TRAINING MODULE: SUSTAINABLE TOURISM FOR BIODIVERSITY CONSERVATION

TO ENHANCE CAPACITIES OF KEY STAKEHOLDERS FOR BIODIVERSITY CONSERVATION

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1. INTRODUCTION

Sikkim is one of the most beautiful states of India located in the womb of Eastern Himalayas. The state shares its boundaries with Bhutan in east, Nepal in west, Tibetan plateau in north and West Bengal in south. Sikkim is apportioned into four districts – North district, East district, South district and West district. It is a mountainous state and one third of its area lies above 3000m, of which a large area is covered by glaciers, snow-capped peaks and alpine meadows. The presence of world's third highest mountain peak- Mount Khangchendzonga adds to the glory of Sikkim. The state of Sikkim is blessed with enormous water resources. The mighty rivers of Sikkim are Teesta and Rangeet. Teesta river originates from Cho Lhamo lake in North Sikkim. River Rangeet flows from the western parts of Sikkim merges with Teesta at Melli near Sikkim West Bengal border. Glaciers are one of the most important physiographic features of the state. They are mostly found in the North district. The most important glacier is Zemu Glacier, which is 26 km in length and is situated at the base of Mt. Khangchendzonga.

Figure 1.1: Administrative map of Sikkim (Source: NATMO Kolkata)

The climate of Sikkim is highly varied due to factors related to wide range of elevation and also partly due to diverse configuration of surrounding high mountains, valleys and water bodies. The state can be divided into five distinct climatic zones: subtropical humid type, semi temperate type, temperate type, alpine snow forest type and alpine meadows. Sikkim has a suitable climate for agricultural and horticultural products. It supports multiple crops; *viz.*, rice, wheat, maize, millet, barley, *urad*, pea, soya bean, mustard and large cardamom. Sikkim is the top producer of large cardamom, contributing over 80 per cent to India's total production.

Among all the Indian states, Sikkim is undoubtedly the richest in biodiversity relative to its small area (7096sq.km.) Total forest cover of Sikkim is 3,392 sq.km which comes to around 47% of the total geographical area of the state (State of Environment report, 2016).

The economy of the State is primarily agrarian, though there are other pivotal sectors like tourism, industries, mining etc. The picturesque landscapes, rich biodiversity and pleasant climate makes Sikkim a sought-after tourist destination. Sikkim is predominantly a rural state. Urban population of the state is just 25% of the total population. The population of the

State comprises many ethnic, linguistic and cultural groups, each characterized by their unique culture and traditions that exhibit strong bonds with nature.

2. Biodiversity Richness of Sikkim

Sikkim is located in the Eastern Himalayas which is a part of the global biodiversity hotspot. It is renowned globally for its picturesque, landscapes, rich and unique biodiversity, associated traditional knowledge and practices along with equally rich cultural and ethnic diversity.

Within a small geographical area, the state houses elevations ranging between 300m to 8598m. The state is flanked by Tibetan plateau in north because of which the northern part of Sikkim has close affinities with cold desert. The southern part of state has close proximity to Bay of Bengal, thereby having close resemblance with tropical moist forests. The diverse forest types include wet hill forests, deciduous forests, dense oak forests, conifer forests and exquisite rhododendron thickets giving way to alpine meadows. The diverse ecosystems of the state are tropical valleys, temperate montane habitat, alpine habitat and cold desert.

Nearly 45% of birds, 31% of mammals and 50% of the butterflies of the country are endemic to Sikkim. Approximately, 165 plant species have been first collected from here hence they are named after the state. The state possesses nearly one third of the countries flowering plants. The Tso Lhamu plateu region supports significant population of Tibetan argali and Tibetan gazelle. India's only population of Southern Kiang is also found in Tso Lhamu plateau region.

Figure 1.1: Biodiversity richness of Sikkim

3. Biodiversity and Tourism

Biodiversity is the variability among living organisms from all sources including terrestrial, aquatic-marine, and fresh water ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems. Biodiversity is the foundation of ecosystem services which are essential for human survival and well-being.

Biodiversity is pivotal for tourism. Mountains, rivers, lakes and forests are major attractions for tourists in Sikkim. Tourism in Sikkim depends heavily on recreational opportunities provided by the mountainous environment. Picturesque landscape and wildlife are major attractions for tourists to come to Sikkim.

Different roles are played by biodiversity in different types of tourism products. In most of the tourism products biodiversity contributes significantly by adding to the quality of destination along with making the destination exquisite for e.g. natural vegetation and clean air are both ecosystem services that makes the destination more attractive. Biodiversity is the soul of nature-based tourism products. Even in urban areas tourism dominantly depends on natural resources such as food, clean water and other ecosystem services that ultimately depends on biodiversity.

Loss of biodiversity is a major problem internationally. The reasons for the loss of biodiversity are habitat loss and fragmentation, introduction of invasive species, over exploitation, pollution and co-extinction. In case of co extinction if one species dies then the species dependent on it also dies for e.g. Pinus and mycorrhiza.

Tourism is one of the most important pillars of Sikkim's economy. The loss of biodiversity will lead to decline in tourism as the destination becomes less attractive. This will culminate into increased unemployment. Eventually, this will severely affect the Sikkim's economic development in long run. The protection of biodiversity in the first place is much cheaper than the conservation efforts-initiated post damage because the technological ways to repair the damage are generally expensive and less effective. Ecosystem services and biodiversity are vital for tourism therefore it is the onus of tourism sector to protect them as valuable assets. Tourism can provide positive stimulus to the conservation efforts. The protection of biodiversity is a shared responsibility that requires coordinated actions from the tourism sector, government, civil societies, NGO's and the people of Sikkim.

4. Growth of Tourism in Sikkim

Tracing the growth of tourism in the State prior to its merger with India in the year 1975, tourists' inflows to Sikkim were negligible. Even after merger, growth was slow till the 1980's as large areas remained inaccessible or restricted to tourists. It was only in the last decade of the century, that tourism growth picked up considerably as more areas came under relaxation of the permit regime and Sikkim gained popularity as an upcoming tourist destination. During the last three decades Sikkim has witnessed unprecedented growth in the arrival of number of tourists. From a mere 15000 tourists in 1980 to a whooping 14,24,965

tourists in 2017 (Domestic and foreign). Today, tourism is fast evolving as one of the most important drivers of state economy.

