May 2012

ENVIRONMENTAL ASSESSMENT GUIDELINE FOR TOURISM ACTIVITES

National Environment Commission
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Foreword

In 1999, the National Environment Commission published six sectoral environmental assessment guidelines for the mining, roads, industries, hydropower, power transmission lines and forestry sectors. These guidelines were intended to guide different project proponents through the process of acquiring an environmental clearance for their projects. These sectoral guidelines were later revised in the year 2003 to make them more practical and relevant to the Bhutanese context and also to streamline with the provisions of the Environmental Assessment Act 2000 and its Regulation 2002.

The revised sectoral guidelines of 2003 have played a very instrumental role in guiding the proponents and the sector agencies in the Environment Assessment (EA) process. However, these sectoral guidelines were long overdue for revision and through the World Bank IDF grant the guidelines were revisited and proposed for revision. All the relevant stakeholders were consulted several times for this revision and through the expert input from both local and international consultants the guidelines were revised to align with the changing government policies and rules and with the long-term objectives of protecting our pristine environment.

The NEC is grateful to the World Bank for their financial assistance to revise and update these guidelines. The revision and updating of these guidelines were accomplished through close consultation with all the relevant stakeholders. We would also like to express our gratitude and appreciation to all the ministries and stakeholders for their active participation, support and inputs. The NEC would also like to thank the team from the Centre for Science and Environment, New Delhi for their hard work and inputs in updating these guidelines especially Mr. Chandra Bhushan, Mr. Sujit Kumar Singh and Ms. Swati Singh Syambal. We are confident that the revised guidelines will be more useful documents that facilitate and expedite the environmental clearance process.

The environmental assessment process endeavors to mitigate and prevent undesirable impacts of developmental activities. It is in no way intended to hamper socio-economic development in Bhutan but to guide project proponents and sector agencies in making right investments in land, manpower, technology and mitigation measures to ensure that their projects have the least possible impacts on the environment. It's the sincere wish and hopes of NEC that all the stakeholders' make the best use of these guidelines, which in turn will help in protecting our fragile ecosystem. Sound implementation of these guidelines will go a long way in minimizing the negative impacts of developmental activities on Bhutan's environment.

Dr. Ugyen Tshewang
Secretary, NEC

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List of Abbreviations

BAP	Biodiversity Action Plan
CA	Competent Authority
CSE	Centre for Science and Environment
EA	Environmental Assessment
EC	Environmental Clearance
EIA	Environmental Impact Assessment
EMP	Environment Management Plan
ETP	Effluent Treatment Plant
FDM	Fugitive Dust Model
HAPs	Habitat Action Plans
NEC	National Environment Commission
NEERI	National Environmental Engineering Research Institute
NOC	No Objection Certificate
PAP	Project-affected Population
PM	Particulate Matter
PPE	Pollution Preventive Equipment

R&R	Resettlement and Rehabilitation Plan
SAPs	Species Action Plans
STP	Sewage Treatment Plant
USEPA	United States Environmental Protection Agency
ToR	Terms of Reference

CHAPTER 1

Introduction to the Tourism Sector

1.1 Background

Due to diverse environmental impacts, tourism projects in most countries today require an Environmental Impact Assessment (EIA) study before they are accorded environmental clearance. This holds true for Bhutan as well. It is regulated ***under the Environmental Assessment (EA) Act, 2000 and Regulation for Environmental Clearance of Projects 2002.*** The EA Act and its Regulation establishes procedures for the assessment of potential effects of strategic plans, policies, programs and projects on the environment, and for the determination of policies and measures to reduce potential adverse effects and to promote environmental benefits. According to the EA Act, Environmental Clearance (EC) is mandatory for any project/ activity that may have adverse impact(s) on the environment. The Regulation for Environmental Clearance of Projects 2002 defines responsibilities and procedures for the implementation of the EA Act concerning the issuance and enforcement of environmental clearance. According to the legal framework, the National Environmental Commission (NEC) is the nodal agency for administering and granting Environmental Clearance (EC).

