

**Impact of Eco Tourism on Community Livelihood and Naturo-
Cultural Conservation: A Case Study of Khangchendzonga
Biosphere Reserve in Sikkim Region**

A Dissertation Submitted to

Sikkim University



In Partial Fulfilment of the Requirement for the
Degree of Master of Philosophy

By

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School of Professional Studies

July 2020



सिक्किम विश्वविद्यालय

(भारतीय संसद के अधिनियमद्वारा स्थापित केन्द्रीय विश्वविद्यालय)
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I, Namender Chandel, hereby declare that the research work embodied in the thesis entitled "Impact of Eco-tourism on Community Livelihood and Nature - Cultural Conservation: A Case Study on Khangchendonga Biosphere Reserve in Sikkim Region" submitted to Sikkim University for the award degree of Master of Philosophy, is my original work and it has not been submitted earlier to this or any other University for any degree.

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CERTIFICATE

This is to certify that M.Phil thesis titled “ **Impact of Eco-tourism on Community Livelihood and Naturo -Cultural Conservation: A Case Study on Khangchendonga Biosphere Reserve in Sikkim Region**” submitted to Sikkim University for the partial fulfillment of the degree of Master of Philosophy in the Department of Tourism, embodies the result of bonafide research work carried out by Namender Chandel under my guidance and supervision. No part of the Thesis has been submitted earlier to this or any other University for any degree.

All the assistance and help received during the course of investigation have been duly acknowledged by him.

I recommend this thesis to be placed before the examiners for evaluation.

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“Impact of Eco-tourism on Community Livelihood and Naturo –Cultural Conservation: A Case Study on Khangchendonga Biosphere Reserve in Sikkim Region”

Submitted by **Namender Chandel** under the supervision of **Dr Jigmie W. Bhutia**, Assistant Professor, Department of Tourism, School of Professional Studies, Sikkim University.

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ABBREVIATIONS

1. ASL Above Sea Level
2. CBT Community Based Tourism
3. ECOSS Ecotourism and Conservation Society of Sikkim
4. ENVIS Environment Information System
5. FEWMD Forest Environment and Wildlife Management Department.
6. FTA Foreign Tourist Arrivals
7. GBPNIHED G.B Pant National Institute of Himalayan Environment
8. GDP Gross Domestic Product
9. GSTC Global Sustainable Tourism Council
10. JFMC Joint Forest Management Committees
11. PA Protected Area
12. TIES The International Ecotourism Society
13. UNDP United Nations Development Programme
14. UNWTO United Nations World Tourism Organisation
15. WTTC World Travel and Tourism Council

CHAPTER 1

1.0 Introduction

Eco-tourism involves travel responsibly to natural areas with ecological attractions which promotes conservation ethics keeping in mind the well being of the local community. Sikkim has been considered as an alluring eco-tourism destination in India. The Government and the local communities in Sikkim are walking hand in hand toward reaching the target of sustainability. It is evident from the fact that the local communities in leading tourist destination of Lachung and Lachen got together and passed law through Dzomsa (traditional administrative institution) placing a ban on the plastic bottles used by the tourists and have replaced them with bamboo bottles. Sikkim is one of the front runners of sustainable tourism practices in India.

Tourism has emerged as a major phenomenon of this century, which makes it an economic activity of immense potential and one of the biggest industry. UNWTO report (2010) stated the international arrivals grew by 7% to a record 940 million in the year 2010 and predicted 1.4 billion mark of international tourists arrival for the year 2020, the predicted mark was however achieved in 2018, two years before the forecast. Despite recent slow economic growth, international conflicts and other barriers growth of tourism industry has proved unprecedented. Not only has tourism emerged as a major phenomenon of the modern society it has also established itself as a sector of immense global economic importance. Tourism generated 10% of the world's economy, contributed to one in every ten jobs and has generated 30% of the world's trade in services (UNWTO, 2018). Tourism has found a niche for itself as an efficient tool for revenue earning and foreign exchange but at the same time, we must be aware on the impacts which are left behind on the environment and the host population. In the last few years heavy spike in the number of domestic tourists in Sikkim is observed. Overcrowding at popular tourism destination during the peak season leads to heavy stress on the resources of the particular destination. Contrary to mass tourism which disregards the natural circle, eco-tourism values biodiversity (Legrand & Seguin, 2010). Eco-tourism gives us that opportunity to develop tourism in a way that it leaves behind minimum negative impacts. Eco-tourism if implemented properly can become a force to prevent environment degradation. Travel to natural areas has been on the rise in the last few decades. Instead of taking a holiday in

cosmopolis, an increasing number of visitors whether it's a family or group or solo, travellers now prefer to visit natural environments to spend quality time. Study (Balmford et al., 2009) shows that there is a spike in the number of Protected Area (P.A) visitors in developing nations. Eco-tourism is structured to meet with multiple objectives which include economic benefits to the local community, awareness regarding conservation and support to the protected area management. Therefore, proper organization and implementation is essential otherwise the project may fail in achieving all of its objectives. Belize, which adopted ecotourism model rather than the traditional approach as its preferential tourism development strategy but study conducted (Lindberg et al., 1996) showed that through ecotourism initiative received support in conservation from the professionals and the locals yet not all the objectives of ecotourism were met and the objective of generating fiscal support for P.A management was not achieved.

1.1 Tourism in India

Tourism has established itself as a major economic sector in India. It has the potential to capitalize on the country's success in the service sector. Looking at the travel trend of most of the domestic tourists, we must acknowledge that the mass tourism is still the mainstream of the Indian tourism industry. It's not a matter of imposing sanctions rather than encouraging the tourism sector to become more environmentally friendly. The government has before stood for the sustainable development ideas also at key tourism events like PATA conference, New Delhi, where it embraced the principle of carbon neutrality. Talking about the state governments, many have decided to create Ecotourism Development Boards such as in Madhya Pradesh, Himachal Pradesh and Sikkim. More recently Karnataka has launched an Ecotourism board too. Apart from providing employment to job seekers from unskilled to specialized, the tourism sector is gender unbiased and provides equal opportunities for both genders alike.

Table 1.1: FTA from different regions of the world			
World Region	2015	2016	2017
North America	14,94,930	16,14,178	17,12,358
Central & South America	70,831	78,730	92,067
Western Europe	18,80,203	20,29,412	21,33,673
Eastern Europe	3,31,051	4,06,002	4,72,872
Africa	2,93,569	3,02,164	3,18,023
Western Asia	4,17,616	4,51,842	4,57,760
South Asia	19,46,207	21,94,555	29,51,668
South East Asia	7,00,298	7,46,069	8,24,575
East Asia	5,55,770	6,17,563	6,63,295
Australasia	3,12,101	3,48,908	3,86,059

Source:(Ministry of Tourism Government of India, 2018)

Figure 1.1:Graphical representation of origin of most FTA in India from 2015-17

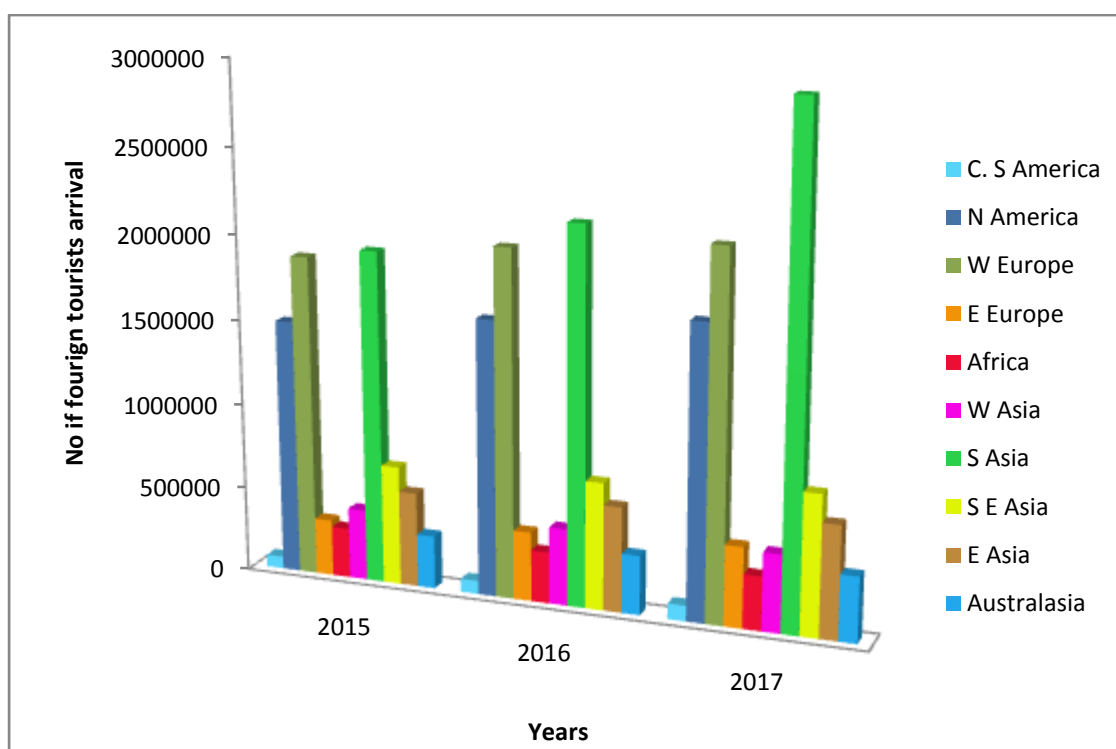


Table 1.2: Top source market of Foreign tourists in India in 2018		
Country of origin	No. of visitors	Percentage share among net FTA arrivals
Bangladesh	21,56,557	21.49%
U.S.A	13,76,919	9.83%
U.K	9,86,296	3.72%
Canada	3,35,439	3.34%
Australia	3,24,243	3.23%
Malaysia	3,22,126	3.21%
Sri Lanka	3,03,590	3.03%
Russia	2,78,904	2.78%
Germany	2,69,380	2.68%
France	2,49,620	2.49%

Source: (Ministry of Tourism Government of India, 2019)

Figure 1.2: Graphical representation of top source market for Foreigner visits in India in 2018

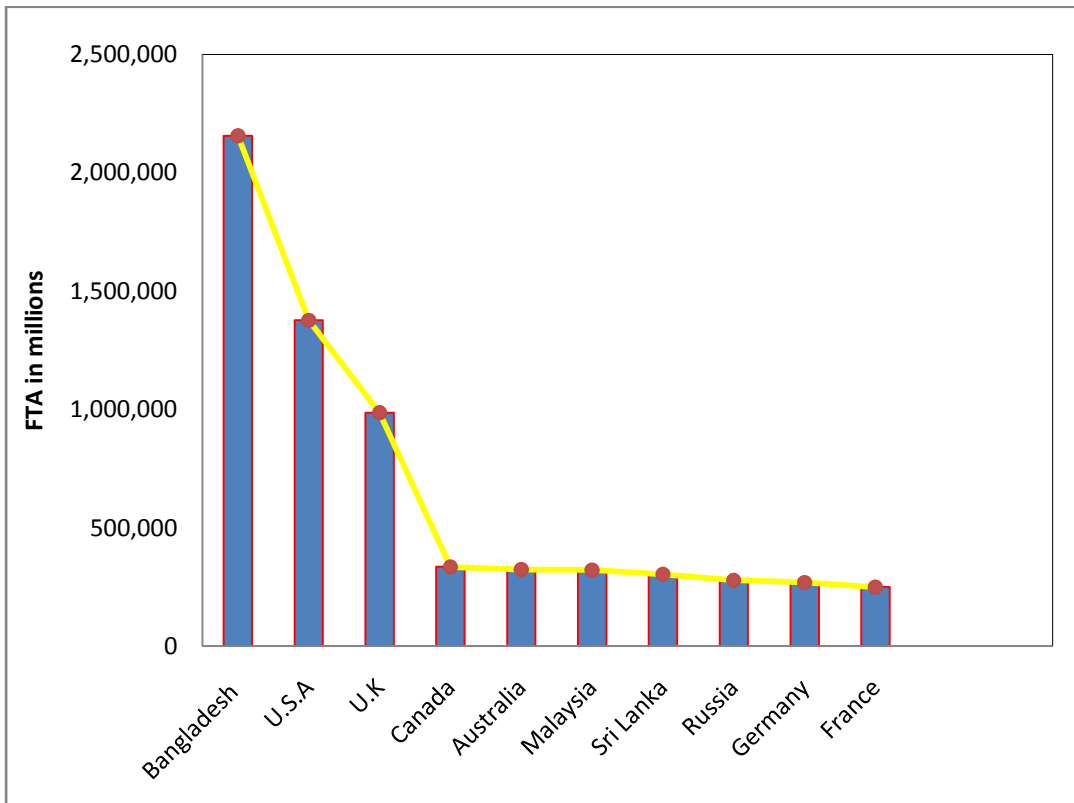


Table 1.3:Month wise FTA in India in 2018	
Month	Year 2018
January	10,45,035
Feb	10,49,255
March	10,21,530
April	7,45,091
May	6,06,522
June	4,83,928
July	8,06,495
August	7,86,003
Sept	7,19,845
Oct	8,90,229
Nov	10,12,564
Dec	11,91,472

Source: (Ministry of Tourism Government of India, 2019)

Figure 1.3 Graphical representation of monthwise FTA in India for the year 2018

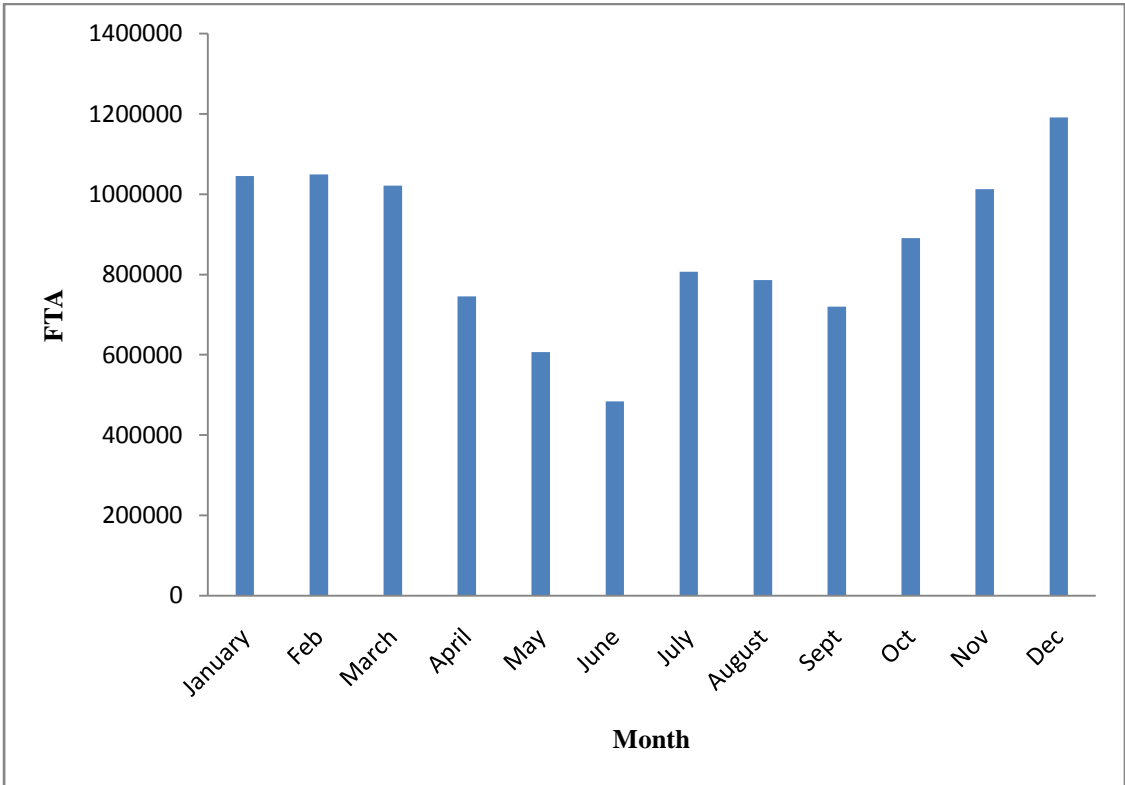
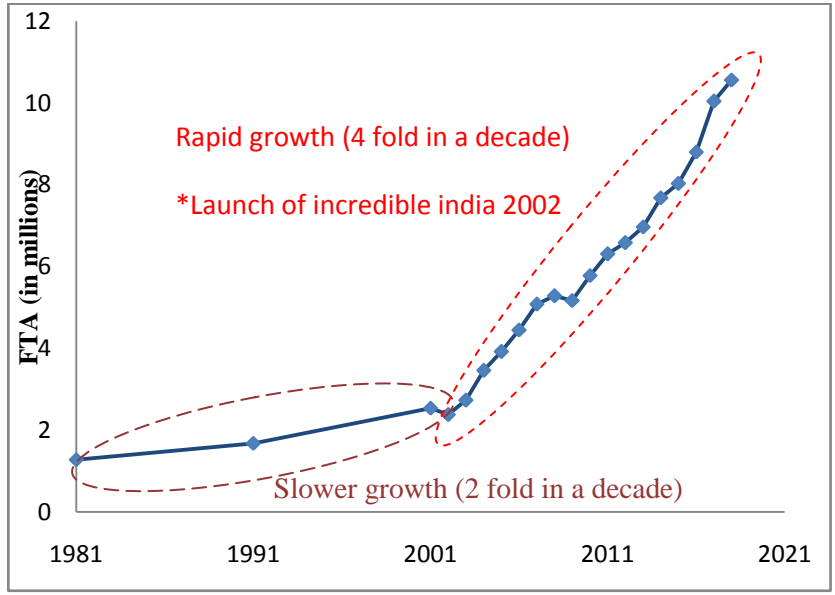


Table 1.4: Number of Foreign tourists arrival in India.