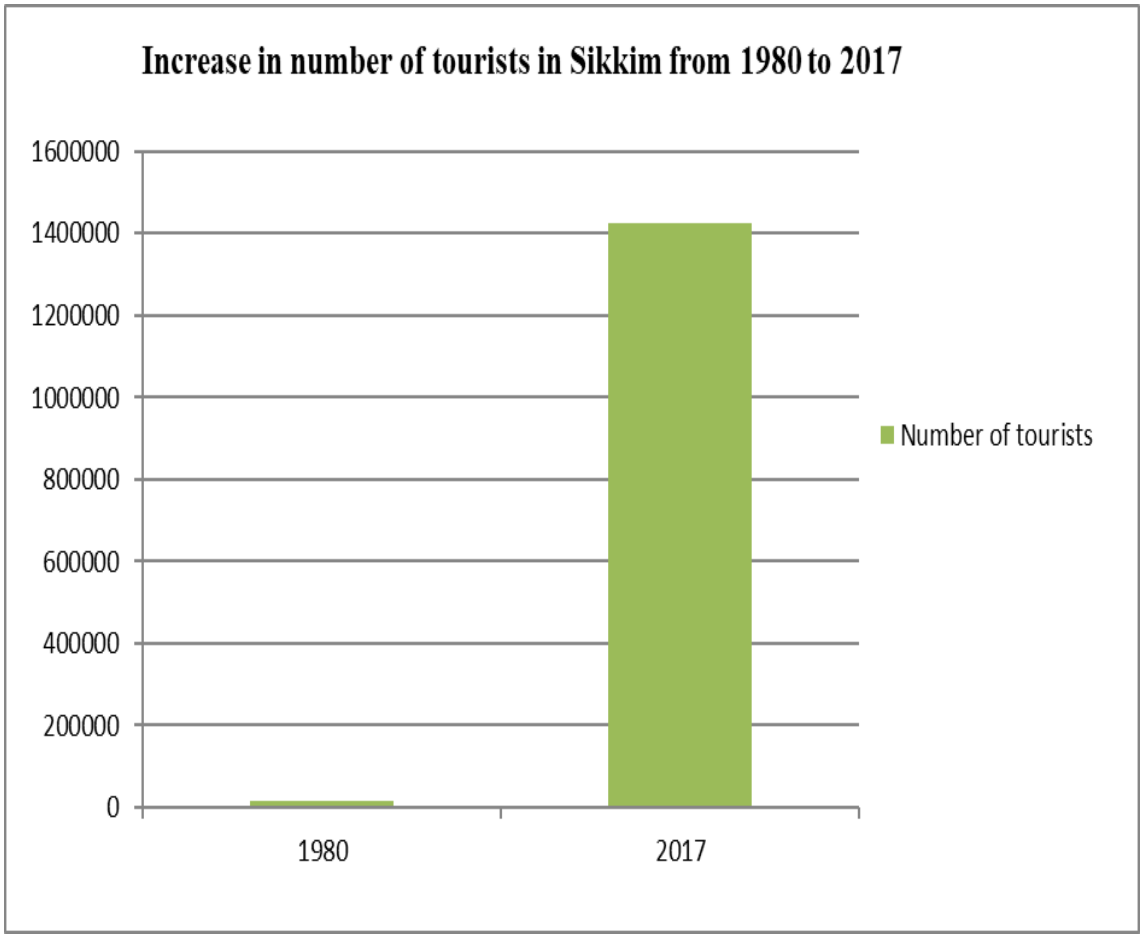


Figure 4.1: Increase in no. of tourists in Sikkim from 1980-2017
(Source: Statistical Cell, Dept. of Tourism & Civil Aviation, GoS)

5. Interface of Tourism with Biodiversity

Every ecosystem has a carrying capacity. Carrying capacity is the largest population size that an ecosystem can sustainably support without degrading the ecosystem. Tracing the growth of tourism, tourist inflows were negligible earlier. Till the 1980's the growth remained slow as large areas remained inaccessible or restricted to tourists. During the last three decades the number of tourists visiting Sikkim has increased exponentially from mere 15000 visitors in 1980 to over 14 lakhs in 2017 (Statistical Cell, Dept. of Tourism & Civil Aviation, GoS). This creates excessive pressure on natural habitats and overuse of natural resources affecting the habitats, vegetation and wildlife and ecosystems which in the first place are prime tourist attraction in a negative way. Exceeding the carrying capacity of tourist sites and ecosystems will have serious repercussions for integrity and value of biodiversity. The positive and negative impact of tourism on biodiversity are enumerated below:

5.1 Harmful Impacts

The main harmful impacts of tourism on biodiversity include the following:

a. **Land conversion for tourism:** In order to create facilities for the tourists land is diverted from green to non-green for the construction of hotels, lodges, widening of roads and other infrastructural development. The conversion of land for creating tourist facilities adversely affects biodiversity in many ways. For e.g. tourist-oriented development inevitably involves deforestation, construction and laying new roads which may prevent free movement of animals leading to fragmented populations of wildlife animals into smaller group.
b. **Pollution:** Pollution from sewage effluents, waste water and solid waste pose a serious threat to biodiversity. The treatment of sewage and waste water effluent is minimal and disposal of effluents leads to nutrient enrichment or eutrophication of water bodies which encourages algal blooms. This affects the healthy functioning of ecosystem. The disposal and management of solid waste is also poor in most of the tourism destinations because of which they enter the broader environment and cause damage to the wildlife.

The expansion of tourism sector has led to rapid growth of number of vehicles which consume tons of fossil fuels on daily basis. This causes air pollution as well as noise pollution, which in the long term will hamper growth of vegetation and propagation of wild life species along the fringes of reserve forests and protected areas. Increase in heart rate, sense of fear and hearing loss are some of the ill-effects of noise pollution on animals.

With the increase in tourism, vehicles continuously move day and night from one place to another. At night time, the headlights of vehicles cause disturbance to wild animals. Light pollution created by vehicles and high-tension electricity wires at night negatively affects the wildlife and has the potential to affect the entire ecosystem. For example, many insects are naturally drawn to light, but artificial light can create a fatal attraction. Declining insect populations negatively impact all species that rely on insects for food or pollination. Hence, the entire food web is disturbed.

