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TRENDS AND POTENTIAL OF ECO-TOURISM DEVELOPMENT IN UTTARAKHAND HIMALAYA

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Abstract

This paper examines the trends and potential of eco-tourism development in the Uttarakhand Himalaya by analysing both the potential of eco-tourism development and eco-tourism resource base. Data were gathered from the Uttarakhand Forest Statistical Diary 2017-18 and the Uttarakhand Eco-Tourism Corporation, Dehradun, respectively. The trends of eco-tourists' inflow in NPs and WLSs and revenue earned from it were examined. The key results from the data analyses depict that the Uttarakhand Himalaya has plenty of eco-tourism resource bases – six national parks (5006.76 km^2), seven wildlife sanctuaries (2683.73 km^2), and four conservation reserves (212.54 km^2) along with rich faunal, floral, and avifaunal diversity. These resource bases have significant potential for eco-tourism development. The trends of eco-tourists' inflow in the NPs and WLSs are increasing, mainly domestic tourists (r^2= 0.941). However, in comparison to natural and pilgrimage tourism, eco-tourists' inflow is low. In terms of the annual growth rate of eco-tourists' inflow, it has been decreasing (r^2=0.168). The main reasons for decreasing growth rate of eco-tourists' inflow were remoteness, fragile landscape, rugged terrain, geo-hydrological hazards, lacking infrastructural facilities – transportation, accommodation, and institutional support in eco-tourism destinations. This study recommends policy measures for eco-tourism development in the Uttarakhand Himalaya through the creation of eco-tourism circles, development of eco-tourism parks, and providing adequate infrastructural facilities – transportation, accommodation, institutions, and communication.

Keywords: Eco-tourism, national parks, wildlife sanctuaries, trends, eco-tourists' inflow, Uttarakhand Himalaya.

Introduction

The Republic of India has significant potential for eco-tourism development as it has a rich biodiversity, national parks (NPs), wildlife sanctuaries (WLSs), and conservation reserves (CRs), spreading in 23% of its total geographical area (ISFR 2017). These NPs, WLSs, and CRs are world-famous and the major eco-tourism destinations. The Himalaya, located in the north and northeast part of India, has been a centre of attraction for nature lovers for centuries. It has varied and spectacular forest landscapes in the forms of alpine grasslands, the highland coniferous forests, mixed-oak forests in the middle-higher region, pine forests in the middle Himalaya, and mixed-deciduous monsoon forests in the river valleys and plain regions., Above 70% geographical area is forested, with a rich faunal, floral, and avifaunal diversity, therefore, the Himalaya is known as one of the biodiversity hotspots of the world. The four Himalayan states of India – Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh and two union territories – Jammu and Kashmir and Ladakh have 25 protected areas as NPs and WLSs with 15,916 km^2, which is 7.6% of the total geographical area (Bhatnagar et al. 2001).

The state of Uttarakhand, an integrated part of the Himalaya and the world-famous eco-tourism destination, has distinct physical features – snow-clad Himalaya, perennial lakes within forest areas, rolling alpine meadows, exotic wildlife, dense forests, and wetland habitats. It supports rich biodiversity in the forms of NPs and WLSs and varied panoramic forest landscapes from the plain regions to Shivalik hills, middle Himalaya, and the snow-capped Himalayan ranges. The Uttarakhand Himalaya has a diversified climate, varies along the altitudes, and accordingly, the faunal, floral, and avifaunal resources vary. Tourism is one of the important service sectors in Uttarakhand. It ranks 12th in the global tourism ranking (Sati, 2013, 2015, 2018) and shares a total of 52% Gross State Development Product (SGDP). Tourism practices vary from pilgrimage tourism to natural tourism, adventurer tourism, and eco-tourism. However, pilgrimage tourism is practiced largely, followed by natural tourism, and adventurer tourism. Eco-tourism is in its initial stage and has yet to be developed. In the meantime, the forest landscape and climate support eco-tourism development in the Uttarakhand Himalaya.

Keeping the spectacular forest landscape in mind, the State Government initiated the development of eco-tourism in Uttarakhand. It has formed an Eco-tourism Development Corporation (ETDC) under the Companies Act of 2013. The main objective to form ETDC was to promote eco-tourism in the state, under the presence of enormous resources related to eco-tourism development. The State Forest Department (SFD) established an 'Eco-tourism Wing' to promote eco-tourism in the NPs, WLSs, and CRs. The eco-parks are also being developed by the SFD for eco-tourism. Even though the state has immense scope for eco-tourism, it is lagging in its development. About 70% of the total population of Uttarakhand lives in rural areas. Their habitats are located in and around the forest areas, upon which the livelihood of the people is dependent, apart from the traditional agriculture and livestock rearing. The development of eco-tourism in rural areas, therefore, will enhance rural livelihoods.

Many scholars researched various themes of eco-tourism in the Uttarakhand Himalaya. Strategy for eco-tourism development (Bagri 1994; Bansal and Kumar 2011; Bhattacharya et al 2011), the concept of eco-tourism, eco-tourism and nature conservation (Bisht and Negi 1998), eco-tourism and environmental sustainability (Gupta and Goel 1998), and eco-lodges role in integration and development (Bagri et al 1997; Kandari and Gusain 2001; Gurung 1995) were among the prominent themes of research. Joshi (2011) described eco-tourism planning and management and Jaini et al (2012) illustrated the practice of tourism in eco-tourism destinations. However, no systematic study was conducted on eco-tourism development (ETD) in the Uttarakhand Himalaya. This study examines the trends and potential of ETD in the Uttarakhand Himalaya in general and in the selected NPs and WLSs in particular. It analyses the trends of eco-tourists' inflows – domestic and foreign tourists, income earned from eco-tourism, and the development of eco-tourism circles and eco-parks. The study suggests policy measures for ETD in the Uttarakhand Himalaya, which will conserve biodiversity resources and will support economic development.

Concept of Eco-tourism Development

The concept of 'Eco-tourism' came into existence in the 1980s to promote sustainable tourism in natural, forest, and cultural areas. It revolves around recreation, which is both nature-based and sustainable. Eco-tourism is believed to be a new name of tourism, which was practiced in natural locales (Wall 1994) in the past. The eco-tourism is termed 'Responsible Tourism', because of its multifaceted nature such as examining the impact of tourism on the environment, community participation in eco-tourism development, and conservation of nature (Black 1996). It also involves imparting education for conservation of the natural environment and ecosystem management (Ballantine and Eagles 1994; Blarney 1995; Bottrill and Pearce 1995; Buckley 1994). The International Eco-tourism Society (TIES) also considers eco-tourism as 'Responsible Tourism' for its nature of conserving the environment and improving the quality of life of the local people. Eco-tourism can also be equated to alternative tourism, green tourism, ecological tourism,

and sustainable tourism (Butler 1980). It controls tourists' inflow in natural areas and frames and implements policies for the conservation of the natural environment and biodiversity (Singh et al, 2009). The community people support eco-tourism for both creations of economic options and conservation of natural habitats (biodiversity resources) and water (Bookbinder et al 1998). Eco-tourism is an important form of nature-based tourism, which not only helps in conserving the natural environment but also supports rural livelihoods through augmenting jobs, generating revenues (World Bank 2018; WTTC 2017; UNWTO 2013, TugbaKiper 2013), and preserving the cultural heritage (WTO 2018; GoI, 2008). It is a market-based approach to the conservation of NPs, WLSs, and CRs (Vaccaro et al 2013), under which, all are benefitted – the environment, local people, and tourists. Eco-tourism also offers tourists a sense to conserve natural habitats, biodiversity resources, tourism, adventure tourism, extreme sports, and agro-forestry in NPs and WLSs.

