecotourism conserve biodiversity preserving the species diversity, utilizing species and ecosystem sustainably, and maintaining ecological processes and life-supporting systems. Ecotourism development of Sri Lanka is dedicated to

**Table 1.** Species diversity, endemics species and threatened endemics species of selected groups of plants and animals in Sri Lanka.

Plant and animal groups	Total no. of species	Total no. of species endemics	No of nationally threatened species	
			Non-Endemic	Endemic
Flora				
Flowering Plants	3771	927	252	412 (61)
Ferns	314	59	60	30 (53)
Vertebrates				
Mammals	91	16	27	14 (88)
Birds	482	33	30	16 (48)
Reptiles	171	101	19	37 (37)
Amphibians	106+	90+	1	51 (57)
Fresh Water Fishes	82	44	8	20 (45)
Invertebrates				
Land snails	246	204	1	32 (16)
Freshwater crabs	51	51	0	37 (73)
Dragonflies	120	57	0	20 (35)
Butterflies	243	20	53	13 (65)

Source: After [5].

protect and enjoy natural heritage, and to preserve biodiversity and maintain ecological services. Popular ecotourism destinations in Sri Lanka are located in huge number of protected natural areas covering UNESCO World Heritage sites, national parks, and forest reserves. Biodiversity of unexplored wilderness and rain forests in Sri Lanka ensures wide exposure to nature create huge trend in ecotourism development. Ecotourism project in the periphery of conservation zone of the Knuckles National Wild Heritage in Sri Lanka was initiated considering high diversity in flora and fauna species to offer ecotourists with rewarding experience [20]. Management of eco-lodges located in Sinharaja Forest Reserve in Sri Lanka, a UNESCO Natural World Heritage Site; also a UNESCO Biosphere Reserve and IUCN designated bio diversity hotspot have recognized the importance of conserving bio diversity and fragile ecosystem [21]. The ecotourists visiting indigenous community (Vedda) in Sri Lanka is able to see the last vestige truly untouched biodiversity and observe their activities fostering biodiversity and support their conservation efforts. Significant habitat for conservation areas of biodiversity with pristine environment setting create excellent opportunities for ecotourism for sightseeing, adventures and other recreational activities [22]. Ecotourism in Sri Lanka contribute conservation of biodiversity and protection of natural assets by generating direct funding. Sri Lanka Wilderness Foundation is an NGO dedicated for conservation of biodiversity through con-

ducting educational programs and sustainable ecotourism development activities. The fee collected from the travellers is directly contributed to conservation of biodiversity and the environment. Some of the travellers work closely with field conservation units of the NGO making their physical contribution for biodiversity conservation in ecotourism destinations.

### **3.2. Habitat Restoration and Manage Biodiversity**

Ecotourism activities strongly associated with commitment to conservation of ecosystem assets, minimisation of anthropogenic impacts and rehabilitation of habitat are considered as vital measures for habitat restoration and manage biodiversity in protected areas. Desire of ecotourists for leisure travel to wilderness areas creates pathways to restore gradually diminishing biodiversity in forest reserves of Sri Lanka. Ecotourism projects support biodiversity, cost-effectively restore nature and manage ecosystems sustainably and deliver economic, social and environmental benefits simultaneously. According to the guidelines for environmentally responsible tourism in Sri Lanka, ecotourism enterprises have to invest a percentage of its profits or turnover in conservation of species or restoration of habitat [23]. With growing ecotourism sector and increasing visits to sensitive natural ecosystems, ecotourism venture requires more restorative countermeasures to achieve long-term conservation goals [24]. Ecotourism development project of Sri Lanka pay especial concern for conservation of values of biodiversity and promotion of ecosystems services in environmentally sensitive forest reserves especially in rain forests. Ecotourism promote natural ecosystem with green and luscious trees to provide truly unique experience out in the wilderness for tourists and making valuable effort in the fight to conserve biodiversity.

Ecosystem integrity is promoted by ecotourism more than other transformative land-uses in protected areas which is essential for the biodiversity restoration [24]. Ecotourism industry manage lands, spaces and species in protected areas and forest reserves in proper manner, and marketing of ecotourism experiences reflect the richness of the biodiversity and its offerings. Biodiversity hot spots in forest reserves in Sri Lanka attract ecotourism while ecotourism earn funds for management of biodiversity and natural resources of the forest reserves. Ecotourism destinations with high biodiversity rich in variety of animals and plants managed wisely to prosper tourism and visitation. Many ecotourism entrepreneurs of the country tend to practice biodiversity restoration and promote sustainable use of biodiversity, as a novel market-oriented concept of fastest growing segment in the international tourism market [25]. Ecotourism industry further attracts special attention of ecotourism entrepreneurs and conservation authorities to improve silvicultural operations for habitat restoration and manage biodiversity leading to sustainable forest management. Ecotourism development increase tourism, income and incentives for habitat protection and biodiversity conservation as a self-sustaining cycle foregoing farming and hunting [26]. Ranpathwala ecotourism project in Galgiriya forest reserve in Sri

Lanka was initiated to prevent deforestation and forest degradation caused by illegal loggings, creating conservation attitude of local residents to manage biodiversity [20]. Development of eco-tourism for revitalization of revolutionary base areas in China has great strategic significances for tourism landscape formation and development of national ecotourism [27].

By the conservation of biodiversity and sustainable management of natural assets, ecotourism brings not only ecological experience to travelers but also provide sources of livelihood to local community and gain economic benefit to the business. Optimal use of environmental resources helping to conserve natural biodiversity under the conservation and management of assets, is one of the seven guiding principles for tourism industry based on the national economic objectives of Sri Lanka and the UN SDGs [17]. Biodiversity conservation and sustainable ecosystem management are widely practicing in rainforests in Sri Lanka for educational purposes under community-based ecotourism programs. Ecotourism development in high environmentally sensitive Nilgala forest reservation was initiated under community-based forest management programs to restore biodiversity and conserve ecosystem, which had been degraded by collection of non-timber forest material, hunting, bee honey gathering, and forest clearing for shifting cultivation by local residents [28].

### **3.3. Making Values for Nature Assets through Ecotourism Activities**

Biodiversity based activities in ecotourism destinations attract more tourists thus popularity make more money for biodiversity conservation and bolster interest of tourists. Ecotourism enhance intrinsic and economic worth of natural environments and biodiversity conservation [29]. Biodiversity conservation facilitates venturing out into wilderness travel and spotting the wildlife that lives and thrives all around ecotourism destinations harmoniously. Biodiversity assets make substantial contribution for ecotourism activities thus promote social, economic and environmental development of Sri Lanka. Ecotourism industry explores biodiversity and genetic diversity in protected areas for the multifaceted environmental values and economic values vital for ecotourism activities. Ecotourism in Sri Lanka utilize biodiversity, natural assets and raw materials create variety of recreational activities that attract tourists to travel wilderness. Biodiversity of forest ecosystems rich in flora and fauna species, and genetic diversity of large number of native and endemic species play vital environmental and economic roles providing wide range of ecotourism activities [30]. Biodiversity of ecosystem landscapes in Sri Lanka provide recreational values including spiritual, aesthetic, and educational values, and carbon storage services for the ecotourism. Many components of biodiversity have economic value and high aesthetic, recreational and scientific value, and often serve as sinks for atmospheric CO<sub>2</sub>. Biodiversity and natural assets in Sri Lanka provide opportunities for wide range of popular ecotourism activities including bird watching, wildlife spotting, botanical excursions, trekking, camping, adventure tourism, and nature photo-



graphy tours (**Table 2**). Conservation of flora and fauna enhancing the biodiversity of dense mangrove forest in Chundikulam National Park in Jaffna that serves as habitat for migratory birds and native species has included in bird watching program of the Northern provincial council ecotourism plan [31]. One of the main objectives of Environment System Conservation and Management Project (ESCAMP) in Sri Lanka is the landscape management improving habitat and enhancing biodiversity in protected areas securing the integrity of ecosystems and viable population of species to facilitate the ecotourism activities [32]. Biodiversity status which provides wide range of ecotourism products and services of forest reserves attract more tourists [33].