Year	FTA Arrivals (in millions)
1981	1.28
1991	1.68
2001	2.54
2002	2.38
2003	2.73
2004	3.46
2005	3.92
2006	4.45
2007	5.08
2008	5.28
2009	5.17
2010	5.78
2011	6.31
2012	6.58
2013	6.97
2014	7.68
2015	8.03
2016	8.80
2017	10.04
2018	10.56

Source: (Ministry of Tourism Government of India, 2019)

Figure 1.4: Temporal growth trends for FTA arrival in India from 1981 to 2018



1.2 Eco-tourism Scenario In Sikkim

The presence of mountains arouses feelings of humility, free from all deceit. Same can be said about the Himalayan state of Sikkim, truly enchanting but in the humblest way. Apart from its beauty the tags of organic and clean attracts more and more visitors towards itself every year. Sikkim is one of the few states who embraced the concept of ecotourism long before it was recognised by other states of India. In the year 2001, South Asian regional conference on Ecotourism was organised in Sikkim by TIES and ECOSS with the support of UNDP and MoT, GoI. Sikkim has gone a long way since then in implementing and promoting ecotourism in a sustainable manner.

The state tourism policy of 2010 had laid down various guidelines and rules to be legislated so as to make sure the ecological footprints of tourism remain as soft as possible. It suggested the environmental awareness and education to be integrated with ecotourism campaign. Wetlands and lakes were established as an integrated part of ecotourism. Emphasis on rivers, streams, waterfalls and hot springs and their conservation were included as part of policy plan. The tourism policy also included intensive campaign on non-use of plastic and collaboration work plan with local and national NGOs on the problem of solid waste and non-biodegradable waste(State Tourism Policy, 2010).

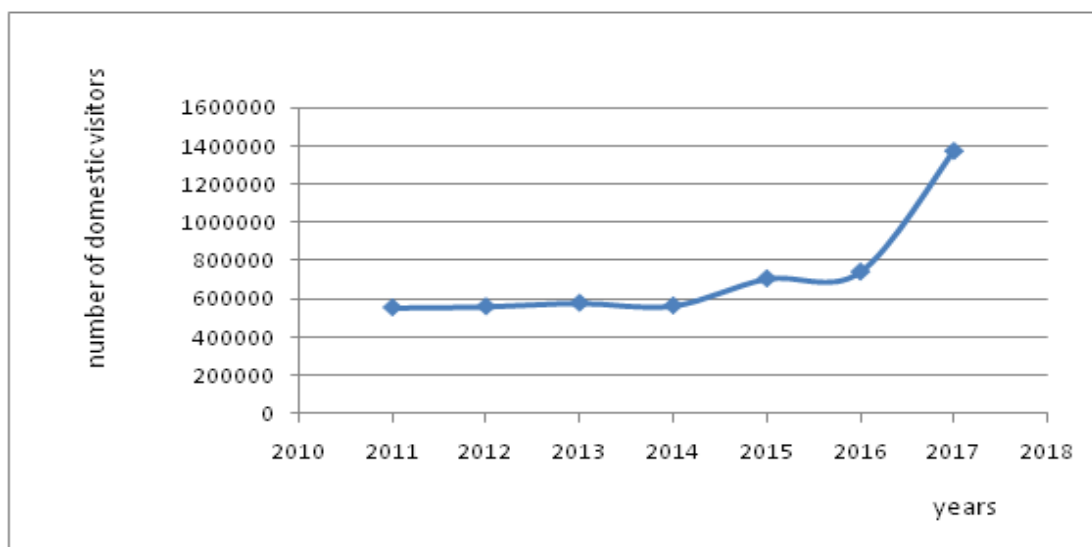
Following the state tourism policy in 2010 an international workshop was held in Gangtok The objective of the workshop was formulation of special policy on ecotourism to conserve the biodiversity and ecosystem of protected areas of Sikkim. The workshop followed by meeting with the stakeholders resulted in Sikkim Ecotourism Policy. In this policy set of separate rules and guidelines were laid out for Ecotourism operators, guides, visitors & research scholars. Penalties for the person, private enterprise or any organization who violates these guidelines were also set up. It also laid down the foundation of Sikkim Ecotourism Council. It links Chief Minister, Chief Wildlife Warden, Tourism department, representatives of travel agents, hotel and restaurant association, adventure tour operators and national and local level NGO's. The council worked alongside the stakeholders in formulation of the guidelines and ensure its implementation alongside coordinating with key government departments. The objective as laid down in Sikkim Ecotourism Policy of

2011 was to bring all stakeholders on a common platform and to promote ecotourism as per the criteria set up by Global Sustainable Tourism Council (GSTC). In more than 20 villages across 4 districts have been developing and promoting ecotourism activities under project. The local residents of these villages were also provided training on handicraft design, marketing and sales, and ecotourism ancillaries (Sikkim Ecotourism Policy, 2011).

1.3 Tourism and Economic Development

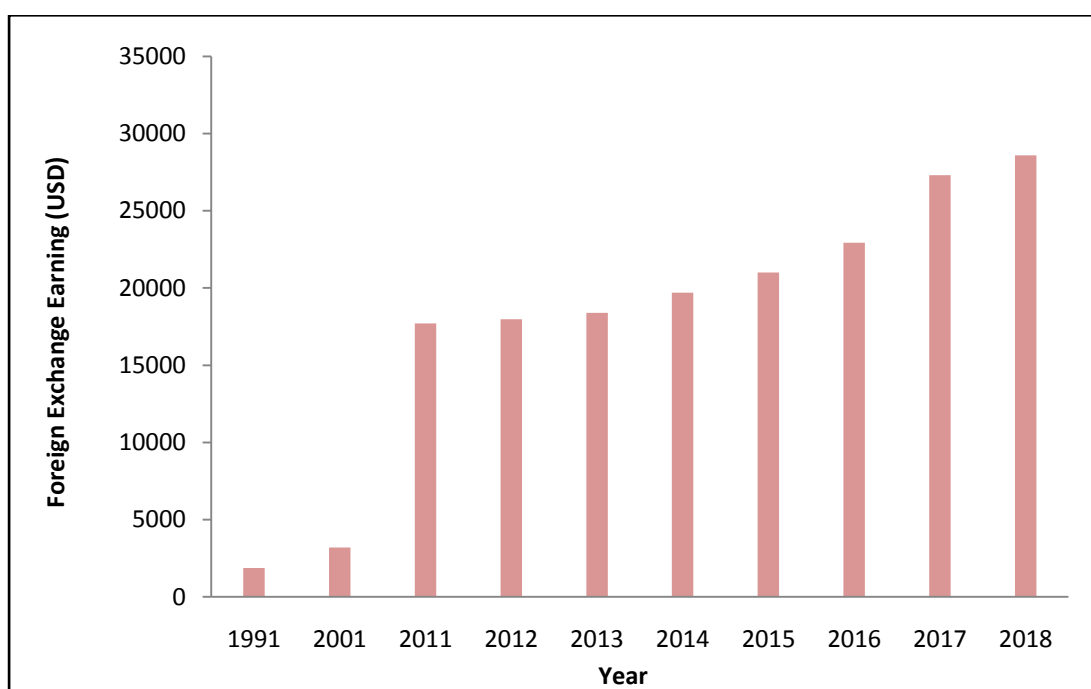
Tourism has emerged as one of the major industries of the world, benefitting many other sectors such as transportation, accommodation, catering etc. Tourism provokes interest among all countries regardless of the level of economic development. An increase in tourist flow can bring positive economic results such as GDP and employment. The WTTC in 2018 estimated that India tourism industry generated Rs 16.91 lakh crore worth of revenue contributing to 9.2% of India’s GDP and supported 42.673 million jobs which equates to 8.1% of its total population. As per the 2018 data of Bureau of Immigration, Government of India in 2017 a heavy increase was seen in the number of FTA arrival when 10.04 million foreign nationals travelled to India as compared to 8.80 million in 2016 meanwhile in 2018 the number further improved as total of 10.56 million foreign travellers choose to travel to India boosting the foreign exchange earnings.

Figure 1.5: Graphical representation of domestic tourist influx in Sikkim for the years from 2011-2017



Source: Sikkim Tourism Department, 2019

Figure 1.6: Total contribution of Tourism to the GDP of India.



Source: WTTC, 2017

Table 1.5 : Foreign Exchange Earning from tourism in India

Year	INR (in crores)	USD (in millions)
1991	4318	1861
2001	15083	3198
2011	83036	17707
2012	95607	17971
2013	107563	18397
2014	120367	19700
2015	134844	21013
2016	154146	22923
2017	177877	27310
2018	194882	28585

Source:(Ministry of Tourism Government of India, 2019)

According to the State Tourism Policy 2018, estimated number of employments generated by the tourism sector in Sikkim is around 12000 to 15000. One of the noting point of the Sikkim tourism industry as was emerged from the Sikkim Human Development Report was that 61% of direct employment in Sikkim was from outside the state(Sikkim Human Development Report, 2014). Between 1981 and 2006 national and international tourists arrival grew at an annual compound rate of 11.68% and 8.28% respectively (Sikkim Ecotourism Policy, 2011).The domestic tourist inflow in Sikkim has seen a significant increase from 5,52,452 in 2011 to 13,75,854 in 2017 showing and increase of 15.75% approximately.

The GDP of tourism sector in Sikkim between the year 2016-2017 was valued at Rs 1,44,735 lakhs and it contributed 7.68% to the GDP(Sikkim Human Development Report, 2014).

CHAPTER II

REVIEW OF LITERATURE

The studies on community based ecotourism projects provide varied and interesting perspectives. Ecotourism started as an off shoot of different alternate tourism approaches and soon grew on its own and even became the central point of sustainability of tourism. Most of the studies have been conducted in the settings of communities and derive generic principles from sustainable tourism.

Lindberg (1991) specifies the difference between nature tourism and sustainable nature-based tourism. The study points out that sustainable nature-based tourism requires the practice of several key principles such as conservation of nature, spreading awareness and education all parties involved including the community, governmental groups, tourism stakeholders and visitor and promoting understanding among the stakeholders.

Debabrata (2004) throws light on the vascular plant diversity in found in Khangchendzonga Biosphere Reserve. Illustrations and information on the rare species of plants and flowers found in high alpine regions of Sikkim is documented in the study.

Tambe and Rawat (2006) conducted study inside the high altitude Khangchendzonga national Park with the objective to provide long term conservation for both biodiversity and related livelihoods in the alpine region of Khangchendzonga Biosphere Reserve and to determine the impacts of pastoralism for effective management of the unique and delicate environment of KBR. The study using Six Dimensional Sustainability Model of Pastoral System proved that pack animals (dzo and horse) is most sustainable followed by sheep and that Yak heading is unsustainable in West Sikkim region of KBR.

Key & Pillai (2006) conducted a study with the purpose of identifying the importance of ethnicity in tourism. The research includes two communities in Belize. Result of the study shows that emergence of tourism brought social changes in the two communities of Seine Bight and Placencia. Tourism led to decrease in the migration of youths of these communities to the cities as opportunities raised for them in their

native land. Tourism also emerged as an agent of social change which brought residents of both the communities together.

Jose (2006) discusses the socio-political contexts of ecotourism projects facilitating women empowerment in Bohol, Philippines. The study suggests that community based ecotourism initiatives can be used to build the foundation required for empowerment of women in the Bohol province, however there are multiple challenges to be dealt with such as communication problems and not enough income for the women. A vast majority of women accepted they gained confidence and self esteem by participating in the tourism activities and socializing with each other and the visitors.

Sharpley (2007) reports from his study at Northumberland, United Kingdom that if attraction features or flagships are added to the rural tourism areas it will not only motivate more number of visitors but also through planned policies can lead to sustainable development of the rural areas. Adding mega attractions to a rural tourism setup will not only ensure more number of visitors but will also help to develop a regional identity of the rural area.

Tambe(2007) suggested to regulate the number of livestock in KBR region based on carrying capacity. The study also gave us insight as when alternative source of livelihood was offered to the herders for some in hope for them to voluntarily gave up pastoralism, it did satisfy the need but not the greed as only herders who had subsistence level income were supportive to this change in livelihood while some of the big yak herders took benefits from both eco-tourism and pastoralism.

Trejos & Chiang (2009) reports from field survey carried on in rural Costa Rica that although tourism activities are going on in the rural parts of Costa Rica but the economic distribution generated by tourism activities are not uniform and also it is negatively affected by seasonality.

Peaty & Portillo (2009) presented case studies of three successful ecotourism projects (Chalalan, Tomarapi and Kawsay Wasi) in Bolivia. It suggests that community based projects on tourism have chances of succeeding if a partnership be

made between the communities and travel agents. Also support from public sector and NGO's is required in providing training to the local stakeholders.

Balmford et al, (2009) collected data from various P.A's across 20 countries between 1992 to 2006. The results from the data showed that number of visitors are declining in case of developed nations such as U.S.A and Japan however in case of developing countries the number of visitors are gradually increasing year by year. Therefore nature based tourism has a bright scope as it has the potential to generate fund for conservation as well as provide benefits to the local community.

Harwood (2010) reviews community based tourism prevalent in three remote villages located in the Arfak Mountains of Indonesia, famous for bird watching. In the study the tour operator, field guides, tourism co-ordinators, heads of the villages and the villagers were interviewed. Community development is considered as an integral perspective of CBT projects however, in this instance the social structure of the villages ruled out the inclusion and the control of the the local community as only few people (blood relatives of landowner) can make use of the land, while the landowner possesses overall ownership of the land. In this case study, the developers and land owners failed in building a relationship necessary to sustain the project between the business operation and the community.

Nissan et al, (2010) opined that tourism activities stimulates economic growth. The results of the study indicated that tourism activities not just supplies necessary funds, but it also creates new job opportunities and stimulates the local firms productivity.

Sebele (2010) investigated challenges of CBT in on community living near Khama Rhino Sanctuary of Botswana. The results indicated that more interaction is required between the local community and the Rhino Sanctuary trust management so that CBT initiative can bring more benefits for local residents. CBT proved as a social tool through with the locals are steadily moving towards empowerment but an increased participation of the locals is required to make them aware about the conservation of natural resources and so they do not indulge in illegal activities such as poaching and trapping.