The eco-tourism resource base and the support system model is described in Figure 2, in which two bases of eco-tourism development are given. The first one is a natural base under which flora, fauna, avifauna, and wetlands are presented. The second is the cultural base – cultural and historical (tangible) and indigenous and rural culture (intangible). Among the support system – transportation, accommodation, and institutional are shown, which are manmade. The role of the State Forest Department (SFD), Eco-tourism Development Corporation (ETDC), and Community Participation (CP) in eco-tourism development is noteworthy.

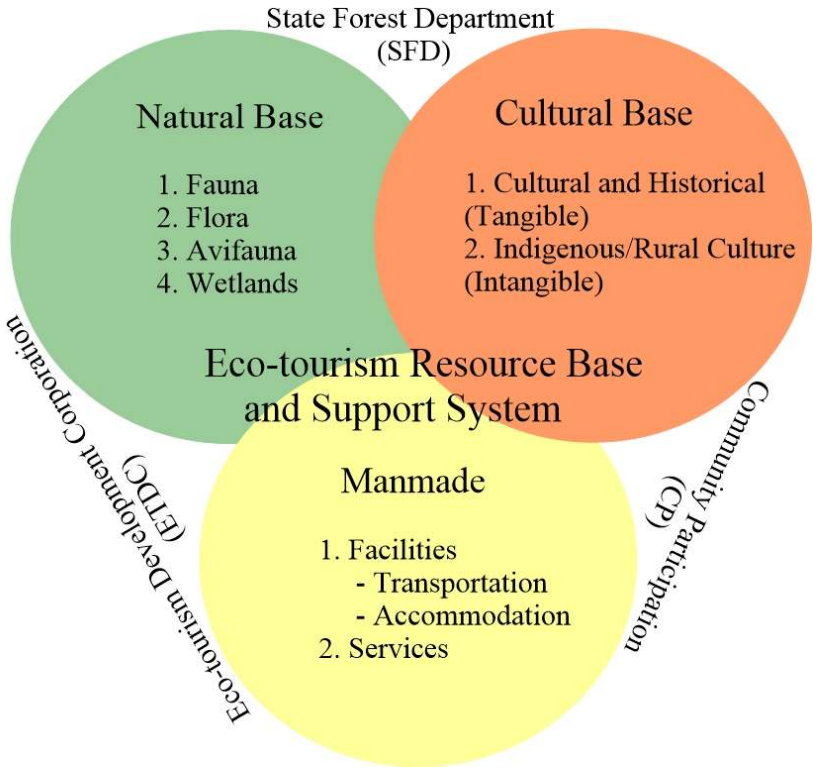

Figure 1: Eco-tourism resource base and support system

The Study Area

The Uttarakhand Himalaya is located in the north part of India and is also known as the Indian Central Himalayan Region (ICHR). Tibet (China) in the north, Nepal in the east, Uttar Pradesh in the south, and Himachal Pradesh in the west delimit its international and national boundary, respectively (Figure 2). The State stretches between 28°43' N to 31°28' N and 77°34' E to 81°03' E, with a total area of 53,483 km^2, which is 1.63% of the country's geographical area. Forest covers 63.41% of area (FSI 2019), spreads in three-dimensional forest landscapes with rich biodiversity.

The state has a total of six NPs, seven WLSs, and four CRs. The Corbett National Park (CNP), Sona Nadi Wildlife Sanctuary (SNWLS), Binsar Wildlife Sanctuary (BWLS), Raja Ji National Park (RJNP), the Valley of Flowers National Park (VFNP), Nanda Devi National Park (NDNP), Kedarnath Wildlife Sanctuary (KWLS), Gangotri National Park (GNP), and Govind Wildlife Sanctuary (GWLS) are the major parks and sanctuaries stretch in the Uttarakhand Himalaya. Besides, four other parks and sanctuaries – Govind National Park (GNP), Mussoorie Wildlife Sanctuary (MWS), Askot Wildlife Sanctuary (AWLS), and Nandhor Wildlife Sanctuary (NWLS) are also located in the Uttarakhand Himalaya. Four CRs – Nanda Devi Bird Conservation Reserve, Pawalgarh Conservation Reserve, Jhilmil Tal Conservation Reserve, and Asan Conservation Reserve stretch in four forest divisions – Nainital Forest Division, Ramnagar Forest Division, Haridwar Forest Division, and Chakrata Forest Division of the state, respectively. These NPs, WLSs, and CRs obtain a total of 7,903 km2 area (14.8% of the geographical area), of which, the NPs occupy a total of 5007 km2 area, WLSs has 2684 km2 area, and the CRs possess 212 km2 area. The oldest national park is CNP, which was established in 1936 with an area of about 520.82 km2 spread in two districts – Pauri and Nainital. The GWLS, the newest one, was established in 1990, situated in Uttarkashi district. The Forest types vary from monsoon deciduous, pine forests, mixed-oak forests, coniferous forests, and alpine grasslands. Uttarakhand has a total of 10.09 million populations, which represents India's 0.83% population (COI 2011).