Ecotourists involve in activities related to recreation, adventure and enjoyment as well as biodiversity conservation strategies helping sustainable ecotourism and economic development. Building ecotourism activities based on biodiversity and ecosystems services create a sustainable ecotourism business with conservation platforms. Ecotourism activities itself justify conservation of biodiversity and protection of natural assets by generating direct funding for conservation and stimulating economy providing entrepreneurial and employment opportunities [35]. Under existing threats of the changes of land use systems in large-scale for development of primary industries and also within the tourism sector competing for commercial gains. Biodiversity of forest reserves in ecotourism destinations in Sri Lanka contain very high potential for scientific investigations and understanding of ecosystems and natural resources. Ecotourism

**Table 2.** Nature based ecotourism activities in Sri Lanka.

Ecotourism activities	Destinations
Rainforest trekking/hiking	Knuckles forest (including Meemure), Sinharaja forest (including Kudawa), Peak Wilderness (Randenigala), Sripadaya, Ritigala, Horton Plains, Udawatta Kale
Botanical gardens trekking	Peradeniya, Haggala, Seetawaka
Safari (wild animal watching)	Yala, Uda Walawa, Wasgamuwa, Minneriya, Sigiriya, Hurulu Eco Park (including Eppawala)
Mountain biking	Throughout the island
Birding	Bundala, Kalamatiya, Muturajawela, Dembara Wewa, Bentota, Sinharaja Forest, Maduru Oya National Park, Pigeon Island, Anawilundawa wet land
Aboriginals culture experiencing	Dambana (Maduru Oya National Park)
Specific geologic features viewing	Geyser at Kudawella; Hot springs at Kanniya, Mahaoya, Madunagala, World End Horton Plain, and many waterfalls (such as Dunhinda, Diyaluma, St.Clair's falls, Devon, Ramboda, Bambarakanda)
Marine snorkeling and diving	Hikkaduwa, Unawatuna, Tangalle, Bentota, Kirinda (great Bases)

Source: After [34].

focus on biodiversity education primarily learning, experiencing, studying, or carrying out activities on nature, its landscape, flora, fauna and their habitats. Biodiversity of customary forest provide significant ecosystem services for educational tourism and cultural tourism under the ecotourism [36]. Eco-tourism consumes the lowest possible amount of natural resources and contributes to biodiversity conservation. Biodiversity is the most important attraction for ecotourism where a number of visitors are controlled to preserve and restore natural habitat, and the values and conditions of the biodiversity in ecotourism destinations. Ecotourism activities sometimes modify natural environments and biodiversity combined with elements of the landscape embedded in human feelings but not the geomorphology or biodiversity properties [37].

## **4. Conflicts of Ecotourism Development and Biodiversity Conservation**

### **4.1. Degradation and Destruction of Habitats**

Ecotourism development is a driver of biodiversity loss directly and indirectly. Ecotourism create more space for business activities encroaching natural environment fragmenting and destroying habitat of countless species threatening biodiversity. Threats facing by the habitat, and irreversible habitat degradation are often attribute to loss of biodiversity. Ecotourism infrastructure such as eco-lodges, theme parks, recreational activities, transport facilities directly affect the biodiversity losses and habitat degradations in Sri Lanka. Destruction of plant and wildlife habitats and reduction in biodiversity from poorly managed infrastructure and unethical visitor activities are main adverse impacts of ecotourism on ecosystems. Although it is expected that wildlife sanctuary for ecotourism destinations maintain biodiversity in its natural state, many negative impacts are experiencing in Sri Lanka with increasing human-wildlife conflicts, forest fires and expansion of recreational activities. Loss of habitat for wildlife by removing trees for infrastructural development, and retardation of growth and dieback of trees due to soil compaction of forest trails are destructing biodiversity in forest-based ecotourism destinations in Sri Lanka. Popular water sports, boating, fishing, angling etc., affects aquatic flora and fauna, and the aquatic biodiversity in ecotourism destinations. Water bird population is being reduced in the wetlands including Bundala National Park, the most popular nature habitat for water birds and the first Ramsar site wetland in Sri Lanka as a result of the biodiversity destruction in coastal belt [38].

Emergence of ecotourism in large scale also threatens biodiversity and has become another means of anthropogenic extinction of species. Endemic biodiversity in protected forests provide essential services of ecosystems are threatened by ecotourism, and in turn, undervalued and converted natural assets to other purposes marginalize potentials of ecotourism development. Although the ecotourism destinations are inherently associated with abundant or unique biodiversity, well-known ecotourism destinations where tourist visit for shorter time are less interest in charismatic species of flora and fauna, and often suffer

from poor biodiversity conservation [39]. Many ecotourism entrepreneurs in Sri Lanka have less interest in preserving biodiversity than making profits of ecotourism industry sacrificing more natural resources clearing forests to build hotels and resorts by disturbing natural landscapes. Limited land extent in national parks and expansion of ecotourism activities in other forested areas in Sri Lanka have restricted and degraded the habitats for elephants posing dangers for public safety. One of the reasons for killing 2535 elephants from 2011 to 2019 due to human–elephant conflicts caused by building eco-lodges blocking the paths and corridors in elephant habitats. Natural resources and wildlife-driven ecotourism in Sri Lanka is affected by increasing human–elephant conflicts killing 319 elephants in 2018 alone [32].

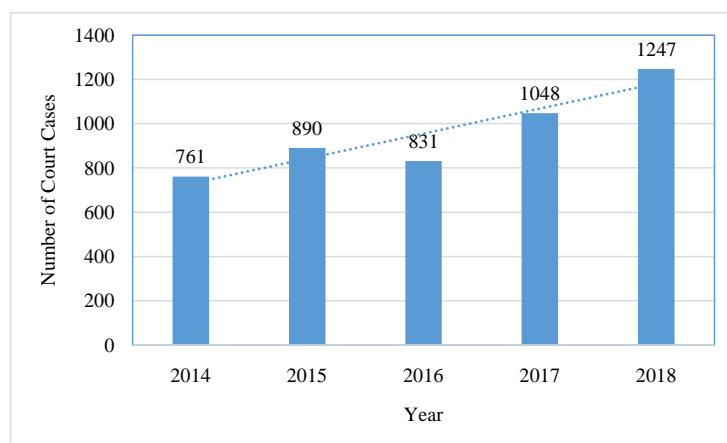
#### **4.2. Overexploitation and Illegal Extraction of Species**

Ecotourism should protect delicate ecological balance and biodiversity of natural environment, and should not extract natural resources beyond the carrying capacity of the ecosystem. Trampling and anchoring involve with ecotourism activities in protected areas cause adverse impacts on physical environment and lead to loss of biodiversity. Unmanaged and over visitation of tourists to ecotourism destinations such as Yala, Udawalawe, and Minneriya National Parks in Sri Lanka cause damage to terrestrial wildlife habitats and the wildlife [23]. Ecotourism destinations are guilty of green washing with the growing demand for and temptation for seeking profits where entrepreneurs allow tourists to exceed the carrying capacity of protected areas with high biodiversity and natural attractions [40]. Many anthropogenic disturbances such as poaching and bio-piracy affecting biodiversity adversely are being reported in many ecotourism destinations in Sri Lanka. Exploitation of natural assets and biodiversity in protected areas and forest reserves for short term monetary gain, natural resources will not be unique enough for satisfy the expectations of ecotourists in near future unless taking urgent remedial measures. Physical removal of plant genetic resources and trafficking of wild fauna and flora degrade biodiversity of nature trails of the ecotourism destinations and adversely affect ecotourism industry as one of the largest economic activities in Sri Lanka. Biodiversity in Sri Lanka is facing many negative impacts of bio-piracy an extremely lucrative business, including depletion of bio diversity, extinction of endemic living organisms, and privatization of national bio treasures [41]. Anthropogenic disturbances such as bio-prospecting, bio-piracy, and smuggling of forest genetic resources and wildlife have directly affected biodiversity in the Kudawa-Sinharaja site of community-based ecotourism project [42]. Ecotourism destroy natural habitats and biodiversity by over extracting timber, minerals, etc. and making enormous pressure on medicinal plants, wild species and wildlife. More than 1500 species of medicinal plants available in protected forests are utilized for herbal treatments of diseases by indigenous medicinal system in Sri Lanka [43]. Many eco-resorts in the country are very popular among ecotourists for indigenous medicine, and have created imminent danger for indigenous medicinal

plants and biodiversity due to the rising demand for plant materials and also for genetic resources by bio-pirates. Poaching and trafficking of wildlife is a huge threat to many species and conservation of biodiversity in Sri Lanka. Rapidly increasing number of prosecuted court cases on wildlife crimes in Sri Lanka have been reported during 2014 to 2018 (**Figure 1**). Pseudo ecotourism approach in pristine protected areas with rich biodiversity has limited potential for conservation without proper regulations and resulted with poaching of wildlife and overexploitation of natural assets [44].

### 4.3. Emissions of Green House Gasses for Climate Change

Global ecotourism industry indirectly produce considerable amount of emissions of green house gasses (GHGs) contributing temperature increase causing huge impacts on ecosystems and decline species of biodiversity. Use of vehicles and air travel intensively in ecotourism industry contribute to the increasing sources of greenhouse gas emissions associated with environmental stresses leads to habitat loss and biodiversity loss making seriousness of the environmental impact of tourism [45]. Ecosystems of forest reserves in ecotourism destinations containing biodiversity play an important role as carbon sinks. Exacerbating biodiversity loss is unintended consequences of ecotourism development looses ability of ecosystems to fully function to mitigate climate change. Similar to other countries, ecotourism in Sri Lanka is also facing great challenges to climate change impacts and the loss of biodiversity. Climate change impacts particularly frequency of extreme climatic events have severely affected vertebrate species in Sri Lanka. From the 748 species in the red list, 345 (46 percent) are nationally threatened and from the 233 (68 percent) endemic species are susceptible to changes in their habitat are at a high risk of extinction. Further, extreme climate events under climate change has created high risk of multiple invasion of invasive alien plant species in Bundala National Park, an International Ramsar Site and UNESCO Biosphere Reserves in Sri Lanka by propagules transported through the visitors and also due to weakening resistance of native species for the spread of invasive species [46].