Giampiccoli & Kalis (2012) suggested the ways in which CBT initiative can be shaped in Pro-poor tourism to uplift develop poor communities of rural Mpondoland in South Africa. The study discusses ways in which the unique local culture itself can positively contribute in attracting visitors. The study advocates that the local culture can be developed into a resource and a tourism attraction.

Lucchetti & Font (2013) reviewed the Critical Success Factors (CSFs) for Ecotourism project in Ccaccacollo, Peru, through which women of the area have become empowered, establishing their own initiative, The Weaving Coop project. The local women have created their own enterprise with the help of incorporating the tradition and weaving skills. The Weaving Coop project is not only providing livelihood to a group of women but also it manages to keep the local community engage in tourism and preserves the ancient traditions of the Inca alive.

Kwangseh (2014) explores the tourism scenario of Cameroon. Cameroon is rich with natural resources but in terms of economic and social welfare tourism has played no significant role as yet. The study establishes that in order for tourism projects to affect rural development role of government sector is fundamental.

Tisdell (2014) establishes that a wildlife tourism project can have adverse environmental consequences. The study lays stress that in order to avoid the consequences preventive measures must be taken. The study also draws attention that strategy to be made for the well being of the local communities and how they get economically benefitted from the tourism project.

Dukić et al, (2014) studied how isolation positively and underdevelopment contributed to the preserving traditions in Omoljica, a remote province of Serbia.. The article argues that the traditional wisdom is not just inclusive of our cultural heritage or medical beliefs. The myths and customs prevalent which have affects in or day to day lives along with the religious believes are also incorporated in tradition.

Mutanga et al, (2015) investigated the community perceptions about wildlife conservation in Zimbabwe among the four communities, Gonarezhou, Umfurudzi,

Matusadona and Cawston Ranch. The study indicates regardless of human- wildlife conflicts and limited access to resources the communities are aware about the importance of biodiversity conservation.

Badola (2015) carried out study in the Khangchendzonga landscape of India, which comprises of entire Sikkim and the three districts of West Bengal. The study was done with the collaboration between GBPIHED and Government of Sikkim. The study sheds light on the unique cultural and natural attributes of this remote part of India and identifies some of the main challenges in conservation in the vast Khanchendzonga landscape.

CHAPTER III

RESEARCH DESIGN

3.1 Need of the Study

Given the popularity and promotion eco-tourism in Sikkim is absorbing, we need much more rigorous assessment and analysis of the tourism related activities in a biodiversity rich area such as KBR and its future scopes. The influence of tourism in people's livelihood, the impact it leaves on the culture and how is it contributing to the conservation process, we will embark on this research with these research questions in mind. As the tourism sector is highly dependent on seasonality and also the scale as number of visitors travelling to rural areas can't be forecasted so keeping these limitations in mind how are people dwelling in villages inside KBR in North and West Sikkim faring with the eco-tourism being promoted in those zones, what is their perception about eco-tourism which for them was brought not just as additional source of income as commonly perceived on the contrary it was total metamorphic as the people not only had to leave their settlements but they also had to adopt change in traditional livelihood such as herding as how are the research will address these limitations and how so far has this budding concept of eco-tourism faring in the present existing scenario.

3.2 Scope of Study

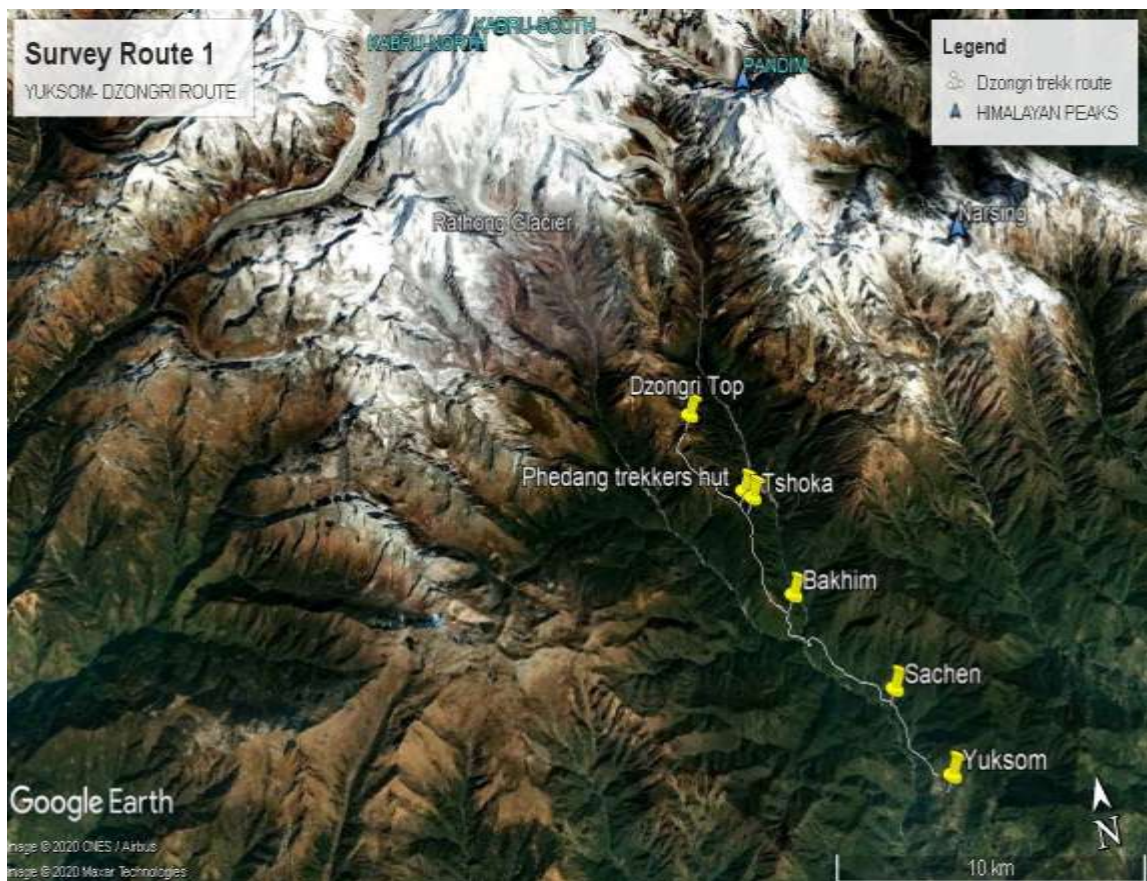
Scope of the study is elaborated on the basis of geographic area, study period and focus of research work.

3.2.1 Geographic Area

The research was conducted in the KBR located in Sikkim. KNP which forms the core zone of KBR is acknowledged as one of India's most prominent biodiversity concentration. The Khangchendzonga landscape which is sacred to both the Buddhists and the Lepchas represent a unique example of co-existence of different religions, traditions and beliefs. KBR is home to a vast number of rare and threatened plant and animal species. Acknowledging this unique wonderland UNESCO inscribed it to one

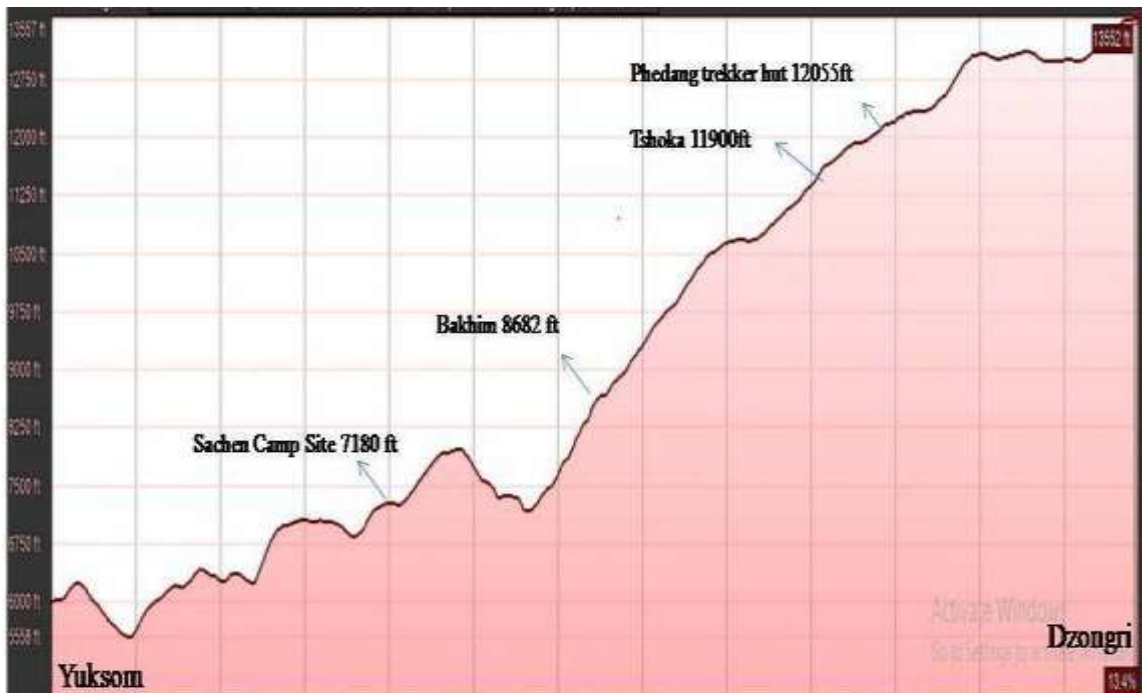
of its ‘World Heritage Site’. Field work was carried out in the various zones of KBR North Sikkim and West Sikkim. In North Sikkim field work was carried out in Dzongu and Upper Dzongu area mainly inhabited by Lepcha people. From Lingdem, famous for its hot spring to the Holy land of Tholung, survey in North Sikkim covered buffer and core zone areas of the KBR. In the West Sikkim Yuksom-Tshoka- Dzongri trail was taken for the survey as the remarkable view of Singalila ranges and Khangchendzonga peaks attracts domestic and international tourists all year round.

Figure 3.1: Yuksom- Dzongri trail



Source: Mapped from Google Earth

Figure 3.2: Yuksom- Dzungri trail elevation profile



Source :Compiled using Google Earth.

Figure 3.3 : Upper Dzungri trail taken for field survey



3.2.2 Study period

Field visits mainly included treks as the trails and bridges connecting to Tholung, in the North District were completely wiped out due to cloud burst and landslides. Furthermore in the during monsoon Yuksom in the West district was also hit by landslides because of unfavourable environmental conditions field work could only begin post monsoon. Data collection was carried on in North District in the month of November and in West District in the month of December.

3.2.3 Focus

The main focus of the study was on local community perception and the role of stakeholders which are involved in eco-tourism. Therefore data was collected in form of different questionnaires from the local residents and stockholders involved in ecotourism.

3.3 Objectives of the Study

Travel and tourism is the industry which is growing at a good rate inspire of the turbulent economy. The popularity of travel influencers reaching out to people through social media in is all time high and due to improvement in infrastructure and connectivity the traditional and biodiversity rich areas are in bucket list of many domestic as well as international tourists. The objectives of the research will be:

- To identify the natural and cultural resources in the study area.
- To understand the level of awareness of the local people towards ecotourism.
- To evaluate the perceptions made by local residents towards ecotourism.
- To examine the impact of eco-tourism activities on the local communities in the KBR region.
- To analyze the role of tourism in the perspective of local people livelihood.

3.4 Data Collection

The primary data has been collected from local residents and local stakeholders of Sikkim through questionnaires. Local residents of North Sikkim and

West Sikkim were surveyed by the means of questionnaire. A separate questionnaire was used to survey stakeholders which included homestay owners, trek guides, cooks, horsemen/yakmen, porters and travel agents based in North and West Sikkim. Travel agents based in Gangtok were also included in the survey. The secondary data has been collected from various books on tourism, research publication, e-journals, travel and tourism magazines, reports, government reports etc.

3.5 Questionnaires Used

In the study self-designed questionnaires were used. The questionnaire for local residents and questionnaire for local stakeholders were used separately during data collection. The questionnaire number one was used for local residents and questionnaire number two was used for local stakeholders. Both the questionnaire were divided into two parts, one reflecting demographic profile of the respondents and part two related to opinions and perceptions of respondents on eco-tourism and related activities.

3.6 Reliability of Questionnaire

Cronbach's Alpha test was done to test the reliability of questionnaires. For the questionnaire number one, used for local residents, the value of Cronbach's Alpha is .848 and for the questionnaire two used for local stakeholders the value for Cronbach's Alpha is .787 which indicates that the questionnaires used in the research are reliable.

3.7 Sampling

The total number of local residents of KBR region and local stakeholders constituted total population for the present study. A sample of 120 respondents was selected which was further divided into two parts i.e. N=60 for local stakeholders and N=60 for local residents.

3.8 Statistical analysis used

The collected data has been analyzed with the help of Mean, Standard Deviation, P value, Chi Square test and Cronbach's Alpha test using IBM SPSS Statistics version 25.

CHAPTER IV

BRIEF DESCRIPTION OF STUDY AREA

4.1 Introduction to MT Khangchendzonga

Situated in the north eastern part of India, Mt Khangchendzonga rises from the confluence of five main ridges that contains multiple peaks that rises beyond 6000m. On the east ridge is Mt. Siniolchu (6887m) on the west ridge rises Mt Jannu (7338m) to the south is Mt Kabru North (7338m), to the north The Twins (7350m) and to the south east Pandim Peak (6691m).

The Lepchas, also considered as the first settlers in Sikkim regard Mt. Khangchendzonga to be their place of origin and their mythological country to be Mayel Lyang, land of eternal paradise. They regard themselves as Rong from the Lepcha words Rongkup meaning the children of snowy mountain/ the children of God. In the Lepcha tradition it is believed that Itbumu, created their ancestors Fudongthing and Nazongnyu from the pure virgin snows of Mt. Khangchendzonga.