The scope of the guideline is as follows:

- Provide guidance and assistance to various stakeholders involved in the EA process.
- Assist the regulatory agency and EIA practitioners to understand the main areas of concern and use that understanding to enhance the quality of the EIA study and report.
- Inform the regulatory agency and EIA practitioners about the best environmental management practices in the tourism sector.
- Assist the regulatory agency to better assess the EIA report and arrive at a sound decision.

1.2 Introduction to Environmental Impact Assessment (EIA)

According to the United Nations Environment Programme's Division of Technology, Industry and Economics, an EIA is a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, finding ways and means to

reduce the adverse impacts, shaping projects to suit the local environment, and presenting options to decision-makers.

An EIA can bring about both environmental and economic benefits, such as reduction in costs and time taken for implementation and design of a project and lesser intervention of legalities and regulations. A properly conducted EIA lessens conflicts by promoting community participation, informs decision-makers, and helps lay the base for environmentally sound projects (*See Box 1: Integration of EIA in the project cycle*).

1.3 Generic Steps in the EIA Process

The EIA process comprises of six key steps:

i. **Screening**: The first step helps decide whether an EIA is required for a project or not. An appropriately designed screening system can prove to be an effective tool to prevent the squandering of time and money on assessing projects with insignificant environmental impacts.

ii. **Scoping**: Scoping is considered the backbone of the EIA process and is ideally undertaken at the project planning stage. The main objective of the scoping process is to establish the environmental and social priorities, set the boundaries for the study and define the Terms of Reference (ToR). Systematic and well planned scoping forms the basis of an effective and efficient EIA process. It also helps avoid unfocused and voluminous reports. Ideally, the role of scoping is to determine three key issues a) Site alternatives b)Design alternatives c)Justifications for the project

SCOPING HELPS FIND ANSWERS TO QUESTIONS LIKE:

- What are the issues to be addressed?
- How should one proceed with the EIA study?
- What is the extent of the analysis needed?
- What is the infrastructure needed?
- What kind of people should be involved in the assessment?

iii. **Baseline data generation**: Baseline data provides a detailed description of the existing status of various environmental and social components in the study area. Both primary and secondary data is collected to describe this status.

iv. **Impact assessment**: In this step, the characteristics of potential impacts are identified, evaluated and predicted using the baseline information on one hand and the features of the project on the other (cause-effect relationship). Impact

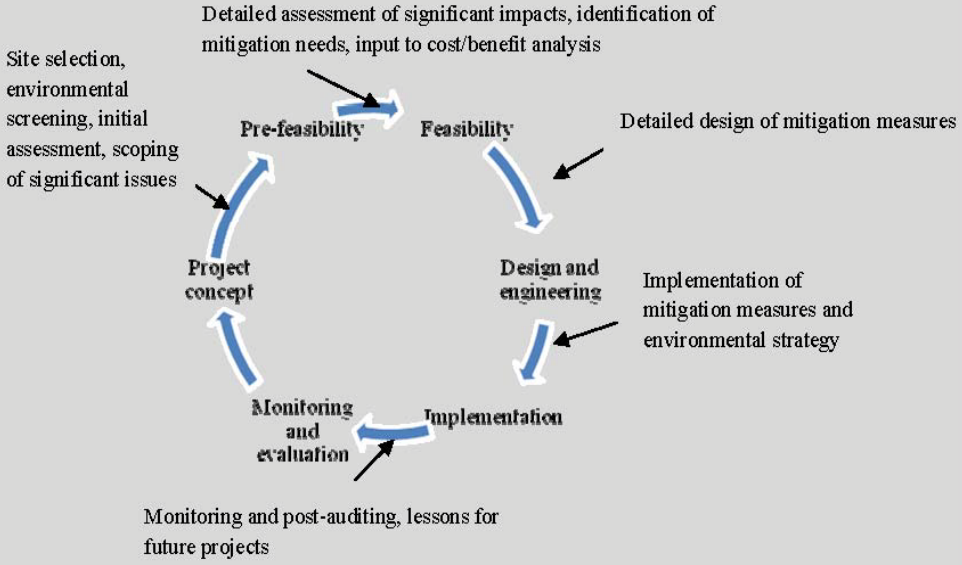
predictions are normally done by using common methodologies and models. However, models should be used with care and prudence, as most of them are designed keeping in mind the requirements of the developed world; also, in most developing countries, the quality of data used to design these models is not always adequate.