**Figure 1.** Prosecuted court cases on wildlife crimes during 2014 to 2018. Source: [18].

Over-tourism, an overcrowding from the excess influx of tourists in ecotourism destinations exceed ecological thresholds and lead to the climate change. Climate change resulted with biodiversity degradation, mangrove cover depletion and beach inundation affect visitation of ecotourists in coastal destinations in Sri Lanka. Climate change induced higher temperature, reduced precipitation and raised sea level resulted with lowering number of turtle nests and increasing beach inundation have significantly and negatively affected visitation of ecotourists to the Rekawa ecotourism destination [47]. Rapidly increasing unregulated supply chains of ecotourism make contribution of greenhouse gas emissions and climate change impacts affecting loss of species and biodiversity compositions. The tangible monetary benefits associated with ecotourism industry to entrepreneurs and local communities use to ignore carbon sequestration as a less tangible ecosystem service of the biodiversity [48]. Climate change policy often do not focus on main issues related to ecotourism industry such as assessment of risk on natural assets and biodiversity, integrated land use planning with other sectors and funding for development of low emission infrastructure [49].

#### **4.4. Contamination and Pollution of Environment**

Significant contaminations, environmental pollution particularly solid waste and wildlife-related issues affecting the biodiversity are often reported from World Heritage Sites and ancient cities in Sri Lanka due to crowding and congestion of ecotourists. With ever increasing visitation, ecotourism produces more disposal waste, and noise, light and chemical pollutions damaging health of wildlife species thus wildlife is becoming a serious threat for biodiversity of ecosystems. Generation of solid waste and habitat degradation by increasing number of tourists seriously threaten the biodiversity upon which successful ecotourism endeavours depends [50]. Environment contamination and pollution caused by ecotourism activities burden not only for biodiversity conservation but also substantially reflect in destination management. Pollution and contaminations are common in ecotourism destinations in protected areas where rules and regulations are not properly imposed, resulted with severe impacts on the fauna, flora, and aquatic depreciation [45]. Polluted ecosystem assets with degraded biodiversity create poor standard to attract genuine ecotourists for ecotourism destinations. According to a study, bivariate correlation of the level of pollution ( $r^2 = 0.263$ ;  $p = 0.067$ ) is a weakly but positively significant factor influencing ecotourism activities in Ella, a very popular ecotourism destination in Sri Lanka [51]. Waste and garbage of ecotourism raise level of pollution of natural environment and affect ecosystems services mainly supply and quality of water eventually losing vulnerable species and natural habitats. Disregards the Coastal Conservation Act no 57 of 1981, coastal pollution has severely affected marine flora and fauna of Unawatuna beach area one of the highly popular ecotourism destination in Sri Lanka. The main eco-systems of Unawatuna area with rich bio-diversity of mangroves, marshes and corals are harboring over 60 species endemic birds, 36 endangered fish species [52].

## 4.5. Spread of Exotic Species

With ever increasing visitation of ecotourists coming across the world has facilitated the spread of non-native species and invasive species, both accidentally and intentionally putting natural ecosystems at risk, and threatening native species and declining biodiversity. Spreading of exotic species carried in on visitors clothing creates structural alterations to plant communities making negative impacts on vegetation of ecotourism destinations [29]. Increased tourism with present trends in globalization has increased the probability of many accidental introductions of potentially invasive species to Sri Lanka an island nation [53]. Some of the exotic species of plants and animals found in national parks in Sri Lanka are out-competing the native species (Table 3).

Harmful invasive species directly compete with endangered species and ecosystems resulted with degradations of habitats and substantial impacts on biodiversity losses in Sri Lanka. [46] has identified 14 invasive alien plant species that could make potential negative consequences such as eliminate vectors, create physical barriers and develop biotic interactions, and change native biodiversity and ecosystems in the protected areas. Department of Wildlife Conservation (DWLC) of Sri Lanka invested and attempted to remove invasive species mainly *Prosopis juliflora* (*Kalapu Andara*) which forms a dense canopy and resemble typical forest canopy structure in the Udawalawa and Lunugamwehera national parks [54]. Guidelines for environmentally responsible tourism in Sri Lanka emphasize the maintenance of biodiversity by planting local indigenous and non-invasive species when establishing new ecotourism enterprise [23].

## 5. Resolutions for Conflicts between Ecotourism Development and Biodiversity Conservation

### 5.1. Education and Awareness-Raising Activities for Biodiversity Conservation

Environmental education by ecotourism industry create awareness and enhance learning experience of tourists and other stakeholders as well as generate public concern for conservation of biodiversity and ecosystem assets. Ecotourists and local communities in Sri Lanka share their experience for understand biodiversity through education and interpretation, and spread awareness for protection of biodiversity as a natural heritage. Biodiversity conservation has been included

**Table 3.** Some invasive species found in selected national parks in Sri Lanka.

Ecosystem	Plant species	Animal species
<b>Thorn Scrub:</b> Bundala National Park (NP)	<i>Prosopis juliflora</i> <i>Opuntia dillenioid</i>	Feral buffalo
<b>Savannas:</b> Victoria-Randenigala-Rantambe sanctuary, Udawalawe National Park.	<i>Lantana camara</i>	Feral buffalo

Source: After [5].

in environmental curricula under the technical subjects of forestry, botany, zoology etc., in Sri Lanka. Biodiversity is still an emerging issue in ecotourism industry taught under socio-economic curricular in formal education. Ecotourism promote environmental education and facilitate conservation awareness playing a vital role in protecting ecosystem assets and biodiversity conservation [55]. Ecotourism education fosters awareness and understanding of biodiversity and promotes attitudes and responsible behaviour of tourists, local community, entrepreneurs and other stakeholders for biodiversity conservation in ecotourism destinations [35]. However, non-formal education on conservation and sustainable use of biodiversity enhance awareness, knowledge, skills, attitudes and values of all the entrepreneurs, local residents of ecotourism industry and the general public. SLTDA offers awareness programs continuously for Guides and tour operators about lesser-known sites interest from a biodiversity perspective in order to educate the visitors [17].

Awareness of ecosystem requirements for ecotourism development pursue the stakeholders of ecotourism industry to maintain and enhance ecological integrity and biodiversity conservation [56]. All the stakeholders of ecotourism are encouraged to involve in local and international awareness-raising activities of biodiversity conservation through news media, books, posters and television documentaries, and conservation awareness/interpretation centres at key visitor destinations, protected areas, and heritage sites in Sri Lanka [57]. Eco-lodge operators in Sinharaja rainforest in Sri Lanka provide very detailed explanations about biodiversity of fauna and flora in their ecotourism destinations at company websites and as pre-tour educational materials [21]. Conservation of biodiversity and natural assets increases the competitiveness of ecotourism destinations while an increase in competitiveness in ecotourism raises awareness of the value of biodiversity conservation leading to biodiversity enhancement [48]. Ecotourism industry in Japan train entrepreneurs and the staff to nature attractions in order to educate eco-travelers [58]. Ecotourism provides greater avenue for scientific research and recreational opportunities for improvement of knowledge, promotion of educational program and increasing awareness of the importance of biodiversity and sustainable natural functions [59].

## **5.2. *In-Situ* Conservation and *Ex-Situ* Preservation of Species**

Habitat fragmentation is a serious threat in ecotourism industry in Sri Lanka and need to be counteracted connecting fragmented forests to similar ecosystems establishing wildlife corridors. *In-situ* conservation as well as *ex-situ* preservation of species is utilized as key tools in management and conservation of biodiversity in selected ecotourism destinations popular in Sri Lanka [18]. Ecotourism enterprises conserve biodiversity through *in-situ* conservation of species within their natural habitat maintaining and protecting natural ecosystem in biosphere reserves wildlife sanctuaries and national parks. Ecological sensitivity to visitation of overcrowded public parks enhances in-site habitat restoration and

biodiversity conservation to maintain the potential of ecotourism [60]. *Ex-situ* conservation of biodiversity by ecotourism industry breed and maintain endangered species in artificial ecosystems less competitive for food, water and space among other organisms, such as zoos, nurseries, botanical gardens, gene banks, etc. *Ex-situ* conservation of endemic species outside the natural habitat is available in Botanical gardens at Peradeniya, Hakgala and Henarathgoda, and the National Zoological Gardens for ecotourism as a complementary strategy for *in-situ* conservation of biodiversity. Planners and implementers of ecotourism development have to recognize the species for *in-situ* conservation and of habitats in spatially defined areas as priority action focusing on conservation of biodiversity. Protected areas are vital approach to safeguard the sustenance of ecosystem services by conserving biodiversity to protect threatened species and their habitats in Sri Lanka. *Ex-situ* conservation of trees outside forests and landscape-scale conservation practices contribute to restoration of biodiversity of degraded forests and need to be promoted as attractive ecotourism destinations in Sri Lanka [54].