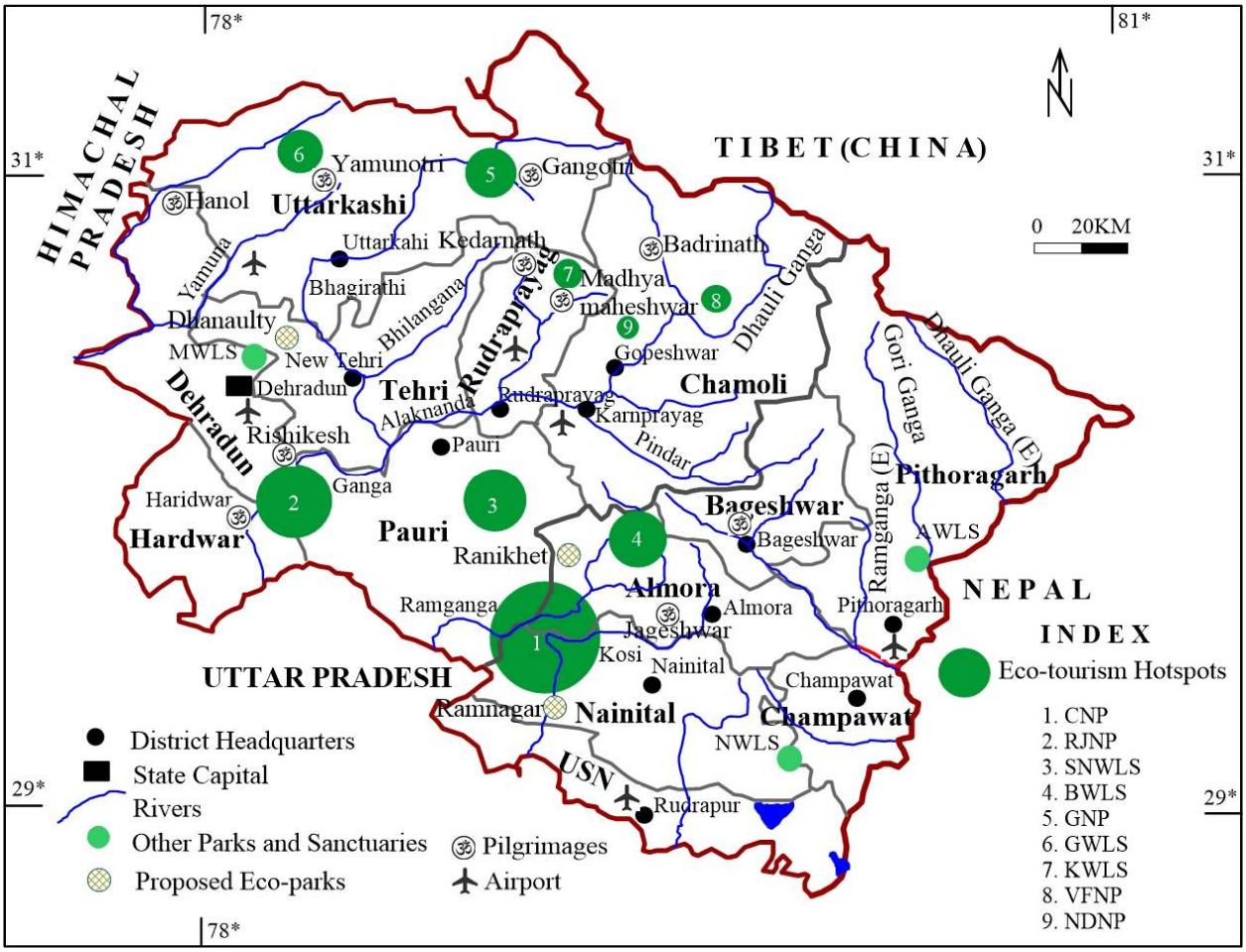

Figure 2: Location map of Uttarakhand Himalaya showing eco-tourism hotspots. The size of circles is as per the number of eco-tourists' inflow in 2018

Methodology

Source of Data

The data were gathered both from secondary and primary sources. The secondary data were collected from the 'Uttarakhand Forest Statistical Diary' (UFSD) 2017-2018, published by SFD, Dehradun, and from ETDC. Firstly, detailed data about the eco-tourism resource base (Potentiality) such as area, major faunal, floral, and avifauna species, and location and accessibility of NPs, WLSs, and CRs were collected. Further, data on the infrastructural facilities – transportation, accommodation, and institutional availability in the NPs and WLSs were gathered. Secondly, data on eco-tourists' inflow – domestic and foreign – in NPs and WLSs, from 2000 to 2018, were gathered from the state ETDC. The revenue earned by eco-tourism from all NPs and WLSs was gathered separately during the reported period and from the same source. Primary data on infrastructural facilities in the eco-tourism destinations were gathered by a participatory approach. The author visited the eco-tourism destinations and interviewed 50 employees working in NPs and WLSs about the infrastructural facilities available in the eco-tourism destinations.

Data Analysis

The collected data – secondary and primary sources – were analysed. Descriptive statistics – minimum, maximum, and mean value and standard deviation were used for describing eco-tourists' inflow and revenue earned. The score-rank method was used to provide ranking to NPs and WLSs on the basin of infrastructural facilities – transportations, accommodation, and institutional. Indices and levels were used to describe eco-tourists' inflow – domestic and foreign in the NPs and WLSs and revenue earned from it. A linear regression approach was also applied to illustrate eco-tourists' inflow and income earned during the reported period.

A detailed description of biodiversity resources – fauna, flora, and avifauna were presented. A location map of the study area was constructed in which, all the basic information was shown. Eco-tourism hotspots were identified based on eco-tourists' inflow in NPs, WLSs, and CRs. The trends of eco-tourists' inflow from 2000 to 2018 were analysed and growth in eco-tourists' inflow was observed. A correlation between eco-tourists' inflow and revenue earned from them in NPs and WLSs was carried out. The eco-tourist circles were identified and eco-parks in three places – Ramnagar, Ranikhet, and Dhanaulty were proposed.

Trends of Eco-tourists' Inflow in NPs and WLSs

Time series data (from 2000 to 2018) on trends of eco-tourists' inflow in NPs and WLSs were gathered from UFSD and ETDC. The eco-tourists were identified as domestic and foreigners and their inflow during the period was analyzed. The details are as follows:

Trends of Domestic Eco-tourists' Inflow

Domestic eco-tourists' inflow in the NPs and WLSs from 2000 to 2018 was analyzed (Figure 3). The trend was noticed increasing with a R^2 value of 0.930. In 2001, tourists' inflow was 60,000, which increased to more than 400,000, with an increase of 7% in 2018. However, the variability in eco-tourists inflow varied from year to year. In 2006, 2011, and 2014, the eco-tourists' inflow has decreased. The highest decrease in eco-tourists' inflow was noticed in 2011. In the meantime, a total of 3,869,280 tourists visited in NPs and WLSs from 2000 to 2018.