The Khangchendzonga is also considered sacred by people of Tibet. In Tibetan language the name Khangchendzonga means five treasures of the great snow. The five peaks of the mighty Khangchendzonga are as follows:

- Khangchendzonga South - 8470m
- Khangchendzonga Central - 8482m
- Khangchendzonga Main - 8586m
- Khangchendzonga West (Yalung-Kung) - 8505m
- Kang- Ba- chan - 7903m

Figure 4.1: Location of KBR

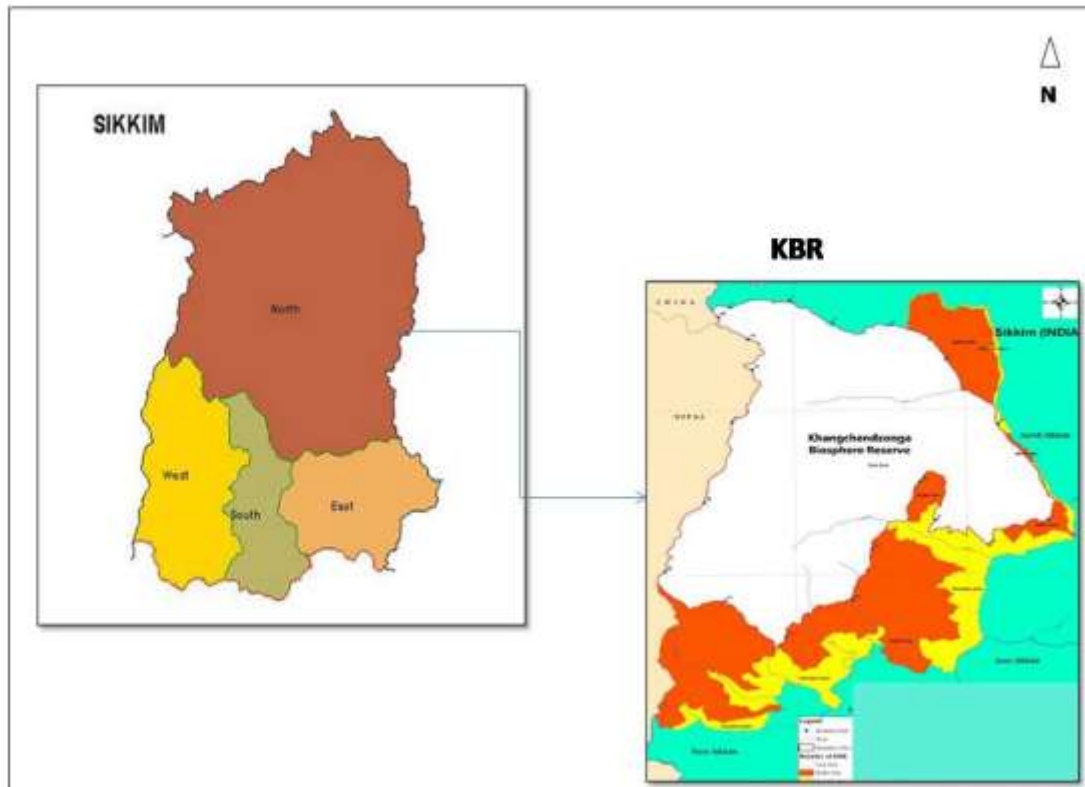


Figure 4.2: Khangchendzonga Mastiff



4.2 A brief timeline of the major events in KBR

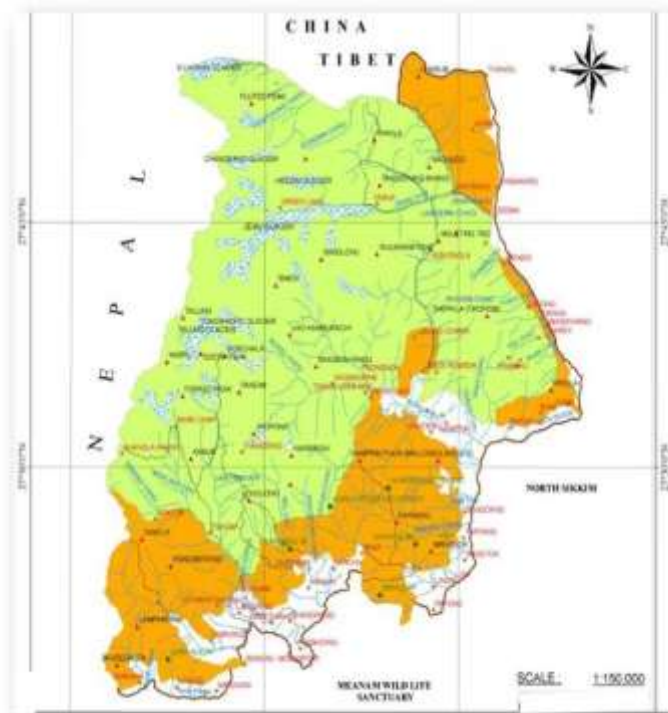
1642	Phuntsog Namgyal is crowned as the first Chogyal of Sikkim in Yuksom
1851	Sir J. D. Hooker explores the Khangchendzonga landscape.
1852	As a result of 1849 British Great Trigonometric Survey height of Mt Everest is calculated and it is revealed that Mt Khangchandzonga was not the highest peak of the world as previously believed.
1955	First successful ascent of Mt. Khangchendzonga.
1973	Japanese team successfully climbs Yalung Kung but have to resort to bivouac shelter while descending. Takeo Matsuda dies tragically by rock fall.
1977	Khangchendzonga National Park (KNP) is designated by the Indian Government. Indian Army expedition led by Col. N. Kuma is successful to summit via NE face of the mountain.
1978	Polish team is successful in climbing the South and the Central summit of Khangchendzonga.
1979	Four-man team consisting of led by Doug Scott successfully climbs using the NW face of the mountain without help of porters and oxygen.
1983	Frenchman Pierre Beghin summits solo, without oxygen and descends successfully making bivouacs shelters.
1984	British- Canadian braveheart Roger Marshall follows the feat of Pierre Beghin and summits solo.
1986	First winter ascent of the main summit by Polish team on January 11.
1991	In order to become the first woman to climb the mighty Khangdzonga Marija Frantor and Joze Rozman from Slovenia attempts to climb. In their last communication via radio it was reported that they have become snowblind later their bodies are discovered close to the summit Slovenian Andrej and Marko Prezelj completed one of the most spectacular alpine style climb to reach the South summit of the Khangchendzonga making four bivouacs to reach the summit.

1992	Wanda Rutkiewicz, one of the most acclaimed climber and first women to summit K2 attempts to climb Khangchendzonga from the NW face. She is never heard of again and her body has been yet not found.
1996	State government stalls the hydro power project on Rathong Chu after protests from the locals.
1997	KNP is extended by 1784 km ² .
1998	Ginette Harrison from United Kingdom becomes the first woman to summit Khangchendzonga.
2000	KBR is designated under UNESCO Man and Biosphere programme.
2010	KBR is extended with inclusion of a transition zone.
2016	KNP, the core zone of the reserve is inscribed as World Heritage site.

Source: Compiled from World Wide Web.

4.3 Zonal Details Of KBR

Figure 4.3: Map KBR showing the three zones; Core zone (green), Buffer Zone (orange) and transition zone (white)



Source: FEWMD,2014

The KNP was first notified in the year 1977 with an area of 850 sq km which in the year 1997 was extended upto 1784 sq km. In the year 2000 Khangchendzonga area was designated as a biosphere reserve under UNESCO Man and Biosphere Programme and a buffer zone comprising of four parts with an area of 835 sq km was added to the reserve. In the year 2010 a transition zone comprising of 44 villages covering an area of 311 sq km was added to the reserve.

Table 4.2: Detail of the different zones of KBR		
S. No	Zones of KBR	Area covered
1.	Core Zone (KNP)	1784 km ²
2.	Buffer Zone I. Buffer Zone I II. Buffer Zone II III. Buffer Zone III IV. Buffer Zone IV	154.48 km ² 55.29 km ² 29.37 km ² 596 km ²
3.	T Transition Zone I. Transition Zone I II. Transition Zone II III. Transition Zone III	28.58 km ² 111.15 km ² 171.47 km ²
	Total area of KBR [Core, Buffer & Transitional	2931.42 km²

Source: Interpretation Centre Yuksom, 2019

4.4 The First Expedition

Year: 1955

Date: 25th May

Team Leader: Dr. Charles Evans

First Summiteers: George Band & Joe Brown



Dr. Charles Evans

The team : The team was headed by Dr Charles Evans who was the part of first assault team in the expedition to Mt Everest in 1953. Norman Hardi was acting as the deputy leader and Dr. John Cley as the medical officer for the team. The team

compromised of total nine climbers including the experienced Tom Makinon and the young climbers such as George Band (26 years) and Joe Brown (24 years).

300 porters and 36 High Altitude Porters (HAP's) contributed to this expedition.

Pemi Dorji upon completion on the expedition returned exhausted at base camp developed symptoms of cerebral thrombosis and later passed away. He was buried at the base camp under a rock on which Sherpas carved his name and the Buddhist prayer, *Om Mane Padme Hum*.

Before the expedition took off the team came to know that the Sikkimese regarded Khangchendzonga sacred and objected attempt to climb it. Dr Charles Evans came to Gangtok, the capital of Sikkim to address the problem. In the words of Dr Charles Evans, "When we were about to sail we heard that the Sikkimese strongly objected to any attempt to climb Kangchenjunga. From Darjelling I went first to Gangtok to discuss the problem. As a result of our talk, although we had never intended to step in Sikkim as we were climbing the mountain from Nepalese side, we agreed that we would only climb so far up Kangchenjunga as was necessary to make sure of a route to the top; and that, in any case, we would not tread the top or its immediate vicinity" (Evans & Band, 1956). Dr Charles Evans and his were true to their words as they did not summit the mountain leaving 6 ft of height to the top, the practice which has been followed by all summiteers till yet.

The journey towards the South West face of Khangchendzonga started on 14th of March, 1955 from Ranjeet Tea State of Darjelling. The expedition consisted on nine team members along with 300 porters and 5 tons of stores. The route taken by the team is given below:

Darjelling – Mani Bhenjyang – Sandakphu – Phalut – Khebang village – Yamfodin
- Tserum – Yalung valley.

At Yalung valley the first permanent camp was set up at the snout of Yalung glacier, after which most of the porters were paid off and left remaining only the team members and High Altitude Sherpa porters. It took the team 4 days to find way and cross across Yalung glacier to the foot of the mighty Khangchendzonga and finally setting up Base Camp 1 at 19,700 ft. The team displayed some amazing technical climbing finding routes through icefalls crossing crevasses and battling blizzards and

the brave porters helped them every way in setting up further 6 camps by lifting the heavy essentials up to the mountain where no man had ever stepped before.

From the foothill of the mountain the team set up six base camps enroute the top.

Base camp 1 – 19,700 ft

Base camp 2- 20,200 ft

Base camp 3- 22,000 ft

Base camp 4 – 23,500ft

Base camp 5 – 25,300 ft

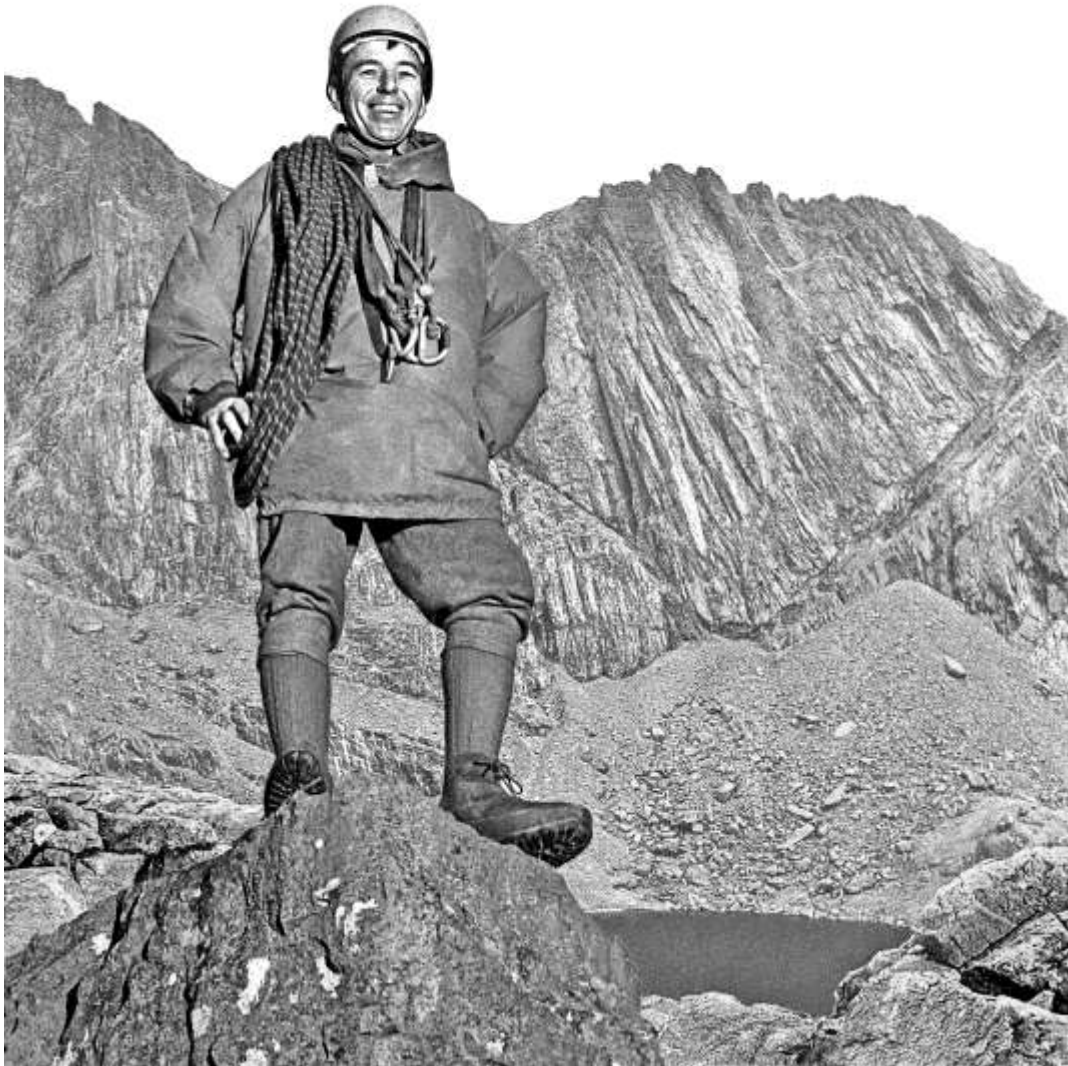
Base camp 6 – 27,000 ft

Figure 4.4 : Route taken by Dr Charles Evans and team along with the location of 6 base camps.



Source: Evans & Band, 1956

Figure 4.5: Joe Brown first person to reach summit of Khangchendzonga.



“Camp 1 was made at the end of a gigantic crevasse. I once walked down this crevasse looking for a bog site, and there in front of me was this huge hole. Through it, I saw hanging snow – and realized that I was standing on hanging snow on my side. My hair stood on end – I tried to walk back weightless.”

:Joe Brown extract from *Kanchenjunga Climbed* (Evans & Band, 1956)

4.5 Flora of Khangchendzonga Biosphere Reserve

Khangchendzonga Biosphere Reserve represents many endangered and endemic biotic elements. Khangchendzonga Biosphere Reserve, being the TransHimalayan (cold desert) and partly as the central Himalayan steppe, supports a range of biotic diversity having with unique elements.

4.5.1 Forests in KBR

Three major forest zones falls within KBR region i.e subtropical forest, temperate forest and alpine forest (Debabrata, 2004).

4.5.1.1 Subtropical Forest

Subtropical forest occurs till the elevation upto 1800m. These are mainly mixed type of forests, comprising of tree species, the predominant shrubs and dominant climbers species found are Piper, Smilax, Tetrastigma, Rhaphidophora etc.

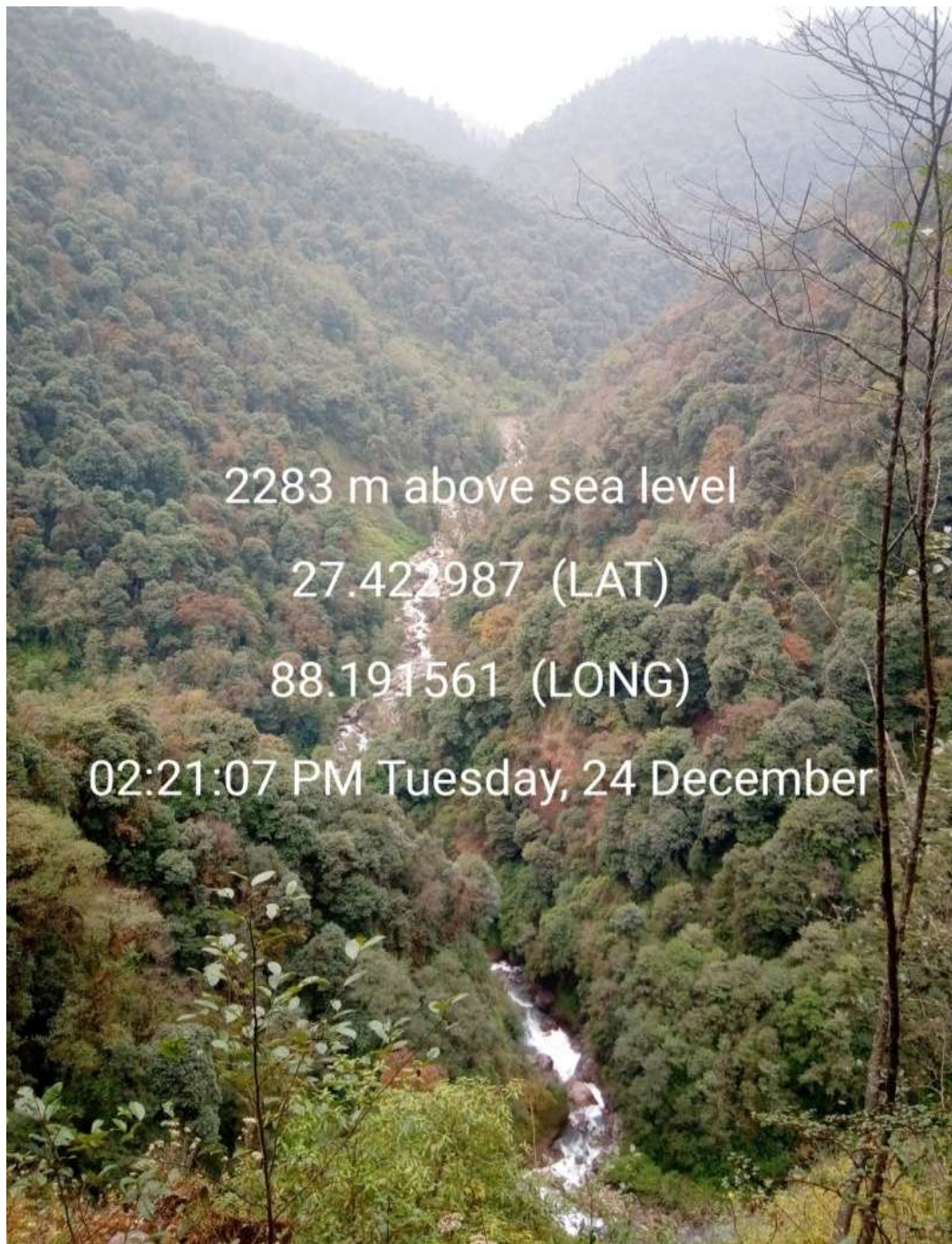
4.5.1.2 Temperate Forest

The temperate forest occur at elevation ranging from 1800m upto 4000m and based on it vegetation components it can be categorised into a) Mixed broad leaf temperate forest and b) Evergreen coniferous forest.