### 5.3. Integrate Biodiversity into Ecotourism Development

Wildlife, habitats, landscapes and natural attractions of healthy ecosystems draws tourists for ecotourism destinations in Sri Lanka. Ecotourism development and biodiversity conservation in Sri Lanka need to become an integral part of the regional planning and development process under the decentralization of public administration to the provincial and district levels. Integration of biodiversity conservation in ecotourism planning and implementation is very important for maintaining healthy ecosystems and sustainability of ecotourism business. Ecotourism development priorities with biodiversity conservation should be reconciled to make systematic choices about how and how many recreational activities should take place in forest reserves. Ecotourism should be an integral part of protected area management plans especially in the areas with conflicts over biodiversity conservation of forests and wildlife resources in Sri Lanka. The government authorities in Sri Lanka responsible for ecotourism development particularly the FD and the DWLC need to make coordinated effort for conservation of natural resources and biodiversity for the benefits of ecotourism. Development of ecotourism products such as hiking, trekking, wildlife sighting, bird watching trails, boating, photography, adventure sports etc., should be focused on catering different target groups of tourists identifying uniqueness and value in terms of aesthetic, natural and landscape characteristics of ecosystem assets and biodiversity of the destinations. Ecotourism development should be planned based on appropriate research finding on inventory of ecosystem assets, endangered species biodiversity threats etc. Strategies for awareness and education on conservation of biodiversity need to be integrated with sustainable ecotourism management. Accumulated traditional knowledge that contains insights, technology and practices of local residents and indigenous people are crucial for



conservation of biodiversity [61]. Ecotourism offers nature-based education for managing natural areas wisely and using good practices for protecting and preserving ecosystem assets and biodiversity [34].

#### **5.4. Integrated Management of Biodiversity and Ecotourism**

Management of ecotourism and biodiversity conservation with local community participation provide livelihood benefits to the local residents while creating pleasant and attractive natural environment for the tourists. Biodiversity conservation and other ecosystem services are the greatest benefits of regional land use planning for sustainable ecotourism development [62]. Ecotourism activities integrated into natural and modified surroundings must be reconciled with the maintenance of biodiversity in overall landscape of protected areas. Ecotourism activities should be designed setting standards for the carrying capacity of the protected destination and activities should be monitored to minimize negative impacts on the biodiversity and ecosystems. Ecosystem assets and natural resources in protected areas should be managed by ecotourism activities within sustainable limits to conserve biodiversity (Table 4).

Ecotourism in Sri Lanka involve with local residents, support FD to manage forest efficiently and effectively while conserving ecosystem assets and biodiversity utilizing their traditional knowledge and long-term experiences. Communities as an active stakeholder manage surrounding natural resources of ecotourism destinations focusing on biodiversity conservation and ecosystem system services. Ecotourism preserve benefits of local communities and the communities play critical and active roles in conserving valuable biodiversity and natural resources as the key custodians. However, ecotourism is not an effective tool for local people to value and protect biodiversity unless providing them with sufficient economic incentives and development opportunities [65]. Responsible ecotourism strengthens relations with local residence around destinations creating tri-forces prevent commercial poaching, illegal hunting and trading of endangered species continues to pose greater threats on biodiversity conservation in Sri Lanka. Economic benefits to local residents from tourism development in protected areas make them abstaining voluntarily from harmful activities to biodiversity or shift them towards activities friendly to the biodiversity conservation [66]. Sustainable ecotourism in Sri Lanka prefer small groups of tourists may be 5 - 7 similar to that of free individual travelers belongs to the category of responsible tourists who are respecting the ecosystem assets and biodiversity when visiting ecotourism destinations. Quality of management and conservation outcomes of biodiversity in protected areas and forest reserves provide important values and changing expectation and behaviour of the ecotourists. Partnership development and sharing benefits with local communities, and design and construction of low impact facilities, ecotourism provide memorable and authentic learning experiences for the tourists with ecology of ecosystems and biodiversity.

**Table 4.** Actions to improve conservation, preservation, and management of natural assets.

Actions	Lead agency and partners	Outcomes
Develop protected area infrastructure guidelines, templates and checklist to allow site audits for each area, with the aim of providing the best visitor experience.	SLTDA, DWLC, CCF, FD consultants	Tourism businesses contribute to protection, conservation and enhancement of Sri Lanka's natural and cultural assets.
SLTDA to advocate for integration of conservation and tourism objectives and actions in site-specific management plans for protected areas.	DWLC, FD, CCF, SLTDA	Visitors have easy access to reliable information and services, feel safe, and are impressed by environmental performance, social responsibility, and service standards in the country.

Source: After [63] [64].

### 5.5. Linking Ecotourism Industry and Conservation Organisations

Collaborative linking and development of partnerships between ecotourism industry and conservation organizations promote effective interactions among related stakeholders and assure careful planning activities, common decision-making processes, and formulation of appropriate policy and legislations to achieve economic, social and conservation goals. The links improves level of investments, quality of human resources, and development of knowledge, progress in technology, strengthening infrastructure, and boosting entrepreneurship, promoting community participation and conserving biodiversity. Government organizations, NGOs, private sector, CBO and individual households who are involving in biodiversity conservation are presently involving in ecotourism business linking to economic development activities in Sri Lanka. According to the conservation organizations, long-term commitment and stewardship of ecotourism industry is critically important for biodiversity conservation in protected areas and forest reserves. International Ecotourism Society (TIES) is making effort to develop ecotourism in developing countries as a viable tool for nature conservation, protection of bio-diversity, addressing the global climate change issues and sustainable community development as a means to achieve Sustainable Development Goals (SDGs). Integrating business skills and ecotourism operations develop viable and effective microenterprises, eco-shops and ecotourism businesses as well as effective tools for biodiversity conservation. Short-term conservation initiatives of ecotourism entrepreneurs without structured management plan fit into their business models do not reflect the long-term impacts on biodiversity and natural assets. The authorities responsible for biodiversity and agencies manage ecotourism in Sri Lanka are operating within their own administrative and business boundaries without proper cooperation and coordination. The tourists visit wilderness areas in Sri Lanka only to see and experience the wild life other than observing and

exploring the flora and fauna, and pay concern over biodiversity conservation [67]. The government authorities who legally own more than 90 percent of forest resources and responsible for biodiversity do not possess the required resources and skills to manage ecotourism. Ministry of Tourism, Forest Department (FD), Department of Wildlife Conservation (DWLC), Central Environmental Authority (CEA), Department of Coast Conservation and Coastal Resource Management, and the Ministry of Culture and Arts (MOCA) are the main government institutions involving in ecotourism development in Sri Lanka.

Private sector entrepreneurs possess sufficient knowledge, skills and capability to exploit biodiversity and natural assets to run ecotourism as profitable ventures. Although the ecotourism in Sri Lanka has a great potential for sustainable use as well as conservation of biodiversity in order to cater the international market, private entrepreneurs particularly eco-lodges of the ecotourism industry do not practice responsible market concepts but more oriented to maximize the earnings [67]. Private sector ecotourism entrepreneurs have to follow rules and regulations imposed by the environment authorities to avoid possible negative consequences for biodiversity in ecotourism destinations. The government institutions and organizations under the Ministry of Tourism (MOT) and Ministry of Environment and Natural Resource together with local authorities have vital responsibility to set standards, formulate rules and regulations, facilitate monitoring and enforce laws in ecotourism development and biodiversity conservation. Ecotourism enterprises have to provide opportunities for their employees to learn about conservation of biodiversity and ecosystem. IUCN in partnership with Kuoni and Whittall Boustead (Travel) Ltd. has conducted training program in Sri Lanka in 2013 and 2014 to the group of small ecotourism operators and other small-scale conservation organizations in managing ecotourism-related businesses through business skills, knowledge and experience sharing [68].