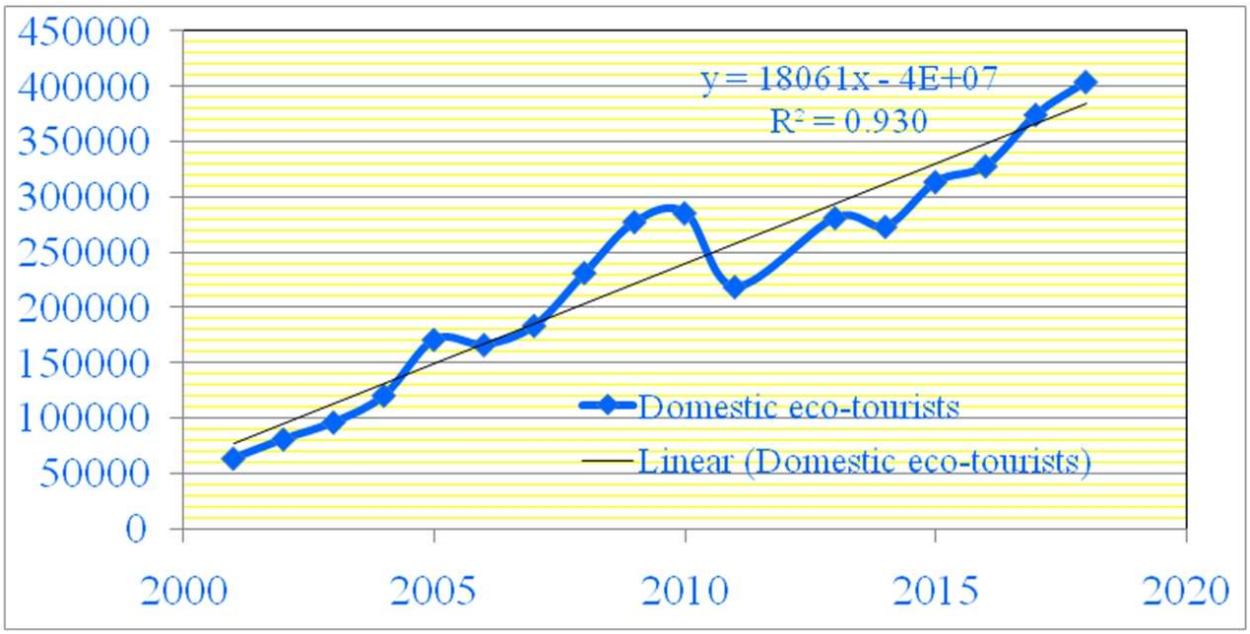

Figure 3: Trends of domestic eco-tourists' inflow

Trends of Foreign Eco-Tourists' Inflow

The trend of foreign tourists' inflow is shown in Figure 4. Out of the total tourists who visited in NPs and WLSs, foreign tourists' shared only 4.72%. The trend has been noticed increasing with a 0.209 R^2 value. The foreign tourists' inflow was 4,500 in 2001, which increased to 14,000 in 2018 with an increase of 32.14%. The inflow was the highest in 2008, which were 16,500 numbers. In 2009, there was a slide decrease in tourists' inflow. After 2010, it continues to decline up to 2015, which decreased from 16,000 to 9000 number eco-tourists during the period. After 2015, the trend was continually increasing with a slide decrease in 2017. Overall, the trend of foreign tourists' inflow was highly variable and changeable.

The important reasons for the low inflow of foreign eco-tourists in the eco-tourism destinations in Uttarakhand are lagging in transportation, accommodation, and institutional facilities. Most of the NPs and WLSs are located in remote areas, where geo-hydrological hazards are very active. The landscape is fragile, and the terrain is rugged. The domestic eco-tourists can adjust to the local environment and manage their visit without substantial facilities. However, the foreign eco-tourists avoid visiting these places and therefore, their inflow is comparatively less.

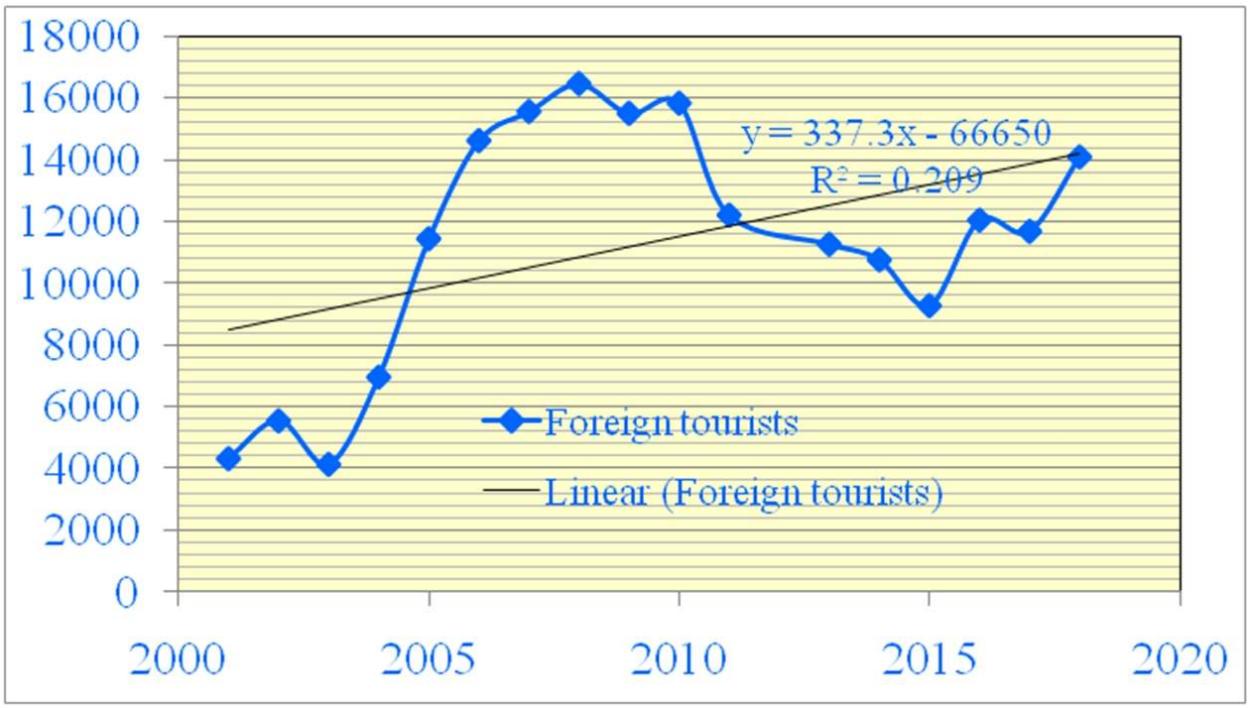

Figure 4: Foreign eco-tourists' inflow in NPs and WLSs

Growth in Eco-tourists' Inflow

The growth in eco-tourists' inflow in NPs and WLSs was analyzed (Figure 5). It has been noticed that tourists' inflow varied from year to year with its declining growth, the R^2 value of which was 0.150. During the period from 2001 to 2018, there were a decrease and increase in the number of times. The highest increase of 43.2% was noticed in 2004-2005, followed by 27.3% in 2001-2002, 27.1% in 2003-2004, 26.72% in 2012.2013, and 24.51% in 2007-2008. A decrease of 23.37% in tourists' inflow was noticed in 2010-12. In 2013-14, the decrease in tourists' inflow was 4% and in 2005-2006, it was 2%. Although the cumulative number in tourists' inflow has been increasing yet growth rate has declined. The tourists' inflow in 2000-2001 was 67,776, which increased to 418,395 in 2017-2018.