Figure 5.1: Air pollution and noise pollution caused by quantitative tourism at Zero point, Yumthang Valley, North Sikkim

c. **Stress on natural resources:** During the last decade the yearly number of tourists coming to Sikkim is more than the population of the State. The tourism sector has high demand for natural resources including food, fresh water and perceived luxury items. When the rate of consumption is much faster than the rate of replenishment of natural resources it leads to over exploitation.
d. **Introduction of invasive alien species:** Sometimes tourist coming to the State may knowingly or unknowingly introduce an alien species. Not all species that arrive from outside become invasive, in fact most do not but some species may grow exponentially when introduced in a new area. For e.g. species like Polygonum, Eupatorium, Lantana etc. have spread over to different parts of the State and have also entered in the protected areas. Rapid multiplication of alien species affects the growth of native species because they hijack the resources of native species. Therefore, this disrupts the functioning of entire ecosystem and affects the native biodiversity severely.
e. **Disturbance to vegetation and wildlife:** Many plants and animal species are very sensitive to human activities. Tourism activities in protected areas can affect the wildlife in many ways e.g. reducing the breeding chances, reducing the hunting chances etc. There are evidences to suggest involvement of visitors and local people in poaching of animals and selective removal of orchids, ferns and medicinal plants.
f. **Climate Change:** The impact of climate change has become a universal phenomenon and Sikkim is no exception. The increasing temperature will threaten the existence of Tibetan gazelle and southern kiang in North Sikkim. The change in the seasonal cycle due to climate change will shift the time of flowering thereby affecting food availability for pollinators, birds, and other dependent species. Climate change triggered northwards shift of vegetation, land encroachment and human animal conflict will emerge strongly. Climate change will lead to loss of a number of species. Newspaper reports have quoted that between December 2018 to May 2019, 300 yaks starved to death in Muguthang and Yumthang in north Sikkim District (The Hindu, 12 May 2019). Yak can live upto temperature of minus 40 and is very sensitive to heat stress. Due to climate change, temperature varies and thinning of snowfall resulted in threat to yak species. Also, local community also claimed that dur to prolonged period of snowfall, the yaks had got nothing to eat. In an ecosystem everything is intricately interrelated with each other, loss of a specie or even numerical reduction in population size entail far reaching consequences.

5.2 Positive Impacts

The main positive impacts include the following:

a. **Employment and economic development:** Tourism is one of the most important drivers of Sikkim's economy. Tourism saw a big boost between 2010-17 with tourist arrival figures equalling and surpassing the State population. This gradually led to development of tourist centers like Gangtok, Pelling, Yuksom, Lachen, Lachung etc. With the development of tourist centres and circuits there has been a manifold increase in employment opportunities.

b. **Export earnings:** Tourism is a main source of export earning for Sikkim. The biodiversity richness and aesthetics of Sikkim attracts tourists from all over the globe.
c. **Income from protected areas:** Tourism generates funds for the management of protected areas.

Quantitative tourism has negative as well as positive impact on biodiversity. The negative factors severely harm the biodiversity whereas the positives impacts are not related to biodiversity and hardly restoring or able to compensate for the adverse impacts on biodiversity on tourism.

6. Tourism and the State of Economy

Tourism is estimated to contribute around 8 percent to the state Gross Domestic Product (GDP) (State of Environment Report Sikkim, 2016). Based on the figures of the tourist accommodation available and the number of service providers, direct employment generated by this sector can be roughly estimated to be around 12000 to 15000 at present. The indirect employment generated by the industry is however much larger and encompasses a broad section of population ranging from construction to supplies and various services. Clearly tourism has emerged very strongly as one of the key drivers of state economy with potential for generating long term sustainable employment.

In the last decade, tourism sector in Sikkim has seen a growth rate of 10- 12%. The Gross State Domestic Product (GSDP) of Tourism sector in 2016-17 has been valued at Rs. 1,44,735 lakhs with total contribution of tourism sector to GSDP being 7.68% (DESME state income unit).

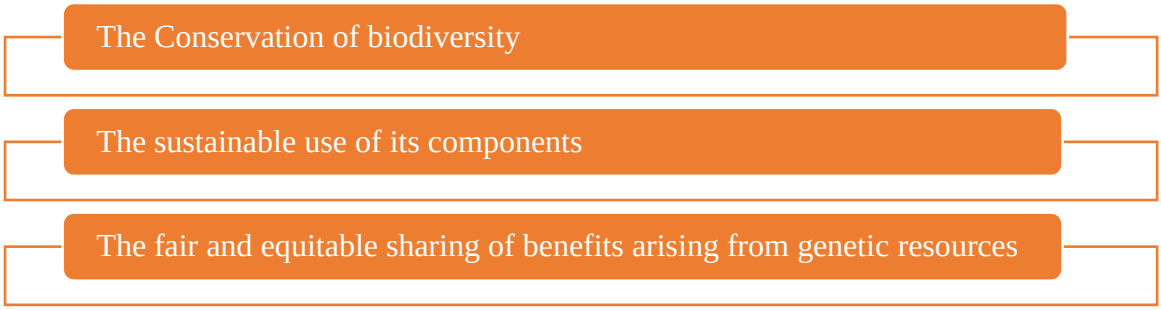
7. Biodiversity and Sustainable Tourism

Over the years the contribution of tourism sector to the Gross Domestic Product (GDP) has increased significantly. The tourism structure that has evolved over the years is quantitative tourism and not sustainable tourism. This quantitative tourism pattern negatively impacts the biodiversity of state. For example, conversion of green to non-green areas, intrusion into wild areas, over exploitation of natural resources etc. Sustainable tourism will not only protect the biodiversity of the state but also benefit local communities both economically and culturally.