### **5.6. Ecotourism Policy and Legislations for Biodiversity Conservation**

Ecotourism under the National Tourism Policy in Sri Lanka highly emphasize the conservation of biodiversity and natural ecosystems. According to the policy, establishment of new ecotourism facilities and operations requires approval from protected area management responsible for regulating, licensing and certifying ecotourism [64]. Strict ecotourism and biodiversity legislations manifest sustenance of a wide variety of flora and fauna of biodiversity and prevent forgoing great natural beauty of ecotourism destinations in Sri Lanka. The Convention on Biological Diversity (CBD) was rectified by Sri Lanka in 1994 and prepared a framework for action in 1998. Fauna and Flora Protection Ordinance in Sri Lanka protects fauna and flora in national reserves, national parks and sanctuaries prohibiting hunting, wounding, harming any animal or collecting, removing,

destroying any kind of plant. Biodiversity conservation policy are implemented by the FD, DWLC according to National Forest Policy in 1995, the Forest Ordinance and the National Wilderness Heritage Act in 1988, Wildlife Policy in 1990, and Flora and Fauna Protection Ordinance in 1964 [34]. Main legislations, polices and plans governing biodiversity conservation applicable to ecotourism in Sri Lanka are given in **Table 5**.

**Table 5.** Main legislations, polices and plans governing biodiversity conservation applicable to ecotourism in Sri Lanka.

Main legislations	Key policies and plans
	<b>Key policies</b>
	The National Environmental Policy of 2003
	The National Wildlife Policy of 2000
	The National Forest Policy of 1995
	The National Wetlands Policy and Strategy of 2006
	The National Watershed Management Policy of 2004
The Forest Ordinance No. 16 of 1907, and its subsequent amendments, including Act No. 23 of 1995 and Act No. 65 of 2009	The National Land Use Policy of 2009
The Fauna and Flora Protection Ordinance No. 2 of 1937, and subsequent amendments including Act No. 49 of 1993 and Act No. 22 of 2009	National Ecotourism Policy (2003)
The National Heritage Wilderness Area Act No. 3 of 1988	<b>Plans</b>
Plant Protection Act No. 35 of 1999 (replacing Plant Protection Ordinance No. 10 of 1924). Legislation is being drafted to implement the Protocol on Biosafety	The National Biodiversity Conservation Action Plan of 1999 (Biodiversity Conservation in Sri Lanka: a framework for action) termed the BCAP and the Addendum to be BCAP of 2007
The National Zoological Gardens Act No. 14 of 1982.	The National Environmental Action Plan of 1991 and its subsequent revisions (the current being Caring for the Environment, path to sustainable, 2008) which has a chapter on biodiversity conservation, forests and wildlife
The Botanic Gardens Ordinance No. 31 of 1928. (This Act is being amended)	The Forestry Sector Master Plan of 1995 which has an entire chapter on biodiversity conservation needs
	National Strategy for Sri Lanka Tourism (This deals with incorporating nature, culture and adventure tourism to develop the tourist industry)
	Ecotourism Development Strategy of Sri Lanka (2003)
	Ecotourism Action Plan (2003)

Sources: After [20] [69].

Ecotourism policy to manage, regulate and promote ecotourism may be affected by environment policy protecting and maintaining biodiversity, which is the key resource for ecotourism. Balance between recreation and conservation by ecotourism in protected areas varies according to policy and level of responsibility of national, regional and local governments [70]. Development of preferential policies by the central government, increase of investment by the local government, and participation of public are necessary for overcome the economic, social and natural constraints for ecotourism development [27]. Current policy, and economic and market systems in Sri Lanka do not incorporate principles of sustainable ecotourism development and biodiversity conservation. Translating complex relationship between the biodiversity and ecotourism activities into appropriate policy might offset pressure from less sustainable business activities that make use of natural assets. Necessary policy and legal framework are needed to bring the private ecotourism entrepreneurs to involve in biodiversity conservation as active partners as well as direct beneficiaries in development of responsible ecotourism industry. It is difficult to quantify the value of carbon sequestration by ecosystems with biodiversity in ecotourism destinations in Sri Lanka yet on financial measures. [54] suggests to align forestry and natural resource policy in Sri Lanka through systematic economic assessment of potential for ecotourism benefits alongside convention for biological diversity and carbon sequestration contributing mitigation and adaptation to climate change.

Although the biodiversity policy is mutual promoters of ecotourism, ecotourism entrepreneurs representing diverse institutions and stakeholders are often not appearing in policy development for biodiversity conservation. Necessary policy and legal framework are needed to bring the private ecotourism entrepreneurs to involve in biodiversity conservation as active partners as well as direct beneficiaries in development of responsible ecotourism industry in Sri Lanka. The government enforces ecotourism enterprises and related facilitators to dispose sewage and garbage and treat effluents environmentally safe manner to avoid pollution of ecosystems [57]. Local residence should be involved in in planning and policy making processes of ecotourism to perform important biodiversity conservation functions in Sri Lanka. Policy makers have to bring multiple drivers of changing community needs and enhancing their livelihoods into the dynamics of biodiversity conservation in adapting ecotourism development in protected areas and forest reserves. National tourism policy integrates with community-based ecotourism enhance awareness of nature conservation and expand carrying capacity for tourists [71]. Research projects on sustainable use of biodiversity to support effective ecotourism development programs have not yet been carried out in Sri Lanka. National Ecotourism Policy in Sri Lanka insists collecting information and data on biodiversity of ecotourism destinations through ecotourism operators, protected area managers, local communities and the research community. Government policies should ensure availability of adequate funding for ecotourism planning and make mandate returning revenues of the

protected areas to conserve biodiversity. [20] suggests a revision of Flora and Fauna Protection Ordinance in Sri Lanka to emphasize invest in biodiversity conservation from the income earnings from ecotourism.

### 5.7. Imposition of Rules and Regulations

Ecotourism development requires better biodiversity conservation mechanism other than the imperfect market system, including legal procedures to address impacts and consequences of human activities on the natural resources. The permits provide to enter into the areas declared under the National Heritage Wilderness Areas Act No 03 of 1988 in Sri Lanka only for non-extractive uses such as tourism and recreation. Ecotourism needs to design more enabling and effective rules and regulations to implement and legitimize biodiversity conservation policy, and to encourage all the stakeholders involve actively in conservation of biodiversity and natural assets and resolve any issues undermine the conservation. National Biodiversity Strategic Action Plan 2016-2022 has proposed to engage SLTDA and the private sector ecotourism entrepreneurs among the wide range of stakeholders whose actions affecting biodiversity, for the sustainable use and conservation of biodiversity [53]. Lack of inspection is more related to negative impacts on biodiversity than public use policy on permissive activities [70]. Follow rules and regulations when travelling in wilderness, avoid absolutely prohibited littering and refrain from vandalizing any properties maintain virgin status of biodiversity of many ecotourism destinations particularly in rain forests in Sri Lanka. Under the Global Code of Ethics for Tourism, sustainability of biodiversity should be considered in deciding type and capacity of ecotourism activities in protected areas [72].

All the ecotourism activities should be in conformity with the laws related to biodiversity conservation and follow guidelines issued by conservation authorities. Legal regulations provided by the National Environment Act (No. 47, 1980) in Sri Lanka covers small-scale tourism activities ignoring forest-based ecotourism that takes place in fragile natural ecosystems [20]. Law of Biodiversity conservation in Sri Lanka is not effective enough in pursuit of preventing habitat degradation, species loss and other threats. Even, National Environment Act (No. 47, 1980) did not provide sufficient legal framework and regulations to assure sustainability of ecotourism in fragile natural ecosystems until introduce National Ecotourism Policy under Tourist Development (Amendment) Act-No 25 of 2003. Although the rich biodiversity has motivated ecotourism development in Sri Lanka, highly institutional driven Sri Lankan Tourism Act which primarily focus on economic perspectives deviated from environment conservation requires sufficient legislative enactments to minimize negative impacts of ecotourism on biodiversity [73]. Establishment of legal framework and regulatory mechanism to ensure the biodiversity conservation through control and regulation of access to genetic resources, indigenous biodiversity, and bio-prospecting are required for responsible and sustainable ecotourism development.

The guidelines should be carefully prepared for the ecotourism destinations in protected areas to conserve the ecosystems and biodiversity. According to the Fauna and Flora Protection Ordinance (FFPO) Amended Act No. 49 of 1993, the establishment of any ecotourism enterprise within one mile from the boundary of any national reserve requires written approval from the Director General, DWLC in addition to Environmental Impact Assessment (EIA)/Initial Environmental Examination (IEE). Flora and Fauna Conservation Ordinance enforce Biodiversity conservation regulations in ecotourism destinations to protect biodiversity from negative influences of ecotourists and local residents. These guidelines should address the rules for tour operators, guides, trekkers, mountaineers, researchers and others visiting the destinations. A study has revealed that more than 70 percent of ecotourists have received advice to avoid visiting restricted areas, maintain minimum distance from wild animals, adhere to imposed regulations and make alert on fragile and endangered species. Further, 60 percent of eco-lodge entrepreneurs have advised tourists on avoiding purchase of artefacts, crafts and souvenirs made of endangered species [74]. Patrolling by local residence and reporting illegal activities to Police are effective efforts for the conservation of biodiversity and ecosystem assets. Despite the prevalent laws and regulations against bio-prospecting and bio-piracy, authorities in Sri Lanka are failed to control smuggling and exporting of Wallapatta plants (*Gyrinops walla*) and gathering of Spotted Bowfinger Gecko (*Cyrtodactylus triedra*) which are endemic in Kudawa-Sinharaja forest reserve managed by community-based ecotourism project due to the support given to bio-pirates by the local community [75]. Wildlife crime trafficking wild fauna and flora which has negative implications for preservation of biodiversity and climate change has grown in importance in the public consciousness and has risen on the political agenda [76]. The Biodiversity, Cultural and National Heritage Protection Division of Sri Lanka Customs prevent, detect, investigate, penalize and dispose of any cross-border shipment of illegal wildlife products [77].