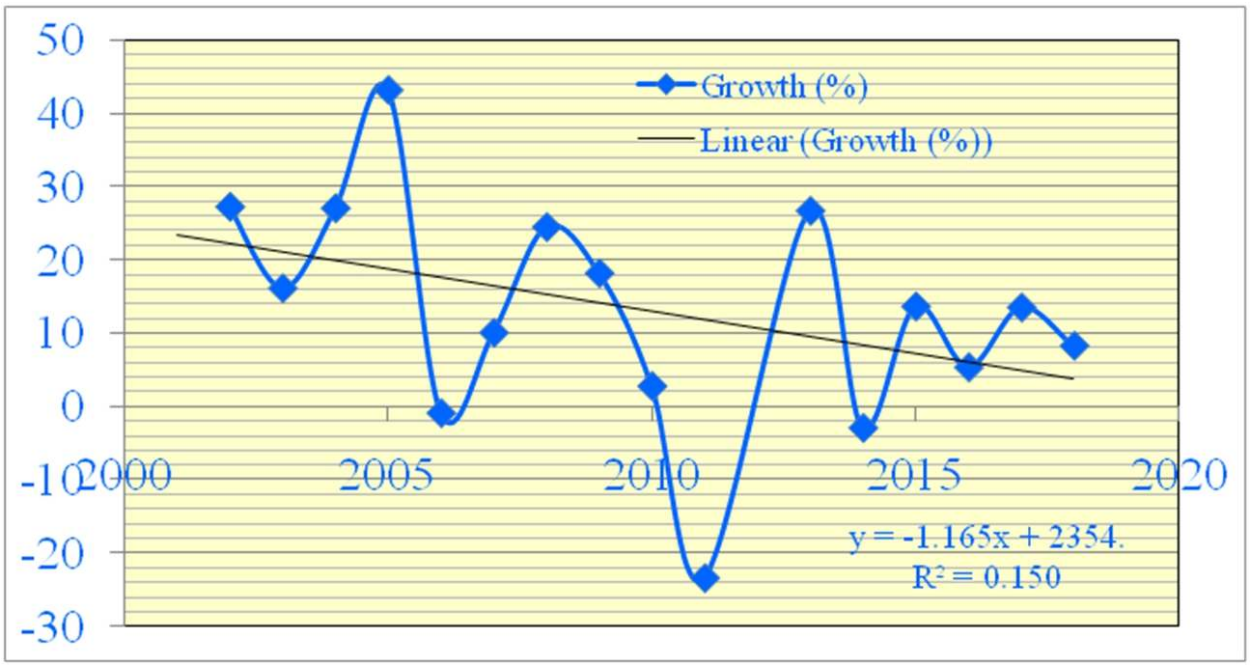

Figure 5: Growth in eco-tourists' inflow (in %) from 2001-2018

Revenue Earned and Eco-tourists' Inflow in Different NPs and WLSs

Data on revenue earned from eco-tourists who visited the NPs and WLSs in 2000-2018 were analyzed. It was observed that the trend has been increasing with the 0.966 R^2 value. In 2000, a total of Rs 4 million revenues were earned from eco-tourism, which was increased to Rs. 120 million in 2018 (Rs. 116 million increase). The growth rate was the highest between 2009 and 2011, and between 2011 and 2012, the growth rate slightly decreased.

Out of the total 404,306 domestic eco-tourists who visited all the case studies, NPs, and WLSs from 2001-2018, the highest inflow (59.37%) of eco-tourists visited CNP, followed by 14.30% eco-tourists who visited RJNP. The other NPs and WLSs received significantly fewer eco-tourists. A total of 14,089 foreign eco-tourists visited NPs and WLSs, which was 3.37% of the total eco-tourists' inflow. Out of which, the highest inflow was in the two NPs – CNP (47.05%) and RJNP (26.08%). For the other NPs and WLSs, the inflow was significantly less. Revenue earned from the eco-tourists in these NPs and WLSs was Rs. 1168.1 Lakh from 2001 to 2018, of which, the highest revenue was earned by CNP (70.37%), followed by RJNP (11.04%). The other NPs and WLSs have earned less than 20% revenue (Figure 6).

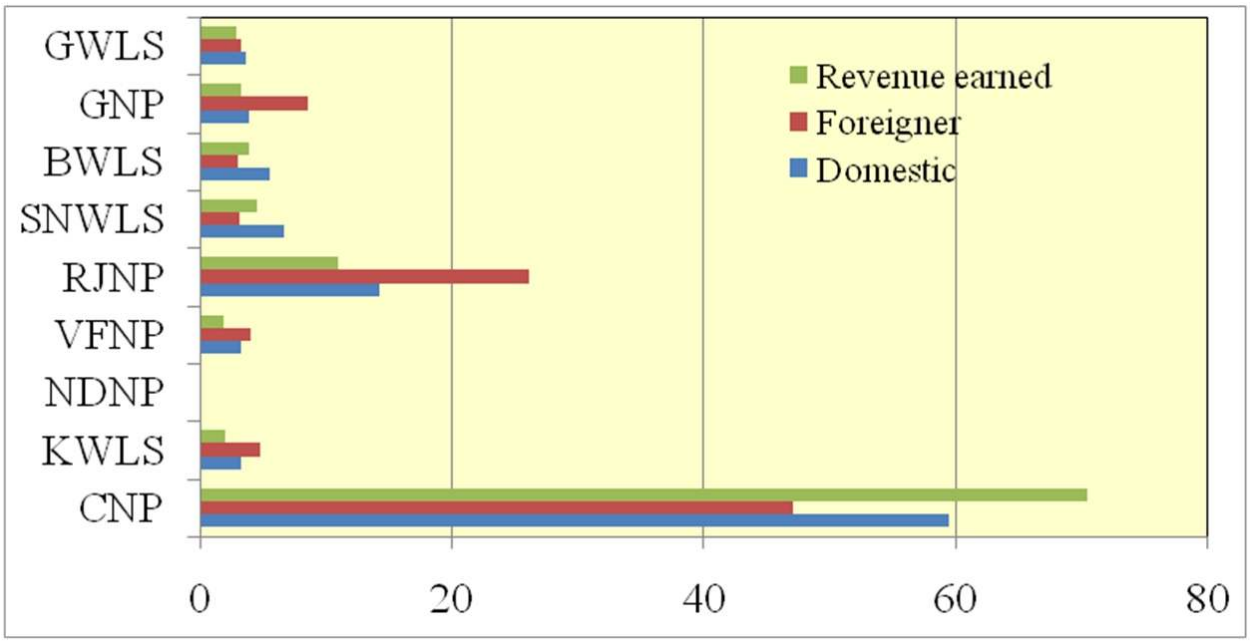

Figure 6: Revenue earned from eco-tourists at NPs and WLSs level

Domestic and foreign eco-tourists and revenue earned from both was indices and levels were given to each NPs and WLSs (Table 1). The high domestic eco-tourists' inflow was noted in CNP, which was >40%, followed by 10-40% (medium) eco-tourists' inflow in RJNP. All other parks have low domestic eco-tourists' inflow, which is <10%. Similarly, in terms of foreign eco-tourists' inflow, the CNP and RJNP had the same status as it was of domestic eco-tourists. The same trend followed in revenue earned from eco-tourists both domestic and foreign. The high revenue was earned by CNP, and medium revenue was earned by RJNP. Others have earned low revenue.