Box 1: Integration of EIA in the project cycle

Any tourism project is accomplished in six stages: (1) Project concept (2) Pre-feasibility (3) Feasibility (4) Design and engineering (5) Implementation and (6) Monitoring and evaluation. Environment Impact Assessment plays an important role in every stage of this cycle. Most of the EIA activities take place during the pre-feasibility and feasibility stages. Between project concept and pre-feasibility stage, the EIA process involves site selection, screening, initial assessment and scoping on significant issues. Detailed EIA assessment starts at the project feasibility stage. This includes an evaluation of significant impacts, including the gathering of baseline information, prediction and quantification of impacts, and a review of the EIA by the regulatory agency.

Following these initial steps, environmental protection measures are identified, environmental operating conditions are determined, and environmental management is established. In the last phase of the feasibility study, the monitoring needs are identified, and an environmental monitoring programme and environment management plan are formulated.

Environmental monitoring is designed to generate information on the actual impact due to the project activity, compliance with environmental conditions and the effectiveness of the environmental mitigation measures. The environmental management plan, which describes the mitigation measures, is considered in the project cycle right from the implementation of the project (during construction, operation and maintenance); the plan's aim is to reduce the environmental impacts.



v. **Mitigation of impacts**: At this stage, the possible preventive, remedial and compensatory measures for each adverse impact are determined and recommended.

vi. **Environment Management Plan**: An environment management plan (EMP), also referred to as an impact management plan, is usually prepared as part of the EIA reporting process. It translates recommended mitigation and monitoring measures into specific actions that have to be carried out by the proponent. Depending upon specific requirements, the plan may be included in the EIA report or can be prepared as a separate document.

1.4 Good Practices in EIA

An EIA should not be used just as a tool for obtaining environmental clearance; rather, the project proponent should see it as a management tool for sound planning of tourist projects. On the other hand, it should be the responsibility of appraisal authorities to ensure that the project causes minimal environmental impacts and brings maximum socio-economic benefits as a whole.