## 6. Conclusion

Ecotourism development in Sri Lanka makes considerable effort to achieve biodiversity conservation objectives through preserving and fostering biodiversity, restoring and managing habitat, and making value for natural ecosystems through ecotourism activities. At this early stage of ecotourism development in Sri Lanka, limited conflicts in terms of degradation and destruction of habitats, overexploitation and illegal extractions of species, and spreading of a few exotic species have occurred. Promoting education and awareness-raising activities for relevant stakeholders and developing integrated management strategies are promising resolutions for successful ecotourism development and biodiversity conservation in Sri Lanka.

## 7. Recommendations

Empirical evidences have to be developed to assess the contribution of ecotour-

ism development for emissions of greenhouse gasses, and contamination and pollution of the environment. National ecotourism policy needs to be revised to enforce existing laws and regulations through a system of monitoring and evaluation as appropriate concerning biodiversity conservation. Ecotourism should be developed according to global standards in relation to effective conservation, management and development of natural assets, with due respect for ecosystems and biodiversity.

## Acknowledgements

The author wishes to gratefully acknowledge the support of the members of the Department of Agricultural Economics, Faculty of Agriculture, University Ruhuna, Sri Lanka, and Cindy Zhang and Yavonne Zhang of the OJE Editorial Office.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

## References

- [1] Stone, M.T. and Nyaupane, G.P. (2017) Ecotourism Influence on Community Needs and the Functions of Protected Areas: A Systems' Thinking Approach. *Journal of Ecotourism*, **16**, 222-246. <https://doi.org/10.1080/14724049.2016.1221959>
- [2] Battaglia, M., Daddi, T. and Rizzi, F. (2012) Sustainable Tourism Planning and Consultation: Evidence from the Project INTER.ECO.TUR. *European Planning Studies*, **20**, 193-211. <https://doi.org/10.1080/09654313.2012.650908>
- [3] Romero-Brito, T.P., Buckley, R.C. and Byrne, J. (2016) NGO Partnerships in Using Ecotourism for Conservation: Systematic Review and Meta-Analysis. *PLOS ONE*, **11**, e0166919. <https://doi.org/10.1371/journal.pone.0166919>
- [4] Third Asia-Pacific Rainforest Summit (2018). [https://www.asiaresearchnews.com/html/calendar.php/aid/11500/cid/4/research/science/administrator\\_account/the\\_3rd\\_asia-pacific\\_rainforest\\_summit\\_2018.html](https://www.asiaresearchnews.com/html/calendar.php/aid/11500/cid/4/research/science/administrator_account/the_3rd_asia-pacific_rainforest_summit_2018.html)
- [5] Gunatilleke, N., Pethiyagoda, R. and Gunatilleke, S. (2008) Biodiversity of Sri Lanka. *Journal of the National Science Foundation of Sri Lanka*, **36**, 25-61. <https://jnsfsl.sljol.info/articles/abstract/10.4038/jnsf.v36i0.8047>  
<https://doi.org/10.4038/jnsf.v36i0.8047>
- [6] International Union for Conservation of Nature and Natural Resources (IUCN) (2012) Integrating Business Skills into Ecotourism Operations. <https://portals.iucn.org/library/efiles/documents/2012-032.pdf>
- [7] Brandt, J.S., Radeloff, V., Allendorf, T., Butsic, V. and Roopsind, A. (2019) Effects of Ecotourism on Forest Loss in the Himalayan Biodiversity Hotspot Based on Counterfactual Analyses. *Conservation Biology*, **33**, 1318-1328. <https://doi.org/10.1111/cobi.13341>
- [8] World Tourism Organization (WTO) (2013) Sustainable Tourism for Development Guidebook.
- [9] Bashar, M.A. (2018) Vision on Biodiversity: Ecotourism and Biodiversity Conservation in Bangladesh. *Journal of Biodiversity Conservation and Bio-Resource Management*, **4**, 1-10. <https://doi.org/10.3329/jbcm.v4i1.37871>



- [10] Diamantis, D. (2010) The Concept of Ecotourism: Evolution and Trends. *Current Issues in Tourism*, **2**, 93-122. <https://doi.org/10.1080/13683509908667847>
- [11] FAO (2011) State of the World's Forests 2011. Food and Agriculture Organization of the United Nations, Rome. <https://www.fao.org/3/i2000e/i2000e00.htm>
- [12] Higgins-Desbiolles, F. (2011) Death by a Thousand Cuts: Governance and Environmental Trade-Offs in Ecotourism Development at Kangaroo Island, South Australia. *Journal of Sustainable Tourism*, **19**, 553-570. <https://doi.org/10.1080/09669582.2011.560942>
- [13] Butcher, J. (2006) Natural Capital and the Advocacy of Ecotourism as Sustainable Development. *Journal of Sustainable Tourism*, **14**, 629-644. <https://doi.org/10.2167/jost610.0>
- [14] Wardle, C., Buckley, R., Shakeela, A. and Castley, J.G. (2018) Ecotourism's Contributions to Conservation: Analysing Patterns in Published Studies. *Journal of Ecotourism*, **20**, 99-129. <https://doi.org/10.1080/14724049.2018.1424173>
- [15] Li, Y., Zhang, L., Gao, Y., Huang, Z., Cui, L., Liu, S., Fang, Y., Ren, G., Fornacca, D. and Xiao, W. (2019) Ecotourism in China, Misuse or Genuine Development? An Analysis Based on Map Browser Results. *Sustainability*, **11**, Article 4997. <https://doi.org/10.3390/su11184997>
- [16] Uddhammar, E. (2006) Development, Conservation and Tourism: Conflict or Symbiosis? *Review of International Political Economy*, **13**, 656-678. <https://doi.org/10.1080/09692290600839923>
- [17] Sri Lanka Tourism Development Authority (SLTDA) (2019) Sri Lanka Tourism Strategic Plan 2017-2020. <https://sltda.gov.lk/en/sri-lanka-tourism-strategic-plan-2017---2020017-2020>
- [18] De Zoysa, M. (2021) Forest-Based Ecotourism in Sri Lanka: A Review on State of Governance, Livelihoods, and Forest Conservation Outcomes. *Journal of Sustainable Forestry*. <https://doi.org/10.1080/10549811.2021.1943450>
- [19] Sri Lanka Tourism Development Authority (SLTDA) (2018) 2018 Annual Statistical Reports. [https://www.sltda.gov.lk/storage/common\\_media/Tourist%20Board%20Annual%20Statistical%20Report%202018\\_Web784216427.pdf](https://www.sltda.gov.lk/storage/common_media/Tourist%20Board%20Annual%20Statistical%20Report%202018_Web784216427.pdf)
- [20] Wickramasinghe, K. (2009) Ecotourism as a Tool for Sustainable Forest Management in Sri Lanka. Environmental Economic Policy Series No. 12, Institute of Policy Studies of Sri Lanka, Colombo. <https://www.academia.edu/1211327>
- [21] Fernando, S.M.D. and Kaluarachchi, K.A.S.P. (2016) Ecotourism Practices in Sri Lanka: The Case Study of Rainforest Eco Lodge. *International Journal of Theory & Practice*, **7**, 50-62. <https://cbj.sjoi.info/articles/abstract/10.4038/cbj.v7i2.9>  
<https://doi.org/10.4038/cbj.v7i2.9>
- [22] Jeffrey, O. and Jalani, A. (2012) Local People's Perception on the Impacts and Importance of Ecotourism in Sabang, Palawan, Philippines. *Procedia—Social and Behavioral Sciences*, **57**, 247-254. <http://www.sciencedirect.com>  
<https://doi.org/10.1016/j.sbspro.2012.09.1182>
- [23] World Bank Group (2009) Sri Lanka-Sustainable Tourism Development Project: Environmental Assessment: Social Management Framework (SMF) (English). World Bank Group, Washington DC. <http://documents.worldbank.org/curated/en/786731468334256860/Social-management-framework-SMF>
- [24] Feyers, S., Tolbert, S. and Altmann, M. (2017) Resolution 060: Improving Standards in Ecotourism Critical Analysis and Global Insights for IUCN Intervention in the