Table 1: Share of eco-tourists' inflow and revenue earned in selected NPs and WLSs

Indices	Levels	Tourists' inflows
Domestic eco-tourists' inflow (Total 404306)		
>40%	High	CNP
10-40%	Medium	RJNP
<10%	Low	SNWLS, BWLS, GNP, GWLS, KWLS, VFNP, NDNP
Foreign eco-tourists' inflow (Total 14089)		
>40%	High	CNP
10-40%	Medium	RJNP
<10%	Low	GNP, KWLS, VFNP, GWLS, SNWLS, BWLS, NDNP
Revenue earned (Total Rs. 116.81 million Rupees)		
>40%	High	CNP
10-40%	Medium	RJNP
<10%	Low	SNWLS, BWLS, GNP, GWLS, KWLS, VFNP, NDNP

Minimum, Maximum, and Mean Value of Eco-tourists' Inflow

Descriptive statistics of eco-tourists' inflow in 18 years were analyzed and the minimum, maximum, mean value and standard deviation were noticed (Table 2). The mean value of domestic eco-tourists' inflow in all the parks and sanctuaries was 227,605 with 63,440 minimum values and 404,306 maximum values. The number of foreign tourists was significantly less with a mean value of 11,282. The minimum value was 4,150 and the maximum value was 16,463. Revenue earned from eco-tourists was substantial with a mean value of 54.5 million rupees. The maximum revenue earned was 117.1 million and the minimum revenue earned was 8.5 million.

Table 2: Eco-tourists' inflow in parks and sanctuaries (n=18)

Variables	Minimum	Maximum	Mean	Std. Deviation
Domestic tourists	63440	404306	227605	102311
Foreign tourists	4150	16463	11282	4023
Total tourists	67776	418395	238886	104743
Revenue earned (lakh)	8.5	117.1	54.5	39.6

Potential of Eco-Tourism Resource Base

The Uttarakhand Himalaya has a rich eco-tourism resource base (Table 3) – suitable and varied climate, spectacular three-dimensional forest landscapes, river valleys, middle latitudes, highlands, alpine meadows, glaciers, the snow-capped Himalaya, rapids, waterfalls, and rich biodiversity for the sustainable eco-tourism development (Sati 2020, 2019). As these NPs and WLSs are located in all physiological divisions and altitudes, therefore, they cover all types of forest landscapes and climates. Two world-famous national parks – CNP and RJNP are located in the Doon valley and *Tarai* region, which have a mainly flat surface with small hills. SNWLS and BWLS are located in the middle altitudes and all other NPs and WLS are located in the highland with a substantial proportion of land covered by snow (Figure 7).

The Uttarakhand Himalaya has rich biodiversity – faunal, floral, and avifauna (Figure 8). About 24 major species of fauna with a number of 145,295 wildlife are found here (SFD 2018). Forest diversity varies from sub-tropical monsoon deciduous forests (< 800 m) to pine forests (800 m-1800 m), mixed-oak forests (1800 m-2200m), coniferous forests (2200 m-2800m), and alpine grasslands (> 2800m). A report published by the Botanical Survey of India (BSI) stated that Uttarakhand has 4,700 flower plant species (25% of India's flowers) out of which, 93 are endemic species. Besides, a total of 487 species of fern and 18 species of gymnosperm are noted in the state. Uttarakhand has 221 wetlands found in both highlands and lowlands, besides numerous glacial-fed perennial rivers, which make the environment sound. The climatic conditions vary from the river valleys to middle altitudes, and highlands provide suitable conditions for eco-tourists in all eco-tourist destinations. Many world-famous river valleys and highland pilgrimages are located within the NPs and WLSs. Uttarakhand has a traditional society, rich culture, and cultural heritage. Folklores, fairs, and festivals, and traditional food and beverages have diversity, which further supports eco-tourism development in Uttarakhand.

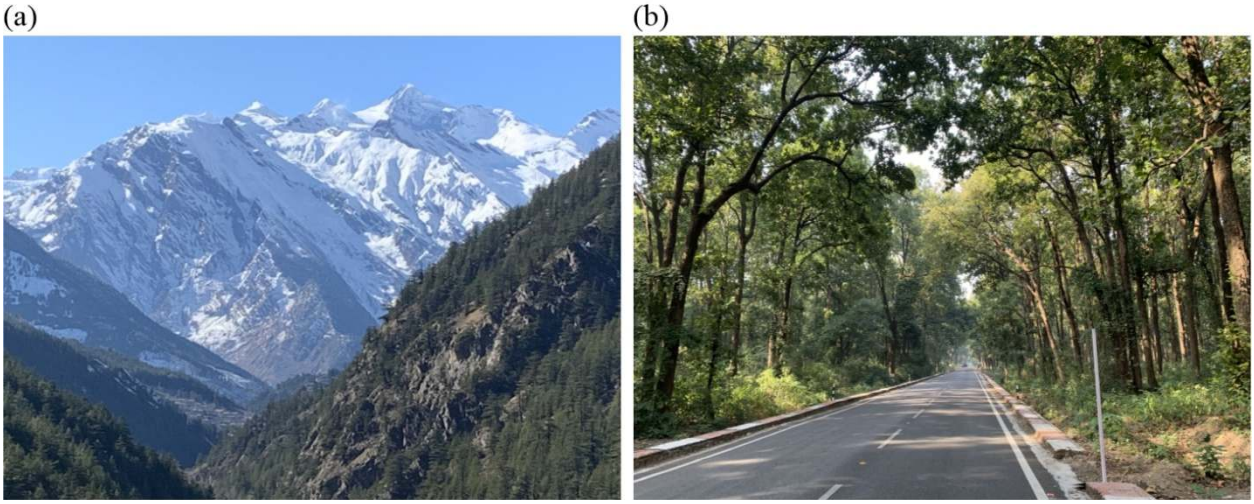

Figure 7: (a) Gangotri National Park (b) Raja Ji National Park

(a) (b)

Figure 8: (a) Chila Wildlife Sanctuaries (b) A herd of elephants in Chila Wildlife Sanctuaries