Sustainable tourism is defined as "tourism that respects both local people and the traveller, cultural heritage and the environment". A sustainable approach to tourism means that neither the natural environment nor the socio-cultural fabric of the host communities will be impaired by the arrival of tourists. The relationship between sustainable tourism and biodiversity is simple: sustainable tourism should contribute to conservation of biodiversity. Principles of Sustainable Tourism:

8. The CBD Guidelines on Biodiversity and Tourism Development

The Convention of Biological Diversity (CBD) entered into force on December 1993. The convention has three main goals:



In order to promote sustainability in tourism the CBD Guidelines on Biodiversity and Tourism Development were adopted in 2004. They cover all forms of tourism activity, and are applicable for tourism which has impacts on biodiversity in all geographical locations and tourist destinations. The Guidelines include a process for policy-making, developing plans and management to implement this framework. In accordance with the 'CBD Guidelines on Biodiversity and Tourism Development' the following guidelines have been prepared for Sikkim. The guidelines will go a long way in development of sustainable tourism along with biodiversity conservation. The main highlights from CBD guidelines is as follows:

8.1 Baseline information

A baseline study is an analysis of the current situation to identify the starting points for a programme or project. Baseline information is extremely important for policy making, developing plans and decision making. This should include:

- Ongoing and planned tourism development plans and activities in Sikkim with their impact on the environment and livelihood

- Market research to know about the status/ demand of different tourism products in Sikkim
- Current socio-economic conditions at district level
- Identification of sites of particular importance, species under threat, protected areas and culturally sensitive areas
- Identification of major tourist destinations
- Damage caused to the environment in past because of development of tourism infrastructure
- Analysis of state biodiversity strategies and action plans, state tourism policy

Baseline information should incorporate all relevant information from all sources and the analysis/synthesis of all such information should be conducted by an expert team comprising of expertise fields of biodiversity and tourism.

8.2 Vision

Envisioning development of Sustainable Tourism in Sikkim that respects both local people and the tourist, cultural heritage and the environment. Tourism has the potential to sustain biodiversity along with livelihood generation.

8.3 Objectives of CBD guidelines

- Identification and evaluation of impact of major tourism activities on biodiversity of the protected areas along with major tourist destinations in Sikkim
- Preventing any further damage to the biodiversity of the state due to tourism
- Restoration of damage caused to environment in past because of tourism, wherever applicable
- Maintaining the healthy functioning of ecosystems
- Revenue sharing arising from tourism with the local community
- Promote standards and certification for the tourism industry for the protection of biodiversity and ecosystem services
- Promoting low impact value-based sustainable tourism products
- Controlled tourism in eco-fragile zones
- Awareness generation and capacity building of all relevant stakeholders as well as encouraging them to actively support biodiversity conservation along with sustainable use of its components

8.4 Policy measures

- Revisiting of existing laws and regulations on biodiversity and tourism
- Policy making for establishing standards for assessing the health of ecosystems in major tourist destinations

- Policy to ensure that economic incentives are given to those tour operators/ organizations who invest their time and resources in development of sustainable tourism
- Policy to ensure that traditional knowledge related to biodiversity is respected and practised

8.5 Impact assessment and mitigation

- Incorporating and strengthening the assessment of impact of tourism on biodiversity related issues into Environmental Impact Assessment (EIA)
- EIA should adopt all stakeholder approach with special focus on vulnerable communities
- Ensuring sufficient funds from tourism to mitigate the harmful impacts of tourism on biodiversity
- Establishing mechanisms and incentivising sustainable use of natural resources and conservation of flora and fauna of Sikkim
- Increased funding in research and development in the field of biodiversity is mandatory for a state like Sikkim
- Adoption of good practices for the conservation of flora and fauna along with generation of livelihood opportunities
- Development of other sectors of economy so that the tourism sector is nor overburdened and strict measures can be taken to move towards value-based tourism instead of mass tourism

8.6 Decision making

Decisions shave to taken on issues as proposals for development of tourism facilities and activities, policy measures, impact assessment and management along with sharing the benefits arising from the tourism with local people. All such decisions should maintain balance between economic development and biodiversity protection.

The decision-making process should be **SMART** i.e. Simple, Measurable, Accountable, Responsible and Transparent. The baseline information, impact assessment and consultation with all stakeholder is prerequisite for decision making. All decisions related to development of tourism in ecologically sensitive areas should be taken after consultation with experts in the field of biodiversity and ecology.

8.7 Strategic implementation

- Ensuring sufficient funds, Knowledge base, information and manpower for the implementation of plans
- The plans should be structured and systematic with clearly defined responsibilities
- Implementing the standards set by the ministry of tourism in its publication ‘Sustainable Tourism Criteria for India (STCI) and its indicators’

- Any revisions in the approved plans must be approved by the designated authorities
- The tourism department and forest department should work in sync to assist local and indigenous people in moving towards sustainable tourism
- Motivation is one of the most important factors in success of any scheme or plans. The tourism department should take consultancy services from motivational speakers and eminent persona's in order to generate awareness and motivate people for bringing actions into words

8.8 Monitoring and reporting

Long term monitoring and reporting is extremely important to assess the effects of mitigation measures on tourism and biodiversity. Every ecosystem has a carrying capacity and timescale to cope up i.e. some changes may visible quickly some may take some time.

The tourism department, forest department, agriculture department, horticulture department and animal husbandry department must constitute a body for monitoring and reporting. The monitoring and reporting must take into account:

- Development of baseline monitoring indicators e.g. Presence of indicator species that reflect the health of ecosystem. Assessing the health of ecosystems on the basis of baseline monitoring indicators
- Assessing the impact of mitigation measures on tourism and biodiversity
- Compliance with the standards set by ministry of tourism for accommodation sector and tour operators
- Proportion of tourism income retained by the local community
- Contribution of tourism to the well-being of the local population

8.9 Ecosystem approach

The ecosystem processes are non-linear, complex and poorly understood. In the absence of complete understanding of ecosystem dynamics there is need to follow ecosystem approach i.e. following the strategy of 'learn by doing' or research learnings. The policy making and developmental plans should be flexible enough to accommodate changes. Implementation programmes should be designed to adjust to the unexpected, rather than to act on the basis of a belief in certainties. Ecosystem management also needs to recognize the diversity of social and cultural factors affecting natural-resource use and sustainability.

8.10 Awareness, education and capacity building

Education and awareness are required at all levels. The Human Resource Department can play a key role in educating the youth of Sikkim about the significance of its Sikkim's biodiversity. Services of experts in the field of biodiversity and tourism should be utilized for preparation of tourist information brochure and developing a training programme for tourist guides highlighting the uniqueness of Sikkim's biodiversity, ecosystems and agricultural landscapes. The implementation of training programme for tourist guides will be the onus of tourism department.