- Tourism Sector. Technical Report, November 2016–November 2017.  
[https://portals.iucn.org/library/sites/library/files/resrecrepattach/Feyers%2C%20Tolbert%2C%20Altmann\\_IUCN%20WCC-2016-RES-060%20Technical%20Report%2C%202017.pdf](https://portals.iucn.org/library/sites/library/files/resrecrepattach/Feyers%2C%20Tolbert%2C%20Altmann_IUCN%20WCC-2016-RES-060%20Technical%20Report%2C%202017.pdf)
- [25] Arachchi, R.S.S.W., Yajid, M.S.A. and Khatibi, A. (2015) Eco-Tourism Practices in Sri Lankan Eco Resorts: An Analysis of Satisfaction and Behavioral Intention of Eco-Tourists. *International Journal of Business and Social Science*, **6**, 211-226.  
[https://ijbssnet.com/journals/Vol\\_6\\_No\\_10\\_October\\_2015/19.pdf](https://ijbssnet.com/journals/Vol_6_No_10_October_2015/19.pdf)
- [26] Stronza, A. (2007) The Economic Promise of Ecotourism for Conservation. *Journal of Ecotourism*, **6**, 210-230. <https://doi.org/10.2167/joe177.0>
- [27] Pu, X., Tian, L. and Cheng, Z. (2018) Study on the Ecotourism Development in Dazhou. *Open Journal of Social Sciences*, **6**, 24-34.  
<https://doi.org/10.4236/jss.2018.65002>
- [28] Kumara, H.I.G.C., Wawwage, S., Yapa, L.G.D.S. and Karunarthne, M.L.M.S. (2017) Issues of Biopiracy vs Community Based Forest Management: A Case Study on in the Nilgala Forest Reservation (Sri Lanka). *Journal of Management Matter*, **4**, 27-45.  
<https://www.researchgate.net/publication/324123109>
- [29] Chin, C.L.M., Moore, S.A., Wallington, T.J. and Dowling, R.K. (2000) Ecotourism in Bako National Park, Borneo: Visitors' Perspectives on Environmental Impacts and Their Management. *Journal of Sustainable Tourism*, **8**, 20-35.  
<https://doi.org/10.1080/09669580008667347>
- [30] Kahveci, G., Ok, K. and Yılmaz, E. (2011) Ecotourism and Sustainable Development of Forests and Forest Villagers in Turkey.  
<http://www.fao.org/DOCREP/ARTICLE/WFC/XII/0708-A1.HTM>
- [31] Vipulan, P., Weng, C.N. and Ghazali, S. B. (2020) Evaluation of Tourism Policies in Relation to Ecotourism in Jaffna, Sri Lanka. In: Samat, N., Sulong, J., Pourya Asl, M., Keikhosrokiani, P., Azam, Y. and Leng, S.T.K., Eds., *Innovation and Transformation in Humanities for a Sustainable Tomorrow*, Vol. 89, European Publisher, Brussels, 759-767. <https://doi.org/10.15405/epsbs.2020.10.02.71>
- [32] Ministry of Tourism Development, Wildlife & Christian Religious Affairs (MTDW & CRA) (2019) Annual Performance Report 2018.  
<https://www.parliament.lk/uploads/documents/paperspresented/performance-report-department-of-wildlife-conservation-2018.pdf>
- [33] Atieno, L. and Njoroge, J.M. (2018) The Ecotourism Metaphor and Environmental Sustainability in Kenya. *Tourism and Hospitality Research*, **18**, 49-60.  
<https://www.jstor.org/stable/26366555>  
<https://doi.org/10.1177/1467358415619671>
- [34] Pathmasiri, E.H.G.C. and Bandara, T.W.M.T.W. (2019) Contradictory Conception and Implementation of Ecotourism in Sri Lanka. *International Journal of Research Publication*, **39**, 1-18. <http://ijrp.org/paper-detail/757>
- [35] Beaumont, N. (2001) Ecotourism and the Conservation Ethic: Recruiting the Uninitiated or Preaching to the Converted. *Journal of Sustainable Tourism*, **9**, 317-341.  
<https://doi.org/10.1080/09669580108667405>
- [36] Muttaqin, M.Z., Alviya, I., Lugina, M., Almuhayat, F. and Hamdani, U. (2019) Developing Community-Based Forest Ecosystem Service Management to Reduce Emissions from Deforestation and Forest Degradation. *Forest Policy and Economics*, **108**, Article ID: 101938. <https://doi.org/10.1016/j.forpol.2019.05.024>
- [37] Sofield, T. and Lia, S. (2011) Tourism Governance and Sustainable National Development in China: A Macro-Level Synthesis. *Journal of Sustainable Tourism*, **19**, 501-534.

- <https://doi.org/10.1080/09669582.2011.571693>
- [38] Fernando, S.L.J. and Shariff, N.M. (2013) Wetland Ecotourism in Sri Lanka: Issues and Challenges. *GEOGRAFIA Online™ Malaysian Journal of Society and Space*, **9**, 99-105.  
<http://journalarticle.ukm.my/6657/1/10ok.geografia-okt2013-fernando%26noresah-edam.pdf>
- [39] Clifton, J. and Benson, A. (2006) Planning for Sustainable Ecotourism: The Case for Research Ecotourism in Developing Country Destinations. *Journal of Sustainable Tourism*, **14**, 238-254. <https://doi.org/10.1080/09669580608669057>
- [40] McGahey, S. (2012) The Ethics, Obligations, and Stakeholders of Ecotourism Marketing. *Intellectual Economics*, **6**, 75-88.  
<https://ojs-dev.mruni.eu/ojs/intellectual-economics/article/viewFile/565/526>
- [41] Akurugoda, C.L. (2013) Bio Piracy and Its Impact on Bio Diversity: A Critical Analysis with Special Reference to Sri Lanka. *International Journal of Business, Economics and Law*, **2**, 268-275.  
<https://www.ijbel.com/wp-content/uploads/2014/07/Bio-Piracy-And-Its-Impact-On-Bio-Diversity-%E2%80%93-A-Critical-Analysis-With-Special-Reference-To-Sri-Lanka-C.L.Akurugoda.pdf>
- [42] Kumara, H.I.G.C. (2016) Challenges to Implementing Community Based Ecotourism (CBET) as a Bottom up Development Approach in the Sinharaja Rain Forest (Sri Lanka). Thesis, Doctor of Philosophy (PhD), University of Waikato, Hamilton.  
<https://researchcommons.waikato.ac.nz/handle/10289/9894>
- [43] Imran, Y., Wijekoon, N., Gonawala, L., Chiang, Y.C. and De Silva, K.R.D. (2021) Biopiracy: Abolish Corporate Hijacking of Indigenous Medicinal Entities. *The Scientific World Journal*, **2021**, Article ID: 8898842. <https://doi.org/10.1155/2021/8898842>
- [44] Poyyamoli, G. (2018) Ecotourism Policy in India: Rhetoric and Reality. *Grassroots Journal of Natural Resources*, **1**, 46-61.
- [45] Belsoy, J., Korir, J. and Yego, J. (2012) Environmental Impacts of Tourism in Protected Areas. *Journal of Environment and Earth Science*, **2**, 64-73.  
<https://core.ac.uk/download/pdf/234662989.pdf>
- [46] Kariyawasam, C.S., Kumar, L. and Ratnayake, S.S. (2020) Potential Risks of Plant Invasions in Protected Areas of Sri Lanka under Climate Change with Special Reference to Threatened Vertebrates. *Climate*, **8**, Article No. 51.  
<https://doi.org/10.3390/cli8040051>
- [47] Salpage, N., Aanesen, M. and Amarasinghe, O. (2020) Is the Sri Lankan Ecotourism Industry Threatened by Climate Change? A Case Study of Rekawa Coastal Wetland Using Contingent Visitation Approach. *Environment and Development Economics*, **25**, 226-243. <https://doi.org/10.1017/S1355770X19000391>
- [48] Boley, B.B. and Green, G.T. (2016) Ecotourism and Natural Resource Conservation: The “Potential” for a Sustainable Symbiotic Relationship. *Journal of Ecotourism*, **15**, 36-50. <https://doi.org/10.1080/14724049.2015.1094080>
- [49] Zeppel, H. (2012) Collaborative Governance for Low-Carbon Tourism: Climate Change Initiatives by Australian Tourism Agencies. *Current Issues in Tourism*, **15**, 603-626.  
<https://doi.org/10.1080/13683500.2011.615913>  
<https://pdfs.semanticscholar.org/75a6/fdfc7859f8ca66c8133f76dc29304bb7bbea.pdf>
- [50] Stem, C.J., Lassoie, J.P., Lee, D.R., Deshler, D.D. and Schelhas, J.W. (2003) Community Participation in Ecotourism Benefits: The Link to Conservation Practices and Perspectives. *Society & Natural Resources*, **16**, 387-413.  
<https://doi.org/10.1080/08941920309177>