Table 3: Natural and cultural eco-tourism resource base in Uttarakhand

Parks/Sanctuaries	Natural base	Cultural base
CNP	Kosi River, beautiful landscape, and rich biodiversity, winters are feasible, and summers are hot, healthy air and water quality.	Rich culture and cultural heritage.
KWLS	Snow-capped Himalaya, numerous natural streams, Mandakini, Son, and Madhyamaheshwar rivers, waterfalls, rapids, and alpine meadows; winters are snow-capped, and summers are very feasible, healthy air and water quality.	Two highland pilgrimages – Kedarnath and Madhyamaheshwar.
NDNP	Panoramic landscape, waterfalls, rapids, streams, conducive climatic conditions – snow-capped in winter and feasible climate in summer, healthy air and water quality.	Rich culture and cultural heritage, Tungnath, Ukhimath, and Mandal are the cultural places.
VFNP	Spectacular landscape, snow-capped Himalaya, alpine meadows, rapids, waterfalls, high flower diversity, and healthy climate, winters are cold, and summers are feasible.	Hem Kund Sahib (the highland pilgrimage).
RJNP	The Ganga River flows through RJNP, winters are conducive, summers are hot.	Haridwar and Rishikesh are river valleys pilgrimages.
SNWLS	Moderate climate, spectacular landscape, Sona Nadi (river of gold) flows through this WLS	Rich and traditional rural culture
BWLS	Panoramic landscape and rich biodiversity	Rich culture and cultural heritage. Binsar is a folk deity and Jageshwar pilgrimage is located here.
GNP	Close to the greater Himalaya, perennial rivers, rapids, waterfalls, glaciers, alpine meadows, snow-capped during winter and cold during summer.	Gangotri and Gaumukh two highland pilgrimages.
GWLS	Close to the greater Himalaya, perennial rivers, rapids, waterfalls, glaciers, alpine meadows, snow-capped during winter and cold during summer.	Rich Jaunsari culture. Yamunotri and Hanol are pilgrimages.

Infrastructural Facilities

Infrastructural facilities play a significant role in the development of eco-tourism. Uttarakhand has 93% area mountainous, where the terrain is rugged and precipitous, and the landscape is fragile. The two parks – RJNP and CNP are well connected by air, train, and roadways. On the other hand, some NPs and WLSs are connected only by roadways. KWLS, GNP, and GWLS are remotely located, inaccessible can only be reached by trekking. Helicopter services are available in Kedarnath meanwhile, it is expensive. The accommodation facilities also vary, depending upon the accessibility and physical features of NPs and WLSs. Meanwhile, these facilities are lagging in eco-tourism destinations. As per the UFSD 2018, there are a total of 176 tourist rest houses (6164 beds), 4813 hotels and paying guesthouses (1560 beds), and 261 forest rest houses. The available accommodation facilities are insufficient to accommodate tourists, therefore, most of the tourists come back from NPs and WLSs on the same day, and therefore, revenue generation from eco-tourism is nominal.

A score-rank analysis of infrastructural facilities was carried out based on the physical features, accessibility, transportation, and accommodation (Table 4). Scores from 1 to 4 were given and based on it, the NPs and WLSs were given ranks. Two national parks – CNP and RJNP are ranked in the first position, followed by SNWLS. The BWLS has the third rank. Here, infrastructural facilities are similar to SNWLS (scored two in each variable) except accommodation, which scored two. The fourth rank was obtained by GWLS, where the score from physical features and accessibility was the least, whereas transportation and accommodation have scored two each. The KWLS and VFNP ranked fifth. Both had the least score in physical features, accessibility, and transportation whereas, in accommodation, they scored two. The other two – NDNP and GNP obtained the last rank sixth.

Table 4: Score-rank analysis of infrastructural facilities

Name	Score				Rank
	Physical Features	Accessibility	Transportation	Accommodation	
CNP	4	4	4	4	First
KWLS	1	1	1	2	Fifth
NDNP	1	1	1	1	Sixth
VFNP	1	1	1	2	Fifth
RJNP	4	4	4	4	First
SNWLS	2	2	2	3	Second
BWLS	2	2	2	2	Third
GNP	1	1	1	1	Sixth
GWLS	1	1	2	2	Forth

Index: Physical features: Mountainous with tough terrain = 1, Mountainous with normal terrain = 2, Partially mountainous = 3, and Plain = 4
Accessibility, Transportation, and Accommodation: Very low = 1, Low = 2, High = 3, Very high = 4

Correlation Among Infrastructural Facilities, Tourists' Inflow, and Revenue Earned

The correlation among infrastructural facilities, tourists' inflow, and revenue earned from eco-tourists was analyzed (Table 5). It was noticed that infrastructural facilities – accessibility, transportation, and accommodation – are directly associated with eco-tourists' inflow. The eco-tourists' inflow is high in the areas where infrastructural facilities are substantial. Further, with an increase in the number of eco-tourists in NPs and WLSs, revenue earned was high with R^2 value of 0.992. The role of physical features is significant in determining eco-tourists' inflow. It was noticed that the eco-tourists' inflow was less in areas, which have tough physical features.

Table 5: Correlation between infrastructural facilities, tourists' inflow, and revenue earned

Variables	Correlation methods	(TI)	(R)	(P F)	(A)	(T)	(A)
Tourists' Inflow (TI)	Pearson Correlation	1	.996**	.772*	.772*	.758*	.709*
	Sig. (2-tailed)		.000	.015	.015	.018	.033
Revenue (R)	Pearson Correlation		1	.719*	.719*	.708*	.652
	Sig. (2-tailed)			.029	.029	.033	.057
Physical Features (PF)	Pearson Correlation			1	1.000**	.965**	.910**
	Sig. (2-tailed)				.000	.000	.001
Accessibility (A)	Pearson Correlation				1	.965**	.910**
	Sig. (2-tailed)					.000	.001
Transportation (T)	Pearson Correlation					1	.913**
	Sig. (2-tailed)						.001
Accommodation (A)	Pearson Correlation						1
	Sig. (2-tailed)						

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Discussion

This study described eco-tourism development in the Uttarakhand Himalaya. It has been observed that the Uttarakhand Himalaya has tremendous potential for eco-tourism development as it has abundant eco-tourism resource bases with high potentiality. Uttarakhand obtains a large area under forest cover, of which, 14.8% area comes under NPs and WLSs. The infrastructural facilities and landscape vary and therefore eco-tourists' inflow in these NPs and WLSs is not uniformed. For instance, two parks – CNP and RJNP are located in the plain regions with a maximum altitude is 500 m. They are well connected by roads, railways, and airways. Accommodation facilities are substantial. It is, therefore, the eco-tourists' inflow was the highest in these parks. Out of the total eco-tourists, more than 70% of eco-tourists visited CNP and RJNP in 2018. Further, SNWLS and BWLS are located in the middle Himalaya, which are moderately accessible, connected by roads and the physical features are feasible. Climate is quite suitable during the summer therefore the tourists' inflow is substantial. However, it was observed that the major drivers of eco-tourism development such as infrastructural facilities – transportation, accommodation, and institutions are lagging in most of the NPs and WLSs. They are inaccessible and their physical features are rugged and precipitous. Among them NDNP, VFNP, GNP, and GWLS are prominent. They are situated above 3000 m altitudes, close to the mighty snow-clad Himalaya with harsh climate and inaccessibility. Accommodation facilities in these areas are inadequate to facilitate the eco-tourists. Therefore, the eco-tourists' inflow in these NPs and WLSs is just negligible. It has been noticed that the inflow of domestic eco-tourists is quite high than the foreign eco-tourists. One of the reasons is that the domestic eco-tourists are well adapted to the terrain and climate of the highland and remotely located NPs and WLSs. They visit eco-tourism destinations comparatively frequently. Trekking in the highland NPs by domestic eco-tourists is an important means.