The mixed broad leaf temperate forest is confined within 1800m to 3300m and the evergreen coniferous forest is confined to the altitude ranging from 3300m-4000m.

4.5.1.3 Alpine Forest

The Alpine forest in the Khangchendzonga Biosphere Reserve start occurring after reaching elevation of 4000m upto snowline.



2283 m above sea level

27.422987 (LAT)

88.191561 (LONG)

02:21:07 PM Tuesday, 24 December

Photograph 4.2: Forest in KBR

Source: Primary data

Ecological Zone	Broad Habitat Type	Altitude	Vegetation Communities
Temperate	Temperate Broadleaf Forest Temperate Conifer Forest	1700m-2600m 2800m-3300m	Evergreen Oak Forest Hemlock Forest
Sub Alpine	Sub Alpine Forest	3100m-3800m	Abies Rhododendron Forest
Alpine	Rhododendron Thicket	3600m-4200m	Rhododendron Wightii Rhododendron Lenatum Rhododendron Fulgens Rhododendron Campanulatum
	Alpine Scrub	3700m-4400m	Juniper Scrub Dwarf Rhododendron Scrub
	Alpine Meadow	4200m-4700m	Deschampsia Marsh meadow Mixed Herbaceous Meadow Sedge Meadow
	Moraine Environment	4200m-4900m	Potentilla fruticosa Rhododendron Lepidotum
	Rocks and Cliffs		Sparse vegetation
	Riverine	Adjacent to river path	Willow Thicket, Myricaria Scrub, Mosses and Lichen
	Special Habitats		Caves, Caverns, Den trees, Snag, Rocky Overhands, Crevices

Source: Tambe & Rawat, 2006

4.5.2 Endangered and rare flora found in KBR- According to Forests Environment and Wildlife Management Department, Government of Sikkim some of the highly rare flora and endangered plant species found in Khangchendzonga Biosphere Reserve are : *Anoectochilus sikkimensis* (orchidaceae.R.), *Aphyllorchis montana* (orchidaceae.R.), *Camellia caduca* (Theaceae.R.), *Cypripedium himalicum* (Orchidaceae), *Cymbidium macrorhizon*, *Cymbidium whiteae* (Orchidaceae.), *Nardostachys grandiflora* (valerianaceae.R), *Populus gamblei* (salicaceae), *Rheum nobile* (polygonaceae.R.), *Rhododendron dalhousiae* (Ericaceae.R), *Rhododendron nivale* (Ericaceae.R.) and *Vanda pumila*

Figure 4.6: Species of flowers in KBR



Rhododendron nivale



**Cymbidium whiteae
(Orchidaceae.)**



Rhododendron dalhousiae



Vanda pumila

Figure 4.7: Rare plants found in KBR



**Anoectochilus
sikkimensis
(orchidaceae.R.)**



**Rheum nobile
(polygonaceae.R.)**

4.5.3 Important medicinal Plants found in KBR

KBR is rich in many rare medicinal plants and herbs. Some of them are: *Aconitum ferox* (Bikh), *Aconitum spicatum* (Bikhma), *Bistorta* sp.(Pothi Rambu), *Orchis latifolia* (Panchamle), *Picrorhiza kurrooa* (Kurki), *Nardostachys grandiflora* (Jatamanshi), *Allium prattii* (Dandu), *Lomatogonium* sp. (Sharmaguru), *Lomatogonium* sp. (Mahaguru), *Saussurea gossypiphora* (Mykopila), *Rheum acuminatum* (Khokim), *Bergenia purpurascens* (Pakhanbhed), *Anemone polyanthes* (Bhutkesh), *Rheum nobile* (Kenjo, Padamchal) etc (Tambe & Rawat, 2006).

Figure 4.8: Medicinal plants found in KBR



Saussurea gossypiphora



Aconitum ferox



Allium prattii



Nardostachys grandiflora

4.5.4 Floral Diversity

KBR offers a wide range of heartwarming floral diversity ranging from different species of Rhododendron, Orchids, horticultural plants and other Himalayan flowers. In KBR region more than 4500 species of flowering plants are identified. Among which there are 550 varieties of Orchids, 36 species of Rhododendrons and 60 species of Primulas. Also there are 23 species of bamboo and 424 species of medicinal plants found in the reserve.

Figure 4.9: Plants of high fiscal value found in KBR



Ophiocordyceps sinensis



Panax pseudoginseng



Astilbe rivularis



Swertia chirayita

4.6 Fauna of Khangchendzonga Biosphere Reserve

KNP is a reservoir of diverse habitats and harbours number of Schedule 1 and II species as per Wildlife Protection Act 1972. 39 species of mammals found in KBR are classified as endangered. Some of the animals found inside KBR are as follows:

Red Panda, Musk Deer, Leopard, Clouded Leopard, Serow (Mountain Goat), Barking Deer, Chinese Pangolin, Snow Leopard, Shaphi (Himalayan Tahr, Assamese Macaque, Himalayan Black Bear, H. Palm Civet, Jackal, Leopard Cat, Common Langur, Blue Sheep, Himalayan Yellow Throated Marten, Himalayan Crestless Porcupine, Common Otter, Wild dog, Indian Fox, Wild Boar, Goral, Tibetan Wild Ass, Red Fox, Chinese Pangolin, Flying Squirrel, Nyan or Great Tibetan Sheep, Tibetan Gazelle etc.

Source: Interpretation Centre Yuksom, 2019

Table 4.4: Population dynamics of animals found in KBR		
FAUNA	Total species identified in Sikkim	Species identified in KBR
Mammals	144	124
Birds	568	550
Reptiles	29	16
Amphibians	44	16
Fishes	48	48
Butterflies	689	627

Compiled from : (Forests Environment and Wildlife Management Department Government of Sikkim, 2014),(Badola & Subba, 2012) and (ENVIS, 2015)

Khangchendzonga Biosphere Reserve forms part of the Important Bird Area (IBA) network and its constitutes one of the highest IBA in the world. The reserve is rich in bird life with around 550 species and sub species. The reserve is also the nesting ground of high altitude pheasants which include Monal pheasants, Tragopan pheasants and Blood pheasants (the State Bird). The Khangchendzonga Biosphere Reserve complex in Sikkim supports 130 endemic bird species of eastern Himalaya.

Figure 4. 10 : Pheasant birds found in KBR



Blood Pheasant



Monal Pheasant



Kalij Pheasant



Tragopan Pheasant

Figure 4.11 : Rare animals found in KBR



Blue Sheep



Himalayan Thar



Red Panda



Snow Leopard

4.7 Glaciers in KBR

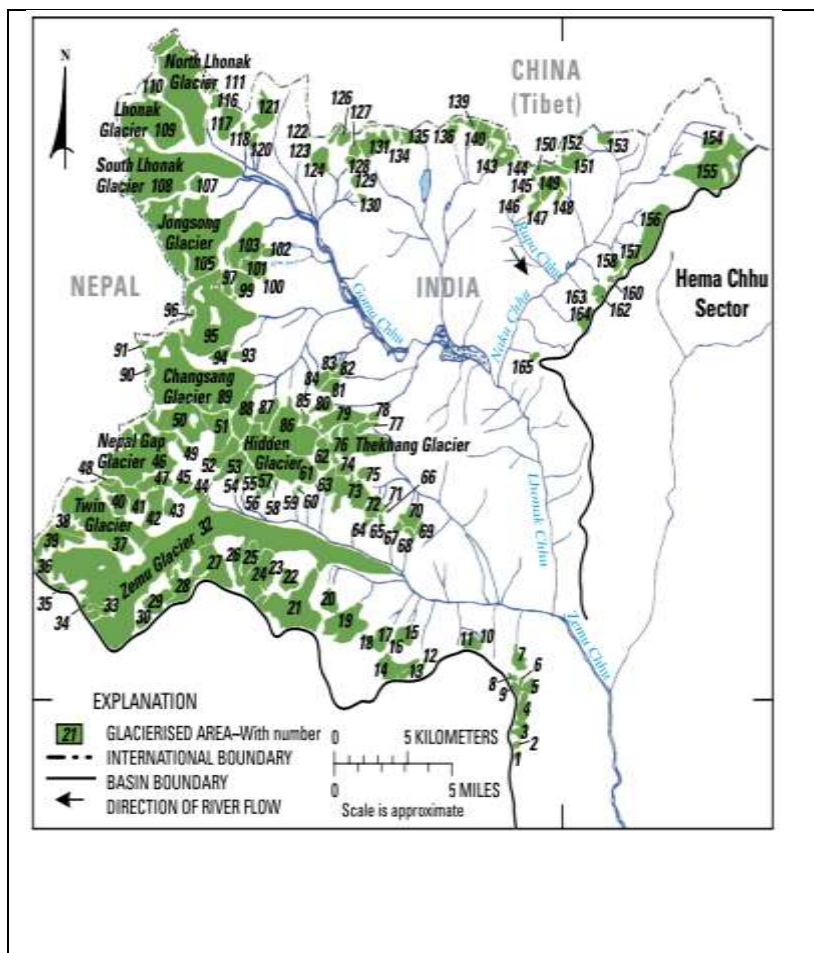
A total of 165 glaciers are there in the state of Sikkim (Vohra,2010)

The alpine zone of KBR consists of number of glaciers giving birth to number of rivers. Some of the glaciers in the KBR are as follows

:

- I. Zemu Glacier
- II. Talung Glacier
- III. Tent Peak Glacier
- IV. Siniolchu Glacier
- V. Simvo Glacier
- VI. Zumthul Glacier
- VII. Napal Gap Glacier
- VIII. Twins Glacier
- IX. Hidden Glacier
- X. Changsang Glacier
- XI. East Rathong Glacier
- XII. Onglakthang Glacier
- XIII. Jonsang Glacier
- XIV. Thekang Glacier
- XV. Tongshiong Glacier
- XVI. East Longpo Glacier
- XVII. South Lhonak Glacier
- XVIII. South Simvo Glacier
- XIX. Zumthulphuk Glacier

Figure 4.12: Glaciers in Sikkim



Source (Vohra, 2010)

4.8 Major peaks of Khangchendzonga Biosphere Reserve

The major Himalayan peaks found in KBR are as follows:

Mt. Khangchendzonga	8586
Mt. Narsing	5825
Mt. Pandim	6691
Mt. Siniolchu	6886
Mt. Simvo	6811
Tent Peak	7365
Jhponu Peak	5963
Paki Lho	4144
Lama Angdang	5868
Singdamringu Peak	3751
Lhokhamburich Peak	5497
The Twin	7350
Nepal Peak	7350
Forked Peak	7150
Rathong Peak	6678
Kokthang Peak	6147
Yajuknamteng Peak	5643
Mt. Tinchengkang	6010
Frey's Peak	5830
Fluted Peak	6084
Kabru North	7338
Kabru South	7317
Goechala Peak	6115
Talung Peak	7349

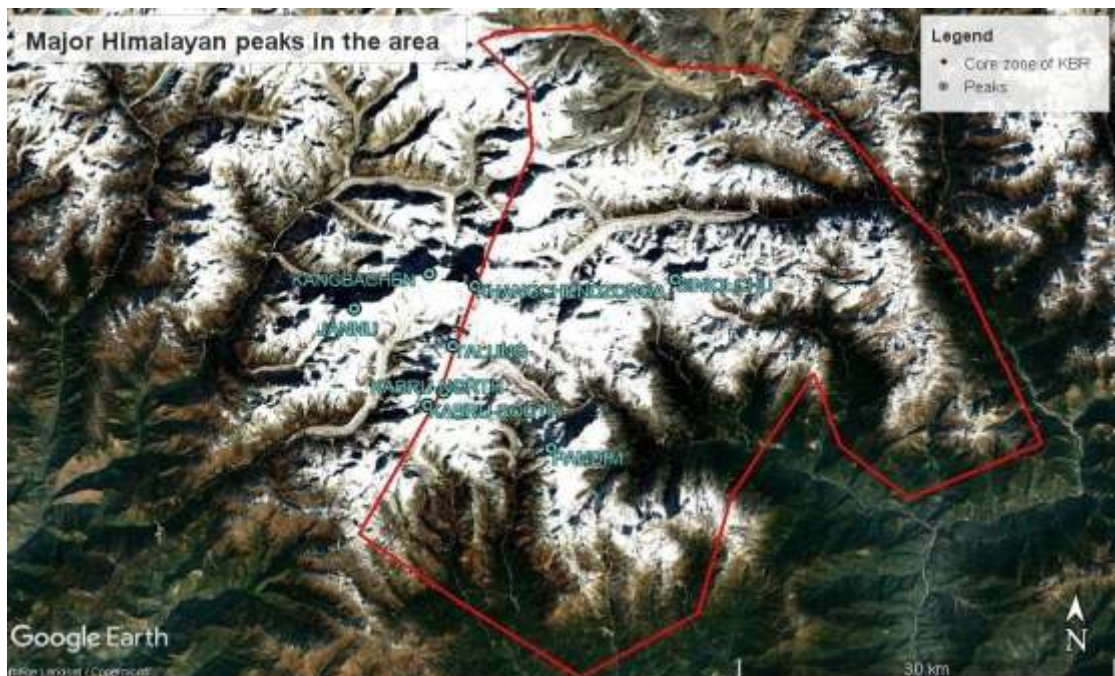
The state government of Sikkim has notified list of sacred peaks, caves, rocks, lakes, chorten/stupas and hot springs as sacred Buddhist places of worship and have placed them in protection under the provision of Places of Worship (Special provisions) Act, 1991.

Sacred Mountains and Peaks in KBR region are:

1. Khangchendzonga : Khangchendzonga Main (8586m)
Khangchendzonga South (8470m)
Khangchendzonga West (8505m)
2. Mt Narsing (5825m)
3. Gabur Gungsten : Kabro North (7338m)
Kabru South (7317m)
Kabru Dome (6600m)
4. Pandim (6691m)
5. Mt. Simvo (6811m)
6. Goechala Peak (6115m)
7. Fork Peak (6108m)
8. Pao Hungri (7128m)
9. Mt Siniolchu (6927m)

The Government of Sikkim has placed a ban on the scaling of the above mentioned peaks.