- There is need of education and awareness programs on biodiversity at all levels with special focus on primary level
- The awareness generation programmes should make use of tools to generate awareness. For e.g. Political speeches, making eminent personas as brand ambassadors for biodiversity conservation, trainings, seminars, workshops, posters, advertisements etc
- Capacity building of all stakeholders with special focus on Tourism department, forest department and Local and indigenous people

8.11 Methodology

The tourism department and the forest department must constitute a team to collect baseline information on parameters mentioned above. Subsequently, a qualified team having expertise in the field of biodiversity conservation and tourism should be constituted for the analysis and synthesis of baseline information. The tourism and the forest department should then frame a policy to strengthen sustainable tourism in the state along with biodiversity protection. This should be followed by the development of management plans for fostering sustainable tourism in protected areas and in major tourist destinations. Once the management plans are implemented this should be followed by the constitution of expert team for monitoring the implementation.

9. The Economics of Ecosystems and Biodiversity (TEEB)

The Economics of Ecosystems and Biodiversity (TEEB) was a global initiative jointly initiated by the German Federal Ministry for the Environment and the European Commission in 2007 under the leadership of Pavan Sukhdev. It is a major international initiative focused on "making nature's values visible". Its main objective is to mainstream the values of biodiversity and ecosystem services into decision-making at all levels. It aims highlight the benefits provided by ecosystems and biodiversity, demonstrate their values in economic terms and, where appropriate, suggest how to capture those values in decision-making. It also draws attention towards the growing costs of biodiversity loss and ecosystem degradation.

In order to foster sustainable development TEEB has developed guidance for policy makers at international, national and local levels. The TEEB study is based on three core principles: Recognizing value, demonstrating value and capturing value. It highlights the best solutions suitable for wider replication. The following section describes how the solutions proposed by TEEB can be applied to Sikkim:

9.1 Rewarding benefits through market-based mechanisms

The tourism sector needs to adopt a system where the contribution of ecosystem services to tourism is recognized and paid for, for example through establishment of Payments for Ecosystem Services (PES) schemes; and continue efforts to improve the sustainability of supply chains and reduce their level of use of ecosystem services. Strengthening PES Schemes will go a long way in protection of biodiversity.

- The state government can implement PES schemes through tax mechanism but for this there should be a clear link between the ecosystem service and tax. For example, Suppose the State government invests heavily for conservation of critically endangered birds and this leads to increase in the population of birds. Then the state government can impose tax on visitors who come for watching the critically endangered bird
- Eco-labelling will help in reducing the impact on natural capital. For e.g. Green key is one such worldwide eco-label awarded to leisure organizations, such as hotels, hostels, conference and holiday centres, campsites, holiday houses and leisure facilities. To obtain The Green Key the company has to fulfil a list of environmental requirements. The Green key award will increase the visibility of the organization by displaying the organization on the Green Key Map. Several online travel agencies will also show the Green Key award on their website. This will make the organization popular among for tourists
- Rewarding sustainable tour operators that abide by the Sustainable Tourism Criteria for India (STCI) and its indicators'
- Every hotel must have sustainable tourist guidelines. The tourist that abide by these guidelines must be rewarded by the hotel for e.g. by giving some cash back or redeem points on next visit

9.2 Reforming environmentally harmful subsidies

Environmentally harmful subsidies are like double edged sword. On one hand they harm the environment and on the other hand they overburden the state budget. Examples includes subsidies in the transport sector, subsidies in construction and housing sector and subsidies that keep the price of fossil fuel energy artificially low, contributing to the environmental problems associated with production and consumption of fossil fuels. It is high time to move away from environmentally harmful subsides and invest in clean technologies. By incentivising environmentally sound technologies like air pollution mitigation equipment, renewable energy technologies such as solar panels etc. will bring several benefits for the state of Sikkim.

9.3 Investing in Ecological Infrastructure

Ecological infrastructure refers to naturally functioning ecosystems that deliver valuable services to people, such as fresh water, climate regulation, soil formation and disaster risk reduction. Rapid growth in the tourism sector has degraded many natural ecosystems therefore investing in the restoration of degraded ecosystems will generate new opportunities for tourism along with conservation of biodiversity. For example, TFS is an amalgamation of natural and manmade adaptive agro-ecosystem developed by mountain communities. It is an evolved dynamic landscape management system that supports ecological and livelihood needs. Restoration of Sikkim Himalayas TFS will benefit the agrobiodiversity as well as the tourism sector.

The state of Sikkim is a paradise for ornithologists. Of the 78 globally threatened bird species of the Indian subcontinent, 17 threatened (three critically endangered, one endangered, and 13 vulnerable) and ten near threatened species occur in Sikkim (IUCN, 2009). It has been

suggested that Government of Sikkim should invest in ecological infrastructure for the conservation of rare, threatened and endemic species of birds.

9.4 Addressing losses through regulation and pricing

Many threats to the ecosystem services and biodiversity can addressed through regulation and pricing. Regulations for the protection of biodiversity include controls on developmental activities in sensitive areas, establishment of new protected areas, regulating water use, regulations on waste water discharge, integrated land use planning and incorporating consideration of biodiversity and ecosystem services while developing plans for tourism activities. Also, the use of tried and tested principles like 'precautionary principle' and 'polluter pay principle' will help in striding towards sustainable tourism.

Several studies have highlighted that plant species in Sikkim will shift towards higher elevation and northwards from their current habitats under future greenhouse gas emission scenarios. In order to avoid this catastrophe, it is recommended to establish three new protected areas in Lachen, Chungthang and Yumsedong regions in the North district of Sikkim. All three new proposed regions are pristine ecosystems, which harbour some of the rare species.