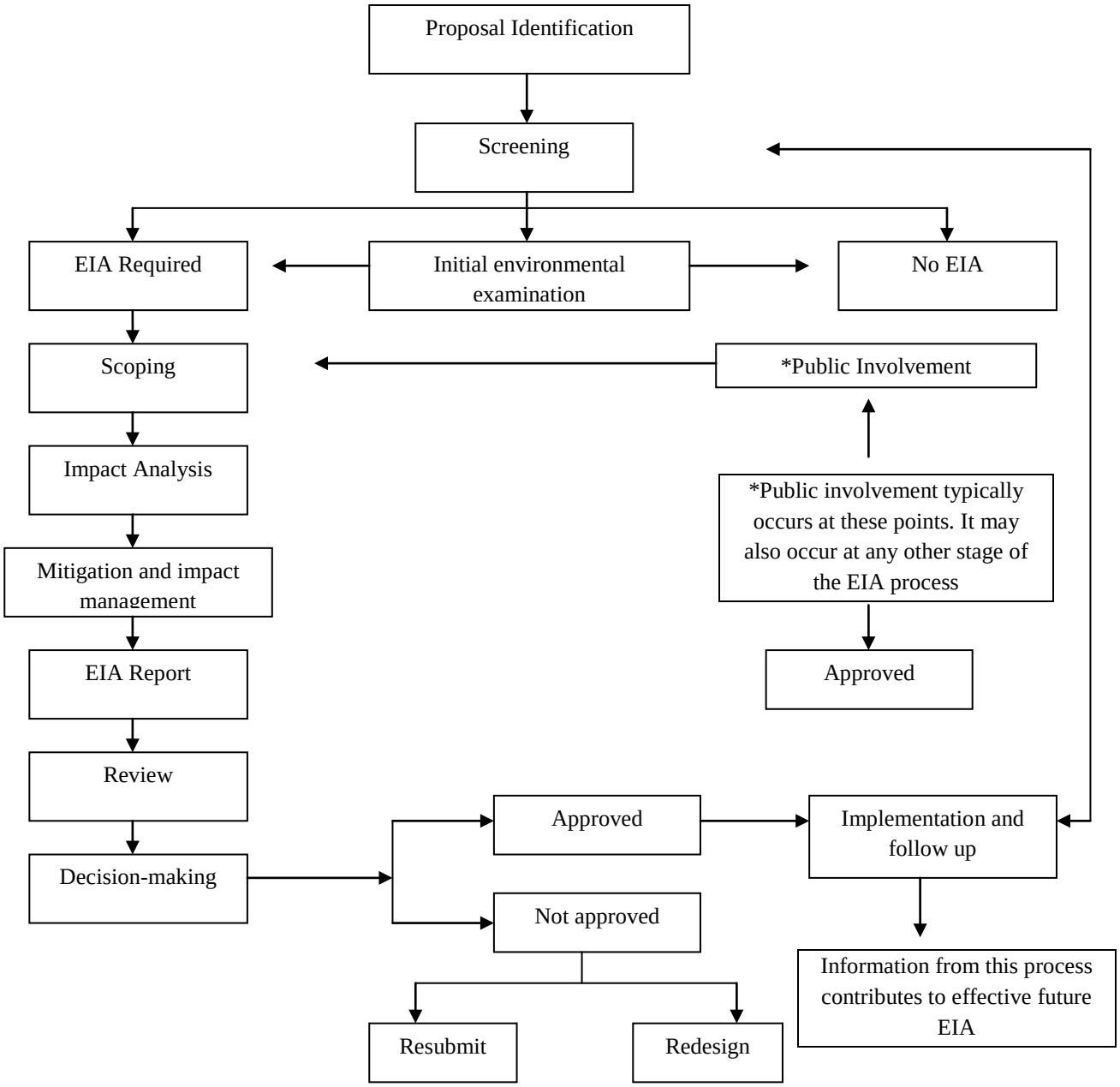
The effectiveness of the EIA process depends on many guiding factors – these include:

- The extent and kind of legal support it is getting in the host countries
- How the EIA is being conducted
- The stakeholders involvement at different stages
- The quality of the EIA
- Accreditation status of consultants who prepare the EIA
- How the environmental, social and economic findings are presented
- Composition and skills of the review committee.

As a good practice, it is always recommended to conduct an initial environmental examination of the project to determine if it requires an EIA or not. It is also advisable to involve the public from the very beginning in the scoping process as well as in various stages of project development (*See Figure 1.1: Best Practices in EIA*). The size, scale, site sensitivity and pollution potential should be considered while deciding the study area, duration and scope of the EIA.

Best practices in an EIA process include preparing a report which is comprehensive and focused, and contains only the significant parameters instead of data and information which are irrelevant to the overall assessment of the project. The extent of the assessment required should be decided after careful examination of likely impacts on the environmental and existing socio-economic settings at the project site.

Figure 1.1: Best practices in EIA



1.5 Potential environmental and socio-economic impacts of the tourism sector

Tourism is emerging as one of the largest sector in Bhutan. The sector not only boosts GDP growth but also encourages infrastructure development in an area. In a country like Bhutan, which is rich in biodiversity, tourism is essentially nature-based. Thus, tourism projects have a considerable ability to influence environmental quality by degrading biological and cultural diversity.

Potential negative impacts arising from the tourism industry on environment include: change of land-use pattern, impact on biodiversity, pollution of water resources, land degradation, air pollution and noise, solid wastes and littering, generation of sewage and pollution etc. Some of the potential impacts of tourism sector are given below:

1.5.1 Impact on land environment

Some of the land related impacts of tourism sector are:

- Displacement and loss of livelihood due to land acquisition.
- Significant change in land-use pattern: Demand of more land for setting up of hotels, other infrastructures such as roads to ensure better mobility, thereby impacting the natural surroundings.
- Extensive land clearing degrades soil and thus leads to siltation of water bodies.
- Induced pressure on local resources due to cumulative growth and infrastructure development.
- Deforestation and load on the forest area for fuel wood and other resources.