Figure 4.13: Major Himalayan peaks in the reserve



4.9 Rivers of Khangchendzonga Biosphere Reserve

The Khangchendzonga landscape leads to the formation of headwaters for seven of the major river systems namely Tista, Rangit, Torsa, Mahananda, Neora, Tamur and Sapt Koshi (Tambe, 2007). The glaciers inside the Khangchendzonga Biosphere Reserve are also origin point of two of the major river systems, Teesta and Rangit. According to Tambe, 2007 the area of reserve can be divided into seven watersheds which are Lhonak, Zemu, Lachen, Rangyong, Rangit, Prek and Churong.

Sl. No	Watershed	Major Tributery	Area (km²)	Highest Elevation (metres)
1	Lhonak	Goma chu, Putung chu, Lungma chu	243	7459m
2	Zemu	Thomphyak chu	368	8586m
3	Lachen	Yuktu chu, Yel chu, Fim chu, Rokzang chu	95	5064m
4	Rangyong	Ringpi chu, Rukel chu, Umram chu, Talung chu	664	8476m
5	Rangit	Relli, Rungdung, Kaiyun	118	5825m
6	Prek chu	Yangzee chu, Khola urar chu	144	6691m
7	Churong chu	Runzi chu, Tekep chu, Yangsaap chu	152	7338m

Source Tambe, 2007

4.9.1 Lhonak Chu

Lhonak originates as Goma chu from the North and South Lhonak glaciers inside Khangchendzonga Biosphere Reserve and flows in the west-east direction before joining Zemu chu at Talem and eventually Lachen Chu. Goma chu, Putung chu and Lungma chu are its main tributaries. The Lhonak Chu marks the northern boundary of the reserve.

4.9.2 Zemu Chu

The Zemu glacier which is the longest glacier of Sikkim give birth to Zemu Chu. Zemu Chu meets Lachen Chu at Zema, 6 kms from Lachen. In its upper reaches Zemu Chu is fed by the Siniolchu glacier, Simvo glacier, Nepal Gap glacier, Tent Peak glacier and many other hidden glaciers.

4.9.3 Lachen Chu

The Lachen Chu flows from north to south through a narrow valley between Zema and Chungthang and then east-west till it meets the Rangyong chu at Sangklang. Chyaga chu, Nathang chu, Yukti chu, Rolazong chu and Raman chu are the main tributaries.

4.9.4 Rangyong Chu

Rangyong Chu is also known as Tholung Chu. The Talung, Tingchen Khangse, Tongshiong, South Simvo, Umram and Jumthul Phuk glaciers feed this river in the upper reaches (Tambe, 2007). The Rukel chu, Umram chu, Passarum chu, Raviongrum chu, Ringpi chu, Rangli chu, Ringyong chu and Rani chu are the main tributaries. The Kishong la alpine pass (4,785 meters) connects this valley to the Zema chu watershed (Tambe, 2007).

4.9.5 Rangit Chu

The Rangit chu originates from the Narsing glacier. Laduwa Chu, Relli Chu, Rungdung Chu and Kayum Chu are the main tributaries.

4.9.6 Prek Chu

The Prek chu originates from the Onglaktang glacier and flows north-south before joining the Churong chu. Yangzee chu and Khola urar chu are the main tributaries.

4.9.7 Churong Chu

The Churong chu originates from the Rathong glacier and flows north-south before meeting the Rangit river. Tikip Chu, Runzi Chu, Yangsaap Chu, Boktok Chu and Prek chu are the main tributaries.

List of all the rivers passing through Khangchendzonga Biosphere Reserve

- | | |
|-------------------|---------------------|
| 1. Teesta River | 20. Passaram Chu |
| 2. Rangit River | 21. Umram Chu |
| 3. Naku Chu | 22. Rukel Chu |
| 4. Lhonak Chu | 23. Rangyong Chu |
| 5. Chyaga Chu | 24. Kayam Chu |
| 6. Nathang Chu | 25. Rangit Chu |
| 7. Yukti Chu | 26. Rangdong Chu |
| 8. Kwang Chu | 27. Rel Chu |
| 9. Yel Chu | 28. Ledo Chu |
| 10. Phim Chu | 29. Rehi Chu |
| 11. Ramam Chu | 30. Prek Chu |
| 12. Rahi Chu | 31. Kokchurang Chu |
| 13. Zong Chu | 32. Chokchuong Chu |
| 14. Tadung Chu | 33. Rungji Chu |
| 15. Rangli Chu | 34. Tikip Chu |
| 16. Kishong Chu | 35. Yangsa Chu |
| 17. Jumthul Chu | 36. Gomathang Khola |
| 18. Ringpi Chu | 37. Rathong Chu |
| 19. Ravingram Chu | |

Source : FEWMD, 2019

4.10 Lakes of KBR

In Sikkim each lake has a unique cultural, spiritual, and ritual significance. In general lakes are considered as holy in Sikkim and special attention is given so it is kept clean and to maintain its sanctity amid large number of visitors. In KBR there are large number of natural lakes which have cultural and traditional values linked with the

locals among these Laxmi Pokhri and Green lake are of utmost importance according to Naysol (religious text of Sikkim).

Other lakes which fall under KBR are :

1. Lhonak Lake
2. Green lake
3. Langpo Lake
4. Dudh Pokhari
5. Bhale Dudh Pokhari
6. Nor Pokhari
7. Sungmoteng Chho
8. Tikuchia Pokhari
9. Mujur Pokhari
10. Dalley Pokhari
11. Lam Pokhari
12. Tinkoney Pokhari
13. Kishong Chu

4.11 Pang Lhabsol

Pang Lhabsol is one of the Sikkim's most important indigenous festivals highlighted by monastic warrior dances. For over three centuries, Pang Lhabsol has been held annually at the end of the monsoon by the Lamas of Pemayangtse Monastery and several other monasteries throughout Sikkim. This festival commemorates the blood brotherhood treaty between the tribes of Lepcha, Bhutia and Limboo uniting these tribes together in brotherhood with Mt Khangchendzonga as the witness deity to this historical pact.

4.12 Historical Ruins

4.12.1 The Rabdentse Palace Ruins

Rabdentse was established by the second Chogyal, Tensung Namgyal in the latter half of the 17th century. Rabdentse is the second capital of Sikkimese Kingdom. Tensung Namgyal, the second King of the Sikkim Kingdom moved the capital from Yuksam to Rabdentse in 1670. Rabdentse remain as the capital for next hundred year. The capital is being attacked for many times during the invasion of Bhutanese and Gurkhas. Eventually, it became a pale of ruins. The old palace and monastery complex are in ruins now and is maintained by Archaeological Survey of India.

4.12.2 Wangdutse (Ongdichi) Palace Ruins, Tumlong

Tumlong was the third capital of Sikkim after Yuksom and Rabdentse. The capital was shifted from Rabdentse to Tumlong by Tshudpud Namgyal in 1793. The Treaty of Tumlong was signed here between the British and the Kingdom of Sikkim in 1861. Later in 1894, the Chogyal, Thutob Namgyal, shifted the capital to Gangtok. The palace of Tumlong is now in ruins and is looked after by the Archaeological Survey of India.

4.12.3 The Norbugang Coronation Throne

In 1642 three learned lama's headed by Lhatsun Chempo crowned the first Chogyal of Sikkim. Lhatsun Chempo suffixed his own surname of 'Namgye' to Phuntsok who was crowned the Chogyal and subsequently the king came to be known as Phuntsok Namgyal. In front of an ancient Cupressus tree, there is a thorne where there are four seats, the highest among all was where Lhatsun Chempo was seated, seat to his right was for the crowned Chogyal Phuntsok Namgyal and to his left Kortok Kunto Zangpo and Ngadak Sempa Chempo was seated at the throne.

4.13 Caves in Khangchendzonga Biosphere Reserve

The four caves of Buddhism in Sikkim are the ancient abodes of great saints such as Saint Guru Rimpoche and Lhatsun Chempo and are now places of worship and pilgrimage.

4.13.1 The Lha Ri Nying Phu

This cave is situated in the north of Tashiding. This cave is considered to be very pure and holy. It takes a three-days trek from Tashiding to reach this cave. It has three caves, each having its own spiritual significance, in addition to it there is a triangular pit in which during the annual casting off evil ceremony, names of powerful demons clans are written and thrown into the pit and it is believed by this they are confined to their own abode.

How to reach: The sacred town of Tashiding is located at a distance of 130 kms from the nearest railway station, NJP, and about a distance of 138 kms from the nearest airport, Bhagdogra. From the capital city of Gangtok, its a road journey of 102 km via Singtam- Yangyang road that usually takes 4-5 hours to reach this town in West Sikkim. From Tashiding a long three days trekk will take to the cave.

4.13.2 The South Kahndro Sang Phu

The cave is located close to Reshi hot spring enroute Jorethang- Legshep road. The cave can be accessed on foot across river Rangit which can be crossed by a pedestrian bridge. On the rocks there was tiny footprints which is to be believed to belong to fairies by the locals. It is believed Guru Rinpoche meditated in this cave and subjugated more demons in to guardian fairies to this cave. Inside the cave there is a shrine hall which contains imprints of hands believed to be of Guru Padmasambava.

How to reach: Reshi the nearest town lies 108 km from NJP. If travelling from Gangtok, one can find numerous cabs going to Jorethang, a major town located just 15 kms from Reshi. From Jorethang taxi to Reshi can be easily be booked as well as accommodation can be managed.

4.13.3 The East Shar- Chok Pe Phu or Secret Cave

It is believed to be one of the few caves that was blessed by the presence of Guru Padmasambhava. The cave near the town of Ravangla, between the hillocks of Tendong and Maenam. Locals come here to worship the spirits dwelling in the cave. The cave also contains numerous self risen figures of Deities.

How to reach: The cave can be reached 5 km hike from the town of Ravangla, which is located at a distance of 125 kms from the nearest railhead, NJP and at a distance of 75 kms from the capital city of Gangtok.

4.13.4 The West Dechen Phu or Cave of Great Happiness

This cave is located near Dzungri, West Sikkim. The journey to reach the cave is not an easy one and one have to walk for three days to reach to this cave. It is believed that one can attain supreme higher attainment if he reaches the cave. Legend says that it has vast treasured stores that can feed half the population of earth.

How to reach: It takes a three day trek to reach Dzungri from the town of Yuksom, which is located in West Sikkim at a distance of 125 km from Gangtok, the capital city of Sikkim.

4.14.1 Monasteries in KBR

1. Dubde Monastery (West Sikkim)

Dubde (meaning the hermit's cell) monastery is located at a distance of three kilometre northeast of Yuksom. As per Ecclesiastical Affaris Department Government of Sikkim, the first ruler of Sikkim Chogyal Phuntshog Namgyal founded this monastery in 1647. It is believed to be one of the oldest monasteries in Sikkim. It is renowned for its paintings of Maha Shidhas.

2. Tholung Gumpa (North Sikkim)

Tholung monastery is located in the remote part of upper Dzongu valley. It contains rare *treasures* of century old artefacts that were brought here for safety against the foreign invaders. A short walk takes one to *Devta Pani* , where one can draw holy water.

3. Sanga Choling Monastery (West Sikkim)

Sanga Choling monastery was established by Lama Lhatsun Chempo during the reign of first king Chogyal Phuntshong Namgyal. As per Ecclesiastical Affaris Department Government of Sikkim the exact date and year of foundation is not known. The monastery is famous to house statues made by Lama Lhatsun Chempo.

4. Pemayangtse Monastery (West Sikkim)

Pemayangtse Monastery is located on a hill near Gyalzing. More than a hundred monks study here. The monks from this monastery are given a special title of "ta-tshang". The head lama of this monastery had the privilege of anointing holy water to the Chogyals during the time of monarchy.

5. Tashiding Monastery (West Sikkim)

The monastery was established in 1651. Bumchu festival is celebrated here, in which water from Rathong Chu is used as holy water.

6. Silnon Monastery (West Sikkim)

It was established at Ngadak Sempa Chempo in 1716. It is located at a distance of 12 kms from Tashiding.

7. Melli Atsing Monastery (West Sikkim)

It was established in 1740 by Lama Dudjom Yeshey.

8. Hungri Monastery (West Sikkim)

Hungri monastery lies between Yaksom and Silnon.

9. Khachoepdabri Monastery

Khachoepdabri Monastery was founded by a saint in 1760.

10. Lachen Monastery

Established in 1858 as a small hut built by Lama Karchen Dorje Drak, now it is a major monastery which holds all the important Buddhist ceremonies and an annual mask dance.

11. Lingthem Monastery

The monastery was established by Lama Atshe in 1856. The monastery has since been demolished by earthquake but now has been reconstructed.

12. Barphog Monastery

Its located in Dzongu area and can be reached after a climb from Lingdong.

4.14.2 Manilakhangs and Lakhangs in KBR

1. Yuksam Norbugang Mani Lhakhang: This Manilakhang is located at Yuksam near the Coronation Throne, West Sikkim.
2. Kongri Mani Lakhang: This Manilakhang is located in remote Kongri block in West Sikkim. The original monastery was destroyed during Gorkha invasion back in 18th century and all the religious texts and articles were destroyed and dumped near a lake nearby. The new Mani lakhang was constructed later on the same site.
3. Bongten Mani Lakhang: This Manilakhang is located in West Sikkim build in 1930 by Senga Chudum Lama.
4. Nambu Mani Lakhang: This Manilakhang is located near Nambu village in West district.
5. Leek Manilakhang: Leek Manilakhang is located in Leek village located in remote upper Dzongu valley in North Sikkim.
6. Hee Gyathang Manilakhang: It is located in Dzongu valley in North Sikkim.
7. Pentong Manilakhang: Pentong Manilakhang is located in Pentong village, in upper Dzongu valley. Build in 1991, this monastery is affiliated to the Tholung Gonpa.
8. Tshoka Lakhang: It is located in Tshoka village which was before inhabited by people but now is vacated as in falls in core zone of KNP.
9. Kathok Woselling Lhakhang: It is located in Yuksom, West Sikkim
10. Sakyong Manilakhang: Sakyong Manilakhang is located in Sakyong un upper Dzongu valley, North Sikkim.

Source: Ecclesiastical Affaris Department Government of Sikkim

4.15 Population within KBR

The last settlement within the Core Zone of the KBR comprised of 88-90 members of 10 family units living in the village called Tshoka in West Sikkim, the settlement at Tshoka was there before the area was declared as a national park. The

families were dependent upon the sale of dairy products and. Presently all the families have been relocated from Tshoka and no human settlements exists within the core zone.

In the Buffer and Transition zone the human settlements are mainly represents the ethnic groups of Lepcha, Sherpa, Bhutia, Tamang, Kami, Gurung, Limboo, Sherpa, Damai, Manger, Rai, Tamang, Newar, Chettri and Sarki people. The native population mainly practice agriculture and are also indulged in animal husbandry and are supported by small trades and a few salaried jobs. Since the introduction of Eco-tourism the trend have changed though. According to Karma Lepcha, resident of Lingdem (Upper Dzongu), “ *for years we(Lepchas) have been living off the land practising traditional farming but since the introduction of eco-tourism people are more excited as they will get this new opportunity to earn while practicing sustainability.*”

Nearest towns : in the West District Yuksom and Gyalshing are the nearest towns to the reserve, in the North District Chungthang and Mangan , and Rabong in South district are the closest towns to KBR.

4.16 Community and Conservation practices in KBR

Lepcha community have intangible performance of the tradition linking towards sustainable conservation of natural resources utilizing bio-resources in tradition ways (Badola, 2015). For centuries they have been linked with traditional ways of sustainable farming such as Bhasme agroforestry which can be observed in Dzongu, North Sikkim. In ancient times Lepchas followed ‘Bon’ religion in which they worshipped various deities of the land, forest, river and wind. For example Khecheopalri lake is considered as a footprint of Goddess Tara Jestum Dolma. The lake also is surrounded by lush green forest whose conservation has been took up by Lepcha, Bhutia and Limboo communities because of their religious sentiments connected with the lake and the forest. Number of folklores and festivals are associated with the lake which helps in reach out to the new generation and make them part of this conservation effort carried on through centuries by their tribal ancestors. ‘Cho Tsho’ is celebrated in October and ‘Bhumchu’ is celebrated in Feburary/ March. During these festivals the local communities worship the religious

spots around the area thereby protecting the forest and lake as holy or sacred since centuries ago.