The other drivers, which are affecting eco-tourists' inflow in the Uttarakhand Himalaya, are geo-hydrological hazards. The tremendous decrease in eco-tourists' inflows in several years such as 2006, 2011, and 2014 was due to the geo-environmental hazards. Most of the NPs and WLSs is

located in the highlands, which are snow-capped during the winter, and during the monsoon season, heavy rain occurs, which limits the eco-tourists' inflow. Further, the landscape is highly vulnerable and ecologically fragile. Flash floods, debris flows, landslides, and mass movements are very frequent and intensive in NPs and WLSs. Eco-tourism activities are mostly unplanned. Poor solid waste management, poor road quality, fragile slopes along the roads, inadequate and poor quality of accommodation, lagging in rail and air connectivity, insufficient public convenience facilities, and poor health facilities are the drivers causing fewer eco-tourists' inflow and loss of biodiversity and environmental degradation (Kala 2012).

Policy measures for the development of eco-tourism in Uttarakhand need to be revised. Development of infrastructural facilities – transportation, accommodation, and communication; imparting training to tour and travel guides, service providers, and local people; conservation of nature – biodiversity, eco-tourism circles, and eco-parks; and community participation in the promotion of local food and beverages, promotion of local culture, and homestay in trekking routes are to be ensured and provided (Figure 9).

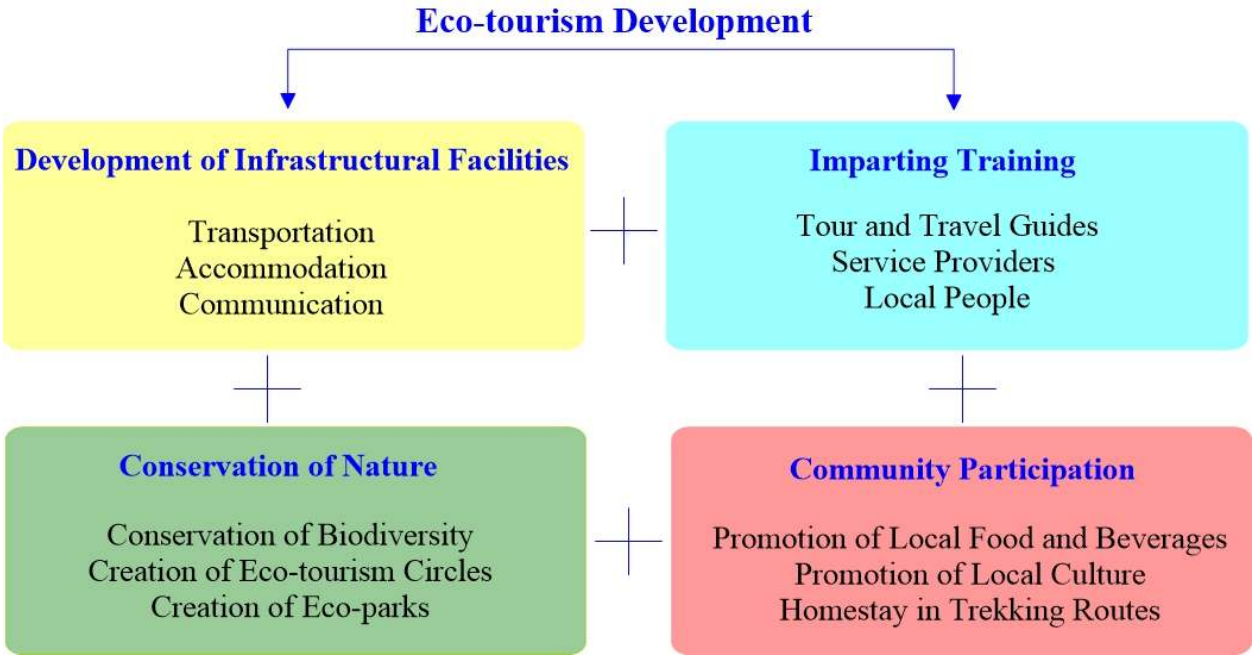

Figure 9: Policy measures for eco-tourism development

Given the suitable forest landscape for eco-tourism in Uttarakhand, eco-tourism circles can be developed. This initiative will lead to biodiversity conservation and economic development of the rural community. Four eco-tourism circles are identified – two each in Garhwal and Kumaon regions. In Garhwal region: Yamuna -Tons valley and Dehradun-Rishikesh-Tehri, and in the Kumaon region, Tanakpur-Champawat-Devidhura and Ramnagar-Almora-Nainital are prominent circles. There are three important eco-parks – Ramnagar, Ranikhet, and Dhanaulty, which can be developed as eco-tourism destinations. Further, reopening and the development of old trek routes in the forest areas are proposed. All these circles and old routes have rich biodiversity, and they cover the entire Uttarakhand state. For the development of eco-tourism circles, eco-parks, old routes, and carrying capacity analysis of eco-tourists destination need attention. The SFD and ETDC are the key institutions for eco-tourism development. Community participation in eco-tourism development is inevitable to conserve biodiversity resources and economic development.

Conclusions

This study revealed that the Uttarakhand Himalaya has rich biodiversity, and it is one of the biodiversity hotspots. It has spectacular three-dimensional forest landscapes, which provide suitable bases for eco-tourism development. However, eco-tourism development could not take shape because the eco-tourism resource bases are not harnessed sustainably. Therefore, harnessing eco-tourism resource bases sustainably for the development of eco-tourism is the need of the hours, which can augment employment and generate income for the local people and revenue to the state government. Conservation of wildlife in their habitat is important. The following suggestions can be given for eco-tourism development in the Uttarakhand Himalaya. Sufficient infrastructural facilities in terms of transportation, accommodation, and institutional can be provided in the eco-tourism destinations. Coordination among SFD, ETDC, and CP shall be ensured. The rich biodiversity shall be maintained with the help of the forest departments along with the development of eco-tourism activities. A proper development planning for eco-tourism shall be ensured with the help of CP for equitable distribution of benefits and socio-economic development of native people. For forest/nature-based eco-tourism viz. nature interpretation camps, nature camps, bird watching, and the nature tour programs shall be organized by SFD and ETDC with providing substantial facilities. Eco-tourism without harming nature and wild animals shall be ensured. Training shall be imparted to tour guides and local people on eco-tourism development. All these measures can support eco-tourism development in the Uttarakhand Himalaya.

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