The conservation programmes are based mostly on charismatic and large species and the threats of many less glamourous species for example, butterflies but playing equally important role in the ecosystem, go unnoticed. The state of Sikkim is home to 50% butterflies of the country. High diversity of butterflies and also other flora and fauna at low and mid elevational forests shows that the biological hotspots in Sikkim lies within 1800m elevation (Acharya, 2008; Chettri et.al,2010; Acharya et.al; 2011). In Sikkim, 31% of the geographical area is under protected area network but most of the protected areas are located above 1500m (Anon, 2003: http://www,sikenvis.nic.in/wildlife.htm). The distribution of protected areas should be consonance with the distribution biological diversity. Only Kitam bird sanctuary is present in low elevational areas (320-825 m) but the area of this sanctuary is mere 6 sq.km. Therefore, further extension of protected area network in areas below 1800m is necessary for the conservation of rich biodiversity including butterflies. (Acharya, 2011)

9.5 Adding values through protected areas

Investment in maintenance and conservation are much cheaper than the cost of restoring damaged ecosystem. Conservation of protected areas helps in meeting key policy objectives such as reduced risk from natural hazards, incrementing resilience to climate change, improved water and food security which contributes to poverty alleviation.

Sustainable tourism in protected areas adds to the value of protected areas. In order to raise funds many protected areas collect a nominal amount from the tourists. While the tourism sector needs to generate sufficient revenues to pay for the ecosystem services that protected areas provide for tourism, protected areas also need to develop and implement effective tourism management plans that integrate tourism alongside their conservation management priorities.

10. Capacity Building for Tourism and Biodiversity

Capacity building of stakeholders can be achieved by focusing on education and awareness raising campaigns on the impacts of tourism on biodiversity, good practices in this area and highlighting the importance of traditional knowledge.

I. **Local communities** should be made aware of the value of conserving and protecting their biodiversity and natural attractions to sustain a viable tourism revenue source. Initial awareness raising should be conducted before developing tourism in an area with communities and before benefits are distributed. Regular meetings, perhaps annually or more frequently should be held to build awareness about the key link between conservation and tourism. In order to increase the awareness of local communities a short video has been prepared by IIPA, New Delhi highlighting the importance of biodiversity and how it can give a boon to local economy.

II. **Tourists:** International and domestic visitors should be made more aware of the biodiversity impacts of their activities and the facilities and services that they choose to use. Campaigns can be targeted to those user groups with highest volumes or highest rates of impacts on specific resources. This can be achieved through working with a number of different communication channels, including:

- Travel writers and general news media, including publishers of guidebooks and online information.
- International and local tour operators, including specialist companies and brands relating to nature and adventure travel as well as those operating in the more general market. Increasing numbers of tour operators and networks are embracing sustainability in their operations and market positioning, including engagement in certification schemes. They need to be made more aware of the biodiversity dimensions of this and relevant messages to use.
- Social and Internet-based media, including use of travel blogs, Facebook pages, Twitter feeds and interaction with consumer-generated evaluation processes

III. **Key government departments:** More support could be given to global, regional and national initiatives to further raise the profile of tourism as a tool for sustainable development, including its contribution to rural livelihoods and biodiversity, especially with high level ministries responsible for development and finance as well as environment and tourism ministries.

IV. **Educational bodies:** Academic, research and training institutions should cover biodiversity and tourism relationships in their activities and teaching. This is particularly important in reaching the current and future personnel who make relevant decisions at all levels and interface with visitors.

11. Case Study: Tourism Can Sustain Biodiversity

Tsomgo lake is a glacial lake located in east Sikkim district. More than 3 lakh tourists visit the lake every year. The lake is about 15m deep and 1 km long. The lake receives its water from the melting of snow from the mountains surrounding it. The lake is considered sacred

by both Hindus and Buddhists. According to local legends, it is said that Buddhist monks used to predict the future by observing the changing colours of lake.

The local are dependent on the lake for their livelihood but heavy tourist footfall over the years have affected the ecological health of the lake. The shops situated very near to the lake were polluting the lake severely. Plastic bags, leftovers and wrappers etc. ultimately make their way to the lake. Thereby, seriously affecting the biodiversity of lake.

Due to the spiritual, cultural and environmental significance of the lake Tsomgo Pokhri Samrakshan Samiti (TPSS)was constituted in 2008. One member from each household in the lake catchment area is a member of the samiti. The samiti is presided by the panchayat of the ward. The representatives from the Shopkeepers' Association, Tourism Department, Taxi Driver's Association and the Police Department act as the executive members of the samiti. The position of members secretary is reserved for the Range Officer from the forest department. The forest department of Sikkim in collaboration with WWF- India, Sindrabong Khangchendzonga Ecofriendly Society and The Mountain Institute issued lake conservation guidelines to restore the ecology of the lake.

Success: The efforts of the samiti proved instrumental in managing the waste coming out from the lake side shops. This was achieved by shifting the lake side market to other suitable location. The waste generated is collected in Resource Recovery Centre on regular basis. The waste is then segregated and then transferred to secure landfills. In order to curb the use of single use plastic bottles, the samiti has installed water filters in the market. TPSS sells picture postcards as entry tickets. The revenue generated is used for supporting lake conservation activities.

The concern and efforts shown by the locals have contributed towards the restoration of the ecology of the lake. Proper management of waste along with shifting of shops has improved the water quality of lake. These efforts will go a long way in restoring the ecosystem services and biodiversity of lake.

12. Recommendations

During the last three-decade Sikkim has seen unprecedented growth in number of tourist's arrivals. The state of Sikkim offers a range of tourism products but the most predominant one is the conventional leisure-based tourism. These tourists come basically to enjoy the aesthetics of Sikkim along with its cool climate. This form of tourism creates high impact on natural resources and environment for e.g. higher water and energy consumption, increase in vehicular emissions, higher generation of waste etc. Therefore, there is a need for development of alternate tourism products. The alternate tourism products should not only protect the environment but at the same time strengthen the local economy. Three such tourism products have been identified. These tourism products will diversify the visitors and will protect the major tourist destinations from overcrowding. The recommended sustainable tourism products are:

12.1 Agro-Tourism Based on Traditional Farming System (TFS)

Globally Important Agricultural Heritage Systems" (GIAHS) are outstanding landscapes of aesthetic beauty that combine agricultural biodiversity, resilient ecosystems and a valuable cultural heritage. Located in specific sites around the world, they sustainably provide multiple goods and services, food and livelihood security for millions of small-scale farmers. While the United Nations Educational, Scientific and Cultural Organization (UNESCO) aims to designate and protect historic monuments and buildings and natural areas, the purpose of GIAHS is to seek maintenance and conservation of agricultural systems to pass them to future generations, through the granting of special designation.