Similarly many other Sacred groves or Devrali forests exists throughout Sikkim which are maintained and looked after by the local communities. As per Environmental Information System (ENVIS) there are 56 sacred groves documented in the state of Sikkim over four districts. Sacred groves attached to monastery is termed as Gumpa Forest Areas, which are managed by Lamas. In KBR various Gumpa/ monastery forests have been prevalent. Dense Gumpa forest can be spotted at Dubdi monastery, West Sikkim situated at an altitude of 1970 m covering an total area of approximate 16 hectares (Singh, 2014). Dubdi, meaning Hermit's cell, is the oldest monastery of Sikkim and is closely linked to to the heritage of Sikkim. The monastery established in the year 1701 AD. Throughout its span of time the monastery maintained its own forest area. Another significant monastery forest is situated at Pemayangtse. The forest area due to its sacred status is well intact. These forests have other cultural attributes linked with them as well which includes *chortens* or holy rocks, lakes, cremation ground, footpaths, ancient ruins (*Gadi Pandam & Kabi longchuk*), plantation area and *jhora* (streams).

These sacred forests, sacred lakes and sacred spaces have so far proved essential in preservation of forests. Most of the community based conservation practices are driven by traditional beliefs or sacred conservation ethics but as the time goes by these ethics are dwindling and the traditional beliefs are slowly eroding under the influence of modern education, consumptive lifestyles and other western societal pattern.

One particular system of local self governance practiced by people in KBR which has empowered sustainable forest management by local communities is Dzumsa system, which is the traditional system of local self governance of Lepcha and Bhutia residents from Lachen and Lachung in North Sikkim. The Dzumsa is an exclusive village council and its head is referred as Pison. The Dzumsa is a community system, which within its jurisdiction have the authority as well as sufficient legal instruments to make important decisions regarding economic affairs it also can formulate strategies such as division of cultivable land, grazing lands, seasonal migration of herds and collection of government taxes. Community members

have to seek permission from the Pipon for grazing of their herds as the grazing lands is owned by the community. They have to pay fixed amount money to Dzumsa, to use grazing land by their herds. Dzumsa is credited to make many decisions and carry on activities to make the high altitude villages eco-friendly, most recently the Dzumsa carried on the ban on plastic packaged water bottles in the area in order to reduce plastic pollution. Also Dzumsa with the collaboration of Gram Vikas Samiti safeguard the local forests and plant trees in the wastelands.

4.16.1 JFMC

Joint Forest Management is a phenomenon in Sikkim which came into existence with the state government notification in the year 1998 enabling people's participation in protection of forests. It all begin in 1998 with 155 Joint Forest Management Committees involving 46,000 families (Singh, 2014). The committees took care of Khasmal, Goucharan forest areas with the provision that they may derive 25% of the income from non timber forest produce and medicinal plants. Formation of JFMC brought a paradigm shift in management of forest areas facing biotic pressure due to rapid increase in population. It formed a partnership between the forest and local people. The approach required sharing of responsibility, duties and powers with the local people which was first sole responsibility of Forest and Wildlife Department. People's participation in preservation and conservation of forests changed the mindsets of government officials and local communities. As tangible benefits from the forests started to reach the communities the forest was seen as a common property resource rather than resource belonging to the government as it was perceived earlier. This changeover provided solutions to the problems such as illicit cutting of forests, issues related with grazing in forest areas, forest fire and encroachment of forest land etc.

4.16.2 Himal rakshaks

As per FEWMD total area of 4187 sq km which constitutes as 59% of total area of Sikkim can be categorized as *Himal* areas i.e the areas which lies at an altitude more than 3000 m a.s.l. In spite of determined efforts by the forest staff effective conservation of the *Himal* is still a difficult task due to its remoteness, tough terrain, high altitude and adverse climatic conditions. Futhur lack of adequate infrastructure at such high altitude locations make patrolling and monitoring activities very hard to

carry on effectively. Therefore the threats to *Himal* areas such as overgrazing, poaching, smuggling of rare plants and irresponsible tourism ethics was something that was deemed urgent to check upon, hence FEWMD in 2006 started to appoint *Himal Rakshas* (Mountain Guardians) who are basically villagers who practice traditional subsistence livelihoods in high altitude areas of Sikkim. Such volunteer villagers, who possesses traditional knowledge and the passion to conserve the mountains were recognised as *Himal Rakshas* by the forest department.

Since their formation, the Himal Rakshaks have had considerable impact in bringing down illegal activities and poaching that threatened the unique biodiversity of the high altitude areas of Sikkim. The first formal exercise was carried out by the Himal Rakshaks in 2007, which was in the core zone of KNP. Himal Rakshas have since carried on numerous monitoring and trap demolition exercises within the KBR region. Presently the monitoring exercises for Himal Rakshaks are conceptualised by WWF-India in corporation with FEWMD and Khangchendzonga Conservation Committee.

Tasks carried on by Himal Rakshaks during the monitoring exercises are as follows

- Habitat status observation
- Wildlife observation: reporting sighting of birds and animals
- Preventing of poaching and trapping: demolition of traps for capture of birds and poaching of wild animals.
- Prevent illegal collecting of medical plants:
- Grazing : Grazing in critical wildlife areas is banned since 1994. However, few herders are still found operating in the alpine pastures, mainly in KBR.
- Waste management: The Himal Rakshaks reports cases of improper waste management from all the trek routes they followed during the exercise. Dumping of untreated wastewater into streams or kholas at high altitudes locations may cause contamination of streams leading to serious health issues in villages.
- Protection of woods : report usage of woods as fuel in restricted areas by pastoralists or tourism operators.

CHAPTER V

DEMOGRAPHIC PROFILE OF SAMPLES

5.1 Demographic sample profile of local residents

Demographic sample profile of local residents is providing information about gender, age, educational qualification, number of dependents, occupation, monthly income and knowledge about ecotourism of local residents of the KBR region. The table highlights information per variable as follow:

1. **Gender:** From the table it is clear that out of total 60 respondents 53.3 % were female and 46.7% were male, so the survey included mixed population and views of both male and female were included in a balanced way.
2. **Age:** As far as age is concerned it is revealed that out of total 60 respondents (N=60) 39 are of age group 15-30 years (65%), 12 are from age group ranging between 30-45 years (20%), 5 were from age group ranging from 45-60 years (8.3%), 3 respondents hailed from age group 60-75 years (5%) and only 1 respondent was older than 75 years (1.7%). Hence the majority of respondents were from age group 15-30.
3. **Education Qualification:** For education qualification of local people (N=60) it was revealed that 12 of the respondents have studied till class 5 (20%), 11 of the respondents are matriculate (18.3%), 20 among the respondents are graduate (33.33%), 10 are post graduate (16.7%), none among the respondents was a research scholar and 7 among the respondents are not literate (11.7%).
4. **Occupation:** For occupation of local residents, i.e. N= 60, 4 are working in private sector (6.7%), 21 are employed in government jobs(35%), 10 of the respondents have set up their own personal business (16.7%), only 3 are practising agriculture full time (5%), 7 are currently unemployed (11.7%), 6 are housemaker (10%) and 9 are students (15%).

Table 5.1: Demographic profile of local residents.

Variable	Status	Frequency	Percentage
Gender	Female	32	53.3
	Male	28	46.7
Age	15-30	39	65.0
	30-45	12	20.0
	45-60	5	8.3
	60-75	3	5.0
	More than 75	1	1.7
Educational Qualification	Primary	12	20
	Metric	11	18.3
	Graduation	20	33.33
	Post graduation	10	16.7
	P.hd	0	0
	Uneducated	7	11.7
Occupation	Private sector	4	6.7
	Government sector	21	35.0
	Personal business	10	16.7
	Agriculture	3	5.0
	Unemployed	7	11.7
	Housemaker	6	10.0
	Student	9	15.0
Monthly income	0-10,000	10	16.7
	10,000-20,000	18	30.0
	20,000-30,000	5	8.3
	More than 30,000	5	8.3
Total number of family members	Two	4	6.7
	Three	2	3.3
	Four	14	23.3
	Five	16	26.7
	More than 5	24	40.0
Total number of family members involved in tourism.	None	28	46.7
	One	22	36.7
	Two	9	15.0
	Three	0	0
	Four	1	1.7
Are you aware about Eco-tourism	Yes	58	96.7
	No	2	3.3
Medium of awareness	Educational Institutes	27	45.0
	Workshops	3	5.0
	Word of mouth	14	23.3
	Conference/ seminar	4	6.7
	Literature/Books/Magazines	10	16.7

Source : Primary data from the survey.

5. **Monthly Income:** For the monthly income of the local residents i.e. N=60, 10 respondents have their income ranging between 0-10,000 Rupees (16.7%), 18 respondents have their income between 10,000 to 20,000 Rupees (30%), 5 earns a income between 20,000 to 30,000 Rupees (8.3%) and 5 respondents earns more than 30,000 rupees per month (8.3%).
6. **Number of family members:** Out of total 60 respondents, N=60, 4 have just two members in family (6.7%), 2 have a total of three members in their family (3.3%), 14 have a total of four members in their family (23.3%), 16 of the respondents have 5 members in their family (26.7%) and 24 respondents have more than 5 members in their family (40%).
7. **Family members involved in tourism:** For the number of family members involved in tourism it was observed that for N=60, 28 respondents have no one in their family earning from tourism activities (46.7%), 22 respondents have one member in their family earning from tourism (36.7%), 9 respondents have two members of their family earning from tourism (15%) and 1 respondent has 4 members of his/her family earning from tourism (1.7%).
8. **Eco-tourism awareness:** For the awareness of eco-tourism among the local community, its is observed for total respondents i.e. N=60 only 2 has no knowledge about eco-tourism (3.3%) and the majority of respondents 58 are aware about eco-tourism (96.7%).
9. **Medium of awareness:** It is observed that among the total respondents i.e. N=60, 58 are aware about eco-tourism, when the medium of awareness was probed it is revealed that 27 respondents are aware through educational institutes (45%), 3 are aware by means of workshops conducted on ecotourism (5%), 14 through word of mouth (23.3%), 4 through conferences/ seminars (6.7%) and 10 by the means of literature/books and magazines (16.7%)

5.2 Demographic sample profile of local stakeholders

Demographic sample profile of local stakeholders provide information about gender, age, educational qualification, marital status, number of dependents, experience in tourism, income through tourism business, provision of employment for local people and knowledge about ecotourism of local stakeholders of the KBR region. The information per variable has been highlighted with the help of table.

1. **Gender:** From the table it is clear that from tourism stakeholders (N=60), 44 of the respondents are male (73.3%) and 16 are female (26.7%). It can be concluded that the majority of tourism professionals are male however the involvement of females is increasing with the passage of time.
2. **Age:** As for the age of local stakeholders is concerned it is revealed that out of total of 60 respondents 21 are from age group ranging between 20-25 years of age (35%), 18 respondents are from age group 25-30 years (30%), 15 are from age group of 30-35 years (25%), 3 from age group of 35-40 years (5%) and 3 from age group 40-45 years (5%).
3. **Education Qualification:** For the education qualification of the local people it is revealed that out of total 60 respondents 17 have studied till class 5 (28.3%), 12 are matriculate (20%), 24 are graduates (40%) and a total of 7 were not literate (11.7%).
4. **Occupation:** It is revealed that out of total 60 respondents (N=60), 15 work as Guides for tourists inside KBR (25%), 10 works as Porters also operates inside KBR(16.7%), 6 works as Yakmen/ Horsemen inside the reserve (10%), 6 works as Cook for tourists inside the reserve (10%), 17 are employed as travel agents (28.3%) and 6 have set up their own homestay for accommodation for tourists (10%).

Variable	Status	Frequency	Percentage
Gender	Female	16	26.7
	Male	44	73.3
Age	20-25	21	35.0
	25-30	18	30.0
	30-35	15	25.0
	35-40	3	5.0
	40-45	3	5.0
Education qualification	Primary	17	28.3
	Metric	12	20
	Graduation	24	40.0
	Post Graduate	0	0
	PhD	0	0
	Uneducated	7	11.7
Occupation	Guide	15	25.0
	Porter	10	16.7
	Yakman	6	10.0
	Cook	6	10.0
	Travel Agent	17	28.3
	Homestay owner	6	10
Monthly income through Eco-tourism	0-10,000	23	38.3
	10,000-20,000	28	46.7
	20,000-30,000	8	13.3
	More than 30,000	1	1.7
Experience in tourism	0-5	47	78.3
	5-10	10	16.7
	10-15	1	1.7
	More than 15	2	3.3
Total number of family members	Two	0	0
	Three	4	6.7
	Four	22	36.7
	Five	19	31.7
	More than 5	15	25.0
Number of family members involved in tourism	None	14	23.3
	One	34	56.7
	Two	11	18.3
	Three	1	1.7
	Four	0	0
Awareness about Eco-tourism	Yes	57	95.0
	No	3	5.0
Medium of awareness	Educational institutes	14	23.3
	Workshops	12	20
	Word of mouth	10	16.7
	Conference/seminars	11	18.3
	Literature/Books/Magazines	10	16.7
Source: Primary data from survey			

5. **Monthly income through tourism:** It is revealed that out of total 60 respondents, N=60, 23 earns between 0-10,000 rupees directly through tourism (38.3%), 28 have their income from tourism ranging between 10,000 to 20,000 rupees (46.7%), 8 are earning between 20,000 to 30,000 rupees from tourism (13.3%) and 1 respondent is earning more than 30,000 rupees directly from tourism (1.7%).
6. **Experience in tourism:** It is observed that for local stakeholders i.e. N=60, 47 are having experience ranging between 0-5 years (78.3%), 10 have an experience in tourism field between 5-10 years, 1 is having an experience of working in tourism field for 10-15 years and 2 have been working for more than 15 years in tourism field.
7. **Total number of family members:** It is observed that for the local stakeholders (N=60), 4 have three members in their family (6.7%), 22 respondents have four family members (36.7%), 19 have 5 members in their family (31.7%) and 15 respondents have more than 5 members in their respective families (25%).
8. **Family members involved in tourism:** For the number of family members involved in tourism it is revealed that for total of 60 respondents 14 have zero member of their family involved in tourism (23.3%), 34 have one member of their family working in tourism sector (56.7%), 11 have two of their family members involved in tourism (18.3%) and 1 have 3 members of his/her family involved in tourism (1.7%)
9. **Awareness about Eco-tourism:** For the awareness of eco-tourism among the local stockholders (N=60), it is revealed that 57 have knowledge about ecotourism (95%) and 3 were not aware about eco-tourism (5%).
10. **Medium of awareness:** Among the 57 tourism professionals who were aware about eco-tourism, when the source of awareness was probed it is revealed that 14 among them are aware through the means of educational institutes (23.3%), 12 through workshops (20%), 10 by the means of word of mouth

(16.7%), 11 through conferences/seminars (18.3%) and 10 by the means of literature/books/ magazines (16.7%)

CHAPTER VI

ANALYSIS AND INTERPRETATION OF DATA

6.1 Analysis and interpretation of perceptions of local residents towards ecotourism

The opinions of local residents towards ecotourism activities and projects within their localities are analyzed and interpreted with the help of various tables as follows:

6.1.1 Perception of local people on economic contribution by eco-tourism

Table 6.1: Perception of local people on economic contribution by Eco-tourism							
Sl. No	Statement	Number	Mean	S.D	Chi Square	Degree of Freedom (df)	P value
1	Eco-tourism has emerged as an additional source of income for local people.	60	4.08	±0.787	64.667	4	.000
2	Eco-tourism is a source of income to the local people through the provision of converting of homes as home stays for the tourists	60	3.97	±0.802	35.467	3	.000
3	Eco-tourism is providing employment to the local people in hotel/ restaurants.	60	3.98	±0.854	43.667	4	.000
4	Eco-tourism acts as a source of income to the local people through the earning of sale of local handicrafts as souvenirs to tourists.	60	4.03	±0.843	21.333	3	.000
5	Eco- tourism is providing employment to the locals as guides, cooks and porters for the -tourists in the area.	60	4.02	±0.792	30.800	3	.000
6	Eco-tourism is providing employment to the local people in transport segment in the area.	60	4.02	±0.888	41.828	3	.000
7	Tourism is providing employment to the local people in travel agencies	60	4.07	±0.841	56.833	4	.000
8	Eco- tourism has brought awareness regarding ongoing trends and livelihood opportunities going on in other Himalayan regions.	60	4.03	±0.823	52.667	4	.000

Source: Primary data obtained through questionnaire

The interpretation of analysis of each statement is discussed below:

1. The Table 6.1 depicts that for the statement number 1, the chi square value is 64.667, (df=4) and since the P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism has emerged as source of income for the local residents.
2. The Table 6.1 depicts that for the statement number 2, the chi square value is 35.467, (df=3) and since the P value (0.000) is < 0.05 , the statement is significant implying that eco-tourism is a source of income to the local people through the provision of converting of homes as home stays for the tourists.
3. The Table 6.1 depicts that for the statement number 3, the chi square value is 43.667, (df=4) and since P value (0.000) is < 0.05 , the statement is significant implying that eco-tourism is providing employment to the local people in hotel/ restaurants.
4. The Table 6.1 depicts that for the statement number 4, the chi square value is 21.333, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism acts as a source of income to the local people through the earning of sale of local handicrafts as souvenirs to tourists.
5. The Table 6.1 depicts that for the statement number 5, the chi square value is 30.800, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism is providing employment to the locals as guides, porters and cooks.
6. The Table 6.1 depicts that for the statement number 6, the chi square value is 41.828, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism is providing employment to the local people in transportation segment.
7. The Table 6.1 depicts that for the statement number 7, the chi square value is 56.833, (df=4) and since P value (0.000) is < 0.05 , the statement is significant proving that tourism is providing employment to locals in transportation segment.