- [51] Sharmini, A.A. and Bandusena, P. (2020) Ecotourism Influences on the Livelihood of Local Community in Sri Lanka—With Special Reference to Ella. *Journal of Tourism Economics and Applied Research*, **4**, 98-118. <http://jtear.uoctourism.com/publication/2020volume2/eco.pdf>
- [52] Rathnayake, M.V.R.M.S. (2015) Negative Environmental Impacts of Tourism in Unawatuna Beach Area. <http://repository.kln.ac.lk/bitstream/handle/123456789/13623/SV.139-152.pdf?sequence=1>
- [53] Ministry of Mahaweli Development and Environment (MOMD&E) (2016) National Biodiversity Strategic Action Plan 2016-2022. Biodiversity Secretariat, Ministry of Mahaweli Development and Environment, Colombo, 284 p. <https://www.cbd.int/doc/world/lk/lk-nbsap-v2-en.pdf>
- [54] Ranagalage, M., Gunarathna, M.H., Surasinghe, T., Dissanayake, D., Simwanda, M., Murayama, Y., Morimoto, T., Phiri, D., Nyirenda, V.R., Premakantha, K.T. and Sathurusinghe, A. (2020) Multi-Decadal Forest-Cover Dynamics in the Tropical Realm: Past Trends and Policy Insights for Forest Conservation in Dry Zone of Sri Lanka. *Forests*, **11**, Article No. 836. <https://www.mdpi.com/1999-4907/11/8/836> <https://doi.org/10.3390/f11080836>
- [55] Wang, S., Heo, J., Yamada, N. and Hwang, S. (2009) Comparison of Ecotourism Policies and Implications for China's Ecotourism Development. *Journal of China Tourism Research*, **5**, 259-272. <https://doi.org/10.1080/19388160903152779>
- [56] Donohoe, H.M. and Needham, R.D. (2006) Ecotourism: The Evolving Contemporary Definition. *Journal of Ecotourism*, **5**, 192-210. <https://doi.org/10.2167/joe152.0>
- [57] Pathmasiri, E.H.G.C. (2017) Historical Evolution of Ecotourism Policy and Regulations in Sri Lanka. *International Journal of Multidisciplinary Research and Development*, **4**, 116-124. <https://www.researchgate.net/publication/319801485>
- [58] Morrow, J.S. (2021) Environmental Awareness in Ecotourism Destination Management in Mount Aso, Kumamoto, Japan. *International Journal of Research in Tourism and Hospitality*, **7**, 1-8. <https://doi.org/10.20431/2455-0043.0701001>
- [59] Adamu, A., Yacob, M.R., Radam, A., Hashim, R. and Adam, S.U. (2015) Economic Valuation of Ecotourism Resources in Yankari Game Reserve, Bauchi Nigeria. *Procedia Environmental Sciences*, **30**, 139-144. <http://creativecommons.org/licenses/by-nc-nd/4.0> <https://doi.org/10.1016/j.proenv.2015.10.025>
- [60] Weaver, D.B. and Lawton, L.J. (2007). Twenty Years on: The State of Contemporary Ecotourism Research. *Tourism Management*, **28**, 1168-1179. <https://doi.org/10.1016/j.tourman.2007.03.004>
- [61] Regmi, K.D. and Walter, P. (2016) Modernisation Theory, Ecotourism Policy, and Sustainable Development for Poor Countries of the Global South: Perspectives from Nepal. *International Journal of Sustainable Development & World Ecology*, **24**, 1-14. <https://doi.org/10.1080/13504509.2016.1147502>
- [62] Bunruamkaew, K. and Murayama, Y. (2012) Land Use and Natural Resources Planning for Sustainable Ecotourism Using GIS in Surat Thani, Thailand. *Sustainability*, **4**, 412-429. <https://doi.org/10.3390/su4030412>
- [63] Ministry of Tourism Development and Christian Religious Affairs (MOTD&CRA) (2017) Sri Lanka Tourism Strategic Plan 2017-2020. [https://www.sltta.gov.lk/storage/common\\_media/tourism-strategic-plan-2017-to-2020913160424.pdf](https://www.sltta.gov.lk/storage/common_media/tourism-strategic-plan-2017-to-2020913160424.pdf)
- [64] Ministry of Tourism Development, Wildlife & Christian Religious Affairs (MOTD

- & WCRA) (2019) Sri Lanka Tourism Strategic Plan 2017-2020. <https://sltda.gov.lk/en/sri-lanka-tourism-strategic-plan-2017---2020017-2020>
- [65] Shoo, R.A. and Songorwa, A.N. (2013) Contribution of Ecotourism to Nature Conservation and Improvement of Livelihoods around Amani Nature Reserve, Tanzania. *Journal of Ecotourism*, **12**, 75-89. <https://doi.org/10.1080/14724049.2013.818679>
- [66] Xu, J., Lü, Y., Chen, L. and Liu, Y. (2009) Contribution of Tourism Development to Protected Area Management: Local Stakeholder Perspectives. *International Journal of Sustainable Development & World Ecology*, **16**, 30-36. <https://doi.org/10.1080/13504500902757189>
- [67] Arachchi, R.S.S.W. (2014) Perception of the Eco Tourism Concepts and Its Practices in the Hotel Industry: The Case in Eco Resorts in Sri Lanka. *Wayamba Journal of Management*, **3**, 30-43. <https://doi.org/10.4038/wjm.v3i2.7442> <https://wjm.sljol.info/articles/10.4038/wjm.v3i2.7442/galley/5749/download>
- [68] IUCN (2014) Integrating Business Skills into Ecotourism Operations Programme. <http://docplayer.net/156993956-Integrating-business-skills-into-ecotourism-operations-training-workshop-summary.html>
- [69] Climate Change Secretariat, Ministry of Environment in Sri Lanka (2010) Sector Vulnerability Profile: Biodiversity and Ecosystem Services. [http://www.climatechange.lk/adaptation/Files/Biodiversity\\_SVP\\_Nov-16-2010.pdf](http://www.climatechange.lk/adaptation/Files/Biodiversity_SVP_Nov-16-2010.pdf)
- [70] Matheus, F.S. and Raimundo, S. (2017) The Results of Ecotourism Policies in Protected Areas in Brazil and Canada. *Brazilian Journal of Tourism Research*, **11**, 454-479. <https://doi.org/10.7784/rbtur.v11i3.1336>
- [71] Auesriwong, A., Nilnoppakun, A. and Paraweck, W. (2015) Integrative Participatory Community-Based Ecotourism at Sangkhom District, Nong Khai Province, Thailand. *Procedia Economics and Finance*, **23**, 778-782. [https://doi.org/10.1016/S2212-5671\(15\)00529-8](https://doi.org/10.1016/S2212-5671(15)00529-8)
- [72] Aciksoz, S., Bollukcu, P. and Celik, D. (2016) Ecotourism and Ethics in Protected Areas: Bartin-Sogutlu Village. *Oxidation Communications*, **39**, 3621-3636. <https://acikerisim.bartın.edu.tr/handle/11772/4830>
- [73] Shanika, W.R.M.S. (2019) Re-Examination of the Tourism Act of Sri Lanka through the Lens of Eco-Tourism; a Third World Country Perspective. *International Journal of Business, Economics and Law*, **19**, 43-53. [https://www.ijbel.com/wp-content/uploads/2019/10/LAW\\_49.pdf](https://www.ijbel.com/wp-content/uploads/2019/10/LAW_49.pdf)
- [74] Bandara, R. (2009) The Practice of Ecotourism in Sri Lanka: An Assessment of Operator Compliance towards International Ecotourism Guidelines. *South Asia Economic Journal*, **10**, 471-492. <https://doi.org/10.1177/139156140901000209> <https://www.researchgate.net/profile/...ecotourism.../100.pdf>
- [75] Kumara, H. (2017) Challenges of Biopiracy: Implementing Community Based Ecotourism (CBET) in the Sri Lankan Context. *Journal of Tropical Forestry and Environment*, **6**, 36-49. <https://doi.org/10.31357/jtfe.v6i2.2941>
- [76] United Nations Office on Drugs and Crime (UNODC) (2020) World Wildlife Crime Report 2020: Trafficking in Protected Species. [https://www.unodc.org/documents/data-and-analysis/wildlife/2020/World\\_Wildlife\\_Report\\_2020\\_9July.pdf](https://www.unodc.org/documents/data-and-analysis/wildlife/2020/World_Wildlife_Report_2020_9July.pdf)
- [77] Mulqueeny, K.K., Cordon, F. and Joy, J. (2014) Third ASEAN Chief Justices' Roundtable on Environment: ASEAN's Environmental Challenges and Legal Responses—The Proceedings. Asian Development Bank, Mandaluyong. <http://hdl.handle.net/11540/2914>