There are three regions of India, which has been designated as the GIAHS sites: Saffron heritage of Kashmir (2011); Koraput traditional agriculture, Odisha (2012) and Kuttonad below sea level farming, Kerala (2013). The GIAHS designation is important because of its emphasis on agricultural biodiversity, which is beneficial for food security worldwide. Many GIAHS sites have developed their own inventories for agrobiodiversity, and have begun to promote the conservation and safeguarding of endemic and endangered crop varieties. Policymakers in GIAHS countries have become more aware of the importance of conserving traditional agricultural systems, and those countries are also creating committees to oversee the management of their GIAHS sites. GIAHS designation has promoted agro-tourism, revitalized local cultural activities, and created an alternative source of employment, especially for women and youth. Some sites have additionally seen a higher demand for the local products that they provide, which has improved the livelihoods of local farmers and communities.

The exuberant Sikkim Himalayan Traditional Farming System (TFS) are examples from Eastern Himalayas that supports ecosystem services and livelihood to mountain communities. They are considered to be adaptive to climate change situations and serve as efficient means to carbon sinks. Due to the remarkable significance of TFS in the mountain ecosystem and livelihood, the Sikkim Himalayan Agriculture Systems has been considered as an associate site under the FAOs GIAHS programmme. The Designation of Sikkim Himalayan Agriculture Systems as GIAHS site will not only preserve agrobiodiversity but will also give a boost to tourism. The development of **TFS Tourism Products** will open new livelihood opportunities for the local community along with biodiversity protection.

12.2 High Altitude Wetland-Based Tourism

Sikkim has many high-altitude wetlands/lakes for example Gurudongmar lake situated (5343m) and Chholhamu lake (5300m). High altitude wetlands regulate the flow of streams and buffer the downstream areas from floods and droughts. They also help in micro-climate regulation. These ecosystems are extremely rich in biodiversity as they provide habitats to many species. They provide critical water bird habitat, have fish resources and contributes significantly to the local economy apart from being prized tourist destinations. At present there is no Ramsar site in Sikkim but the process of applying for Ramsar site status for three wetland complexes has been initiated. The designation of Ramsar site will bring strengthen sustainable tourism credentials of the state by significantly increasing academic tourist inflow. The development of sustainable high-altitude wetland-based tourism products will not

only provide aesthetic and adventurous opportunities to the tourists but will also help in creating livelihood opportunities for the locals.

12.3 Strengthening Village Based Tourism

Though the concept of village tourism is not new to Sikkim but a lot needs to be done to strengthen the village-based tourism products. Village tourism revolves around staying with locals at their houses (homestay), dining with them, and witnessing and partaking in their daily chores like milking cows, making butter, fodder collection and feeding cattle, cardamom weeding and harvesting.

Generally, development of tourism facilities is identified with large scale infrastructural development but in case of village tourism there is no need of ostentatious hotels and cafes. The concretization of villages will defeat the entire goal of sustainable tourism for biodiversity conservation. Therefore, all what is required is development of Himalayan Homestays and Himalayan eco cafes. Himalayan homestays are uniquely rich in culture and can be constructed with minimal or no changes to traditional homes causing no harm to the environment. Whereas, several eco cafes can be established throughout the trekking trails. The villagers should be encouraged to sell locally produced food which prevents health hazards, littering, and keeps the money within Sikkim. The development of village-based tourism products will not only help the local economy but will go a long way in biodiversity protection.

Story Board: Sustainable Tourism for Biodiversity Conservation and Livelihood Enhancement

Sikkim is reckoned for its rich biodiversity globally, and is a part of the Eastern Himalayan hotspot.

Snow leopards are natural inhabitants of Sikkim Himalayas and play an important role in maintaining the ecological integrity of the area. [Prey species: blue sheep, Himalayan tahr, argali etc.] The prey species of snow leopards share their habitats with domestic livestock. For the snow leopard, it is easier to stalk and kill domestic livestock. This is catastrophic for Herders who in turn kill the snow leopard in retaliation.

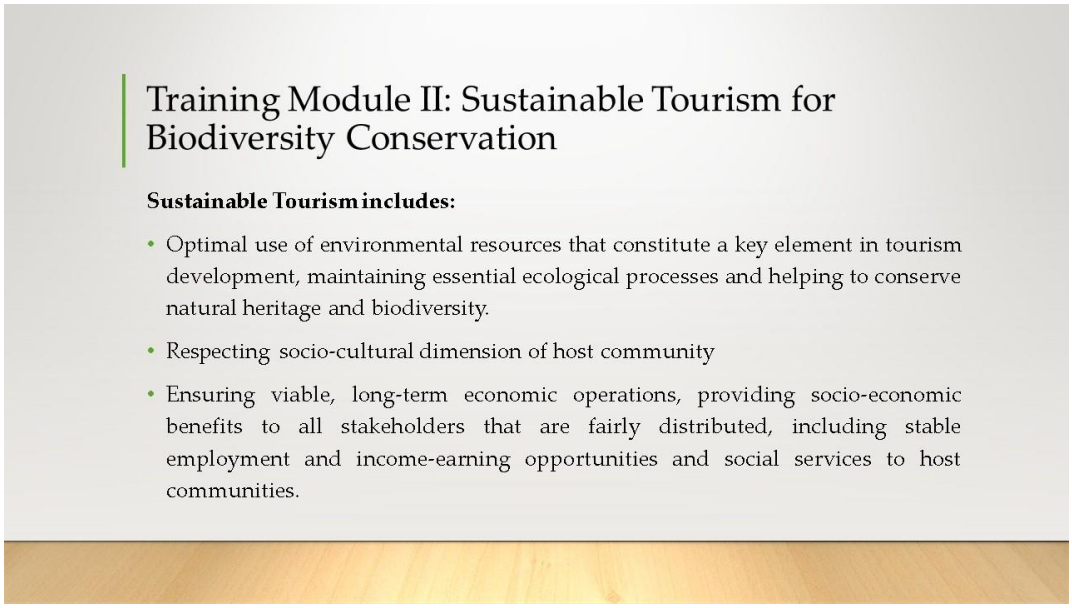
The snow leopard is not an ominous animal; in fact, it is a charismatic animal. It is the topmost predator and controls the functioning of the entire ecosystem in which it lives.