8. The Table 6.1 depicts that for the statement number 8, the chi square value is 52.667, (df=4) and since P value (0.000) is < 0.05, the statement is significant proving that eco-tourism has brought awareness to the locals regarding ongoing trends and livelihood opportunities going on in other Himalayan regions.

6.1.2 Perception of local residents on naturo-cultural impacts of Eco- tourism

Table 6.2 : Perception of local people on naturo-cultural impacts of ecotourism							
Sl. No	Statement	N	Chi Squire	Mean	S.D	Degree of Freedom (df)	Asymp. Sig.
1	Eco-tourism is promoting local cuisine among tourists.	60	35.067	3.95	±0.832	3	.000
2	Eco- tourism leads to publicity of local culture such as traditional attires, music, language and lifestyle	60	29.467	4.20	±0.860	3	.000
3	Eco-tourism is leading towards eco friendly construction of accommodation for tourists in hostels, camp sites and hotels etc.	60	30.746	3.92	±0.952	4	.000
4	Eco- tourism is promoting eco friendly projects like rural tourism, agri tourism etc	60	26.627	4.17	±0.834	3	.000
5	Eco-tourism is preventing cutting of trees for construction of hotels and resorts due to provision of home stays.	60	21.500	3.73	±1.056	4	.000
6	Eco-tourism is generating awareness among people regarding environmental conservation.	60	32.322	4.29	±.832	3	.000

Source: Primary data obtained through questionnaire

The interpretation of each analyzed statement from the table is discussed as below:

1. The Table 6.2 depicts that for the statement number 1 the chi square value is 35.067, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that that eco-tourism is promoting local cuisine among the tourists.
2. The Table 6.2 depicts that for the statement number 2 the chi square value is 29.467, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that that eco-tourism leads to publicity of local culture.
3. It can be noted from the Table 6.2 that for statement number 3 chi square value is 30.764, (df=4) and since P value (0.000) is < 0.05 , the statement is significant proving that that eco-tourism is leading towards eco-friendly construction of accommodation for tourists.
4. The Table 6.2 depicts that for the statement number 4 the chi square value is 26.627, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism is promoting eco friendly tourism projects like rural tourism, agri tourism etc.
5. The Table 6.2 depicts that for the statement number 5 the chi square value is 21.500, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism is preventing cutting of trees for construction of hotels and resorts due to provision of home stays.
6. The Table 6.2 depicts that for the statement number 6 the chi square value is 32.322, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism is spreading awareness about environmental conservation among the local people.

6.2 Analysis and Interpretation of opinions of local stakeholders towards their role in ecotourism

The role of local stakeholders in ecotourism has been analyzed and interpreted keeping their opinions towards different statements as base with the help of various tables as follows:

6.2.1 Role of Stakeholders in economic contribution within local community

Sl. No	Statement	Number	Chi Square	Degree of Freedom (df)	Asymp. Sig.
1	You are providing job opportunities to the local youth	60	17.067	1	.000
2	You are promoting home stays of local people for accommodation of the tourists	60	11.267	1	.001

Source: Primary data obtained through questionnaire

The interpretation of each analyzed statement from the table is discussed as below:

1. The Table 6.3 depicts that for the statement number 1 the chi square value is 17.067, (df=1) and since P value (0.000) is < 0.05, the statement is significant proving that ilocal stakeholders are providing job opportunities to the youth of Sikkim.
2. The Table 6.3 depicts that for the statement number 2 the chi square value is 11.267, (df=1) and since P value (0.000) is < 0.05, the statement is significant proving that local stakeholders are promoting homestays of local people for accommodation of the tourists.

6.2.2 Role of stakeholders in environmental conservation

S.No	Statement	Number	Chi Square	Degree of Freedom (df)	Asymp. Sig.
1	Do you practice conservation practices during your day to day operation	60	24.067	1	.000
2	Do you interact with people (locals & tourists) about nature and the importance of conservation during the trips or hikes.	60	35.267	1	.000

Source: Primary data obtained through questionnaire

The interpretation of each analyzed statement from the table is discussed as below:

1. The Table 6.4 depicts that for the statement number 1 the chi square value is 24.067, (df=1) and since P value (0.000) is < 0.05, the statement is significant proving that local stakeholders are practising conservation in their day to day operations.
2. The Table 6.4 depicts that for the statement number 2 the chi square value is 35.267, (df=1) and since P value (0.000) is < 0.05, the statement is significant proving that that local stakeholders are spreading awareness about the importance of conservation among the locals and tourists.

6.2.3 Perception of local stakeholders on naturo-cultural impact of eco-tourism

Table 6.5: Perception of local stakeholders on naturo-cultural impact of eco-tourism							
S.No	Statement	Number	Mean	S.D	Chi Square	Degree of Freedom (df)	Asymp. Sig.
1	Eco-tourism generates awareness among the visitors and locals towards environmental conservation.	60	3.78	±1.059	26.833	4	.000
2	Eco-tourism leads towards establishment of environmental friendly establishments such as camp sites, homestay, hotels etc.	60	4.07	±0.972	50.000	4	.000
3	Eco-tourism is promoting sustainable tourism instead of mass tourism.	60	3.50	±0.983	24.667	4	.000
4	Eco-tourism leads to publicity of local culture such as traditional attire and practices at a national and international level.	60	3.85	±1.005	33.833	4	.000
5	Eco-tourism promotes sale of local handicrafts as souvenirs for visitors.	60	3.88	±0.922	56.833	4	.000
6	Eco-tourism is promoting local cuisine among visitors.	60	3.92	±0.869	23.333	3	.000
7	Eco-tourism is promoting local spots and places at an international level.	60	4.18	±1.017	48.833	4	.000

Source: Primary data obtained through questionnaire

The interpretation of each analyzed statement from the table is discussed as below:

1. The Table 6.5 depicts that for the statement number 1 the chi square value is 26.833, (df=4) and since P value (0.000) is < 0.05 , the statement is significant proving that local stakeholders eco-tourism is generating awareness among the visitors and locals towards environmental conservation.
2. The Table 6.5 depicts that for the statement number 2 the chi square value is 50.000 , (df=4) and since P value (0.000) is < 0.05 , the statement is significant proving that ecotourism is leading towards establishment of environmental friendly establishments such as camp sites, homestay, hotels etc.
3. The Table 6.5 depicts that for the statement number 3 the chi square value is 24.667, (df=4) and since P value (0.000) is < 0.05 , the statement is significant proving that ecotourism is promoting sustainable tourism instead of mass tourism.
4. The Table 6.5 depicts that for the statement number 4 the chi square value is 33.833, (df=4) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism is leading to publicity of local culture such as traditional attire and practices.
5. The Table 6.5 depicts that for the statement number 5 the chi square value is 56.833 (df=4) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism promotes sale of local handicrafts as souvenirs for visitors.
6. The Table 6.5 depicts that for the statement number 6 the chi square value is 23.333 (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism is promoting local cuisine among visitors.
7. The Table 6.5 depicts that for the statement number 7 the chi square value is 48.833, (df=3) and since P value (0.000) is < 0.05 , the statement is significant proving that eco-tourism is promoting local spots of Sikkim and places at an international level.

CHAPTER VII

CONCLUSION, SUGGESTIONS AND RECOMMENDATIONS

7.1 Conclusion of Demographic Profile of Local Stakeholders

It is observed that the majority of local stakeholders in the study area are male (73.3%). But the participation of women specially young women is not that behind as its is evident from observing the age group of 20-25 years which was dominated by women stakeholders as their participation is leading (52.4%) to that of males (47.6%), indicating that the next generation of women are leading the way in finding opportunities in the field of tourism. Further it is observed that majority of the local stakeholders are educated, most of them being graduates (40.0%), matriculates (20.0%) or have completed basic primary education (28.3%). It is also observed that eco-tourism is also providing opportunities to the people who have not yet received education (11.7%), and they are working as porters, yakmen/ horsemen and cooks in the study area. Most of the stakeholders practising tourism in the study area have experience of 0-5 years (78.3%) and 5-10 years (16.7%) in tourism. Majority of local stakeholders earn monthly 10,000-20,000 through tourism (46.7%). It was also observed at study area that with increase in experience the earning capacity of the stakeholder also increases considerably. Most of the stakeholders have four (36.7%), five (31.7%) or more than 5 (25.0%) members in their families, from which some stakeholders have got no other family member other than them involved in eco-tourism (23.3%) but large proportion have atleast one (56.7%) or two members (18.3%) from their family involved in eco-tourism related activities. It is also observed that most of the local stakeholders (95.0%) possesses knowledge about eco-tourism, the large proportion is attributed to various channels of awareness which are educational institutes (24.6%), workshops (21.1%), word of mouth (17.5%), conference/ seminars (18.3%) and literature/ books/ magazines (17.5%). Further most of the local stakeholders (81.7%) admitted to follow conservation techniques and practices in their day to day operation. Also a large number of local stakeholders (88.3%) are taking it as their own responsibility to spread awareness about the importance of conservation to the locals and the tourists. It is also revealed that most of the local stakeholders (76.7%) also provide job opportunities to the local youth and

majority of them (71.7%) indulge in supporting and promoting local grown business initiatives such as home stays, souvenir shops and small eateries, local fabric shops etc.

7.2 Conclusion of Demographic profile of Local Residents

Demographic profile of local residents shows that majority of the respondents are female (53.3%). Most of the respondents included in the survey are young (65.0%) belonging to the age group of 15-30 years followed by middle aged adults (20.0%) belonging to the age group of 30-45 years and remaining respondents (15.0%) are more than 45 years of age. Majority of the local respondents are graduates (33.3%) and are employed in government sector (35%). Quite a few have set up their own personal business (16.7%) while some are still practising agriculture using traditional methods (5.0%). Most of the local residents have their income between Rs 10,000- 20,000 per month (30.0%), also to be noted there were considerable number of respondents (36.7%) not getting regular earnings which included unemployed (11.7%), housemaker (10.0%) and students (15.0%). Among the residents majority have one (36.7%) or two (15%) members of their family working in eco-tourism however there still are large section of population within the local residents from which there are no involvement of any family member in ecotourism activities (46.7%). It can be contributed to the fact that although in the West district especially in Yuksom area eco-tourism activities have received lot of attraction from the locals as well as domestic and international tourists but comparatively in the North district in Dzongu valley eco-tourism is still developing stage and involvement of local people is slowly increasing. Majority of local residents (96.7%) were found to be aware about eco-tourism, among whose educational institutes were the biggest contributors to the awareness (45.0%) followed by word of mouth (23.3%).

7.3 Conclusion of Role of Local Stakeholders

Local stakeholders in Sikkim are actively involved in tourism activities and generating tourism business. They are creating awareness among local people regarding tourism, tourism business and sustainability of natural tourism products. Local stake holders are participating in decision making regarding tourism projects.

They are providing employment to local people in tourism. Local stakeholders are earning foreign exchange through tourism operations. Local stakeholders are generating awareness among local people and visitors towards environmental conservation. They are leading towards the exchange of culture by organizing events for interaction of local people with domestic & foreign tourists. Local stakeholders are contributing towards the marketing and publicity of local culture, events and promoting local artists. They are promoting local cuisines and local handicrafts as souvenirs for tourists.

7.4 Conclusion on the perception of local residents

Eco-tourism has emerged as an additional source of income for local people. The provision of converting homes into home stays for the accommodation of tourists has brought fiscal benefits to the local residents. Eco-tourism has also providing source of income to the locals from the sale of local handicrafts and fabrics and other local souvenirs to the tourists. Eco-tourism is also providing employment to the locals in hotels and cafes. Furthermore eco-tourism has also provided employment to the local people as guides, cooks, porters, and horsemen/yakmen for the trekkers. Eco-tourism has brought awareness to the local people about the ongoing trends in eco-tourism and opportunities in going on in other Himalayan regions. Tourism has led to better services in the community. Eco-tourism is also leading towards eco friendly construction of accommodation for tourists in hostels, camp sites and hotels etc. Eco-tourism is promoting local cuisine among tourists and is leading to publicity of local culture; the traditional attires, music, language and environmental friendly lifestyle of the people of this friendly state. Eco- tourism is promoting eco friendly tourism projects like rural tourism, agri tourism etc and is generating awareness among people regarding environmental conservation.

Suggestions and Recommendations

- Local stakeholders in Sikkim must have more responsible involvement in eco-tourism initiatives and projects within their localities.
- Local stakeholders must have more participation in decision making regarding tourism projects.

- Local stakeholders should prefer local man-power in comparison of outsourced man-power or man-power outside of home state
- Local stakeholders must promote more local cultural events.
- Local residents should ensure their participation during planning of tourism initiatives and projects within their locality, whenever invited by tourism department.
- Local residents having large houses near different tourist locations & spots should register their houses under home stay scheme.
- Local residents must ensure their participation in different cultural events like local fairs and festivals, musical and dance performances to ensure conservation of local culture.
- Local residents must encourage and motivate local cultural performers and artists. They must be given opportunities within community events. The cultural fairs and events must restore the fading tradition of the past which has been replaced by modern novelties.

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APPENDIX 1



A



B



C



D



E

A: Yuksom town.

B: Trekkers and Guide wait for the permit outside Interpretation Centre, Yuksom.

C: Trekkers pose at the entry gate of KNP

D: Tshoka meadow facing Mt Pandim

E: Camp site sign board at Sachen



A



B



C



D



E

- A: Trekkers Hut at Tshoka
- B: Yak at Bakhim
- C: Rules to be followed based on Eco-touism mentioned at Dzongri Trekkers Hut
- D: Buddhist religious site, Dzongri.
- E: Lake at Tshoka



A



B



C



D

- A: Snowline at Phedang
- B: Coronation Thone at Yuksom
- C: Bamboo bridge on the way to Tholung
- D: Waterfall in Dzongu