1.5.2 Impact on air and noise Environment

- Increase in air and noise pollution due to high traffic volumes.
- Traffic congestion
- Noise due to traffic and other induced development activities.

1.5.3 Impact on water environment

- Induced pressure on local water resources caused by the extensive overuse of water resources by hotels, swimming pools and personal use of water by tourists.
- Generation of wastewater and increased sewage pollution which may affect the local water resources, aquatic flora and fauna.
- Impact on human health due to polluted water resources.

1.5.4 Impact on biodiversity

- Loss of flora and fauna due to change in land-use pattern.
- Decline of species due to fragmentation of habitat.
- Damage to or destruction of ecosystems and habitats, including deforestation.
- Disturbance to wild species, disrupting their normal behaviour and potentially affecting mortality and reproductive success.
- Disturbance to breeding and nesting grounds
- Loss of rare, endangered, threatened, species of special concern and species of economic importance. Eco-tourism projects may impact the biodiversity of the region due to clearing of land for construction.
- Impact due to changes in water quality, soil profile, noise, light and air pollution, which may affect the nature and character of habitat.
- Removal of vegetation and uprooting of trees leads to negative changes in micro-level wildlife habitat and the surrounding environment.
- Road kills, poaching can have significant impacts on the population dynamics of species, especially those with restricted and declining species.
- Fire hazards due to *bon fire* and cigarettes in the forest areas.
- Trampling of vegetation and soil due to trekking by tourists, eventually causing damage that can lead to loss of biodiversity and other impacts. Such damage can be even more extensive when visitors frequently stray off established trails. (*Refer Table 1.1: Impact of trampling on vegetation and soil*).

Table 1.1 Impact of trampling on vegetation and soil

Trampling impact on vegetation	**Trampling impact on soil**
Loss of flora	Reduced fertility
Reduced plant vigour	Loss of organic matter
Reduced regeneration	Decrease in air and water permeability
Loss of ground cover	Increase in runoff
Change in species composition	Accelerated erosion

1.5.5 Impact on local resources

- Increase of demand –water, energy, food
- Rise in number of migrants affecting culture and aesthetic values.
- Many destinations become overcrowded during the peak season and thus lead to a shortage in supply of water, energy and other utilities.

1.5.6 Solid waste and littering

- Disposal of waste may impact the natural environment - rivers, scenic areas, and roadsides.

- Choking of sewer lines due to waste plastic and other solid waste articles.
- Health issues that may arise due to poor management of solid waste.
- Degrades the physical appearance of the water and affects aquatic life
- In mountain areas, trekking tourists generate a significant quantity of waste, such as plastic bottles, polythene, paper litter, also oxygen cylinders and camping equipment.
- Construction and demolition waste due to hotel construction, development and new infrastructure projects leading to water and air pollution.

1.5.7 Socio-economic impacts

- Escalation of property rates
- Erosion of socio and cultural values and traditions
- Loss of access by indigenous and local communities to their land and resources as well as sacred sites
- Over crowding
- Influx of people and social degradation (e.g. local prostitution, drug abuse, etc.)
- Migration of workers for construction activities, as well as influx of tourists may lead to spread of new diseases like AIDS, TB etc.

CHAPTER 2

Scoping

2.1 Introduction

The primary function of scoping also referred to as setting the Terms of Reference (ToR) of an EIA, is to establish the environmental priorities and set the boundaries for the study. The objective of the ToR is to make the assessment process concise and focused, and avoid creating a voluminous or data deficient report. The ToR provides the benchmark for data collection and limits the possibility of inefficiency in the EA process. It also acts as a benchmark to be used by the appraisal committee to decide whether the EIA report has been compiled after meeting all the requirements or not.

There are various tools that can be used for scoping, such as ***questionnaire checklists, network method, comparison with other similar projects, matrix and ad-hoc methods, etc***. The selection of scoping tools largely depends on the size of the project and the existing environmental and social characteristics of the project area.

The ToR given below is a generic one and can be framed as per the project requirements. While framing the ToR, ground realities, background information of the study area, existing stress on natural environment and project-specific peculiarities, applicable laws, rules, guidelines and policies need to be added to make it relevant and realistic. Site