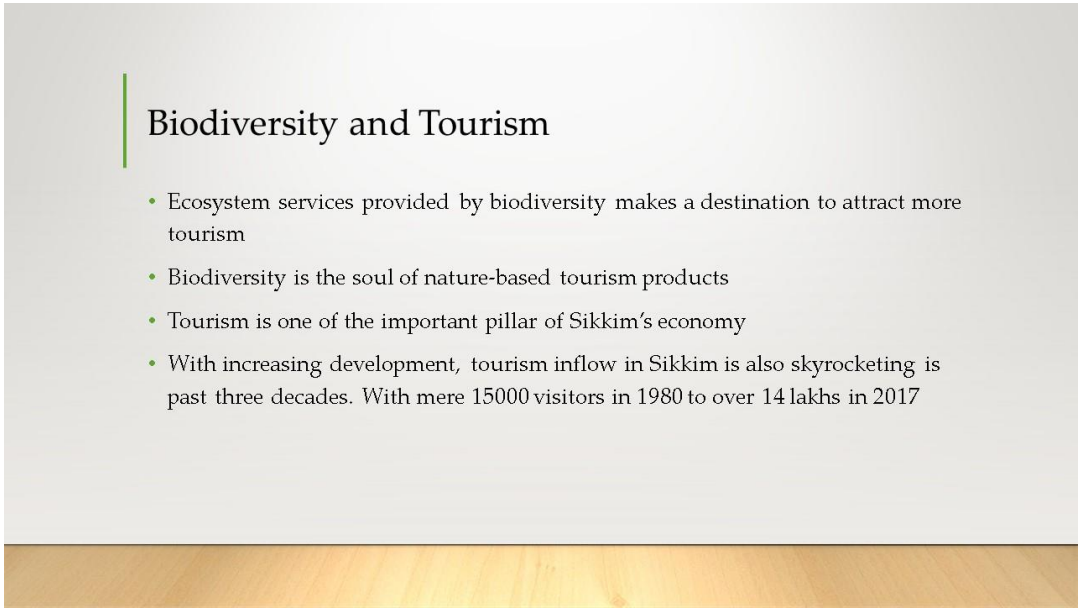
Therefore, for securing livelihood the concept of Himalayan homestays and eco cafes can be promoted in Sikkim. As snow leopard is a fascinating animal, large number of tourists will come every year for safaris and stay in the Himalayan homestays.

Himalayan homestays are uniquely rich in culture and can be constructed with minimal or no changes to traditional homes causing no harm to the environment.

Several eco cafes can be run established throughout the trekking trails. The villagers should be encouraged to sell locally produced food which prevents health hazards, littering, and keeps the money within Sikkim. The additional income from homestays and eco cafes helps villagers to offset their livestock losses to snow leopards. Accordingly, sustainable tourism will help in protection of biodiversity along with the generation of livelihood opportunities.

Presentation for Training





Impacts of Tourism

NEGATIVE IMPACTS

- Land conversion for tourism
- Pollutions: air, soil, water as well noise
- Stress on natural resources
- Introduction of invasive alien species
- Disturbance to vegetation and wildlife
- Climate Change

POSITIVE IMPACTS

- Employment and economic development
- Export earnings
- Income from protected areas

Tourism and state of economy

- Tourism is estimated to contribute around 8% to the state GDP
- Direct employment generated by this sector is roughly 12000 to 15000, indirect employment would be much larger
- It has a potential for generating long term sustainable employment
- In the last decade, tourism sector in Sikkim has seen a growth rate of 10-12%
- There is a need to focus more on sustainable tourism

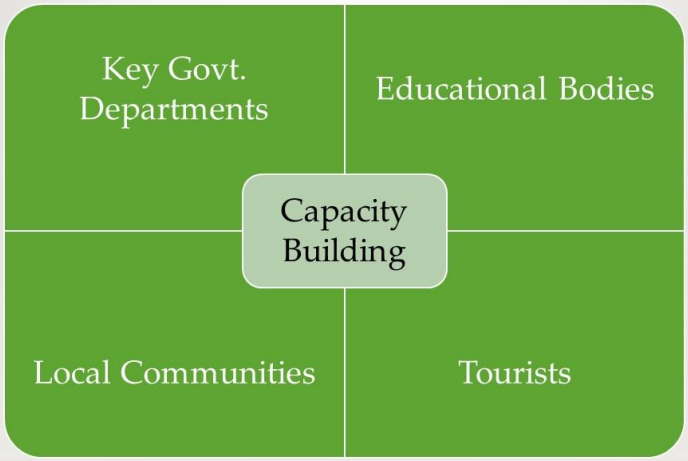
Principles of Sustainable Tourism

CBD Guidelines (main highlights)

- Baseline Information
- Vision
- Objectives
- Policy measures
- Impact assessment and mitigation
- Decision Making
- Strategic implementation
- Monitoring and reporting
- Ecosystem approach
- Awareness, education and capacity building

The Economics of Ecosystem and Biodiversity (TEEB)

- Rewarding benefits through market-based mechanisms
- **Reforming environmentally harmful subsidies**
- **Investing in Ecological Infrastructure**
- Addressing losses through regulation and pricing
- **Adding values through protected areas**



Recommendations

- **Agro-Tourism Based on Traditional Farming System (TFS)**
- **High Altitude Wetland-Based Tourism**
- **Strengthening Village Based Tourism**

Case study: Tourism can sustain biodiversity

- More than 3 lakh tourists visit the Tsomgo lake every year. It is considered sacred by both Hindus and Buddhists.
- Local are dependent on the lake for their livelihood. But heavy tourist footfall affected the ecological health of the lake.
- In lieu of spiritual, cultural and environmental significance of the lake, Tsomgo Pokhri Samrakshan Samiti (TPSS) was constituted in 2008.
- The forest department of Sikkim in collaboration with WWF-India, Sindrabong Khangchendzongs Ecofriendly Society and The Mountain Institute issued a conservation guidelines to restore the ecology of the lake.
- As a result, lake side market shifted, waste generated is collected, segregated and transfer to secure landfills on regular basis
- Revenue generated by selling picture postcards is used to support lake conservation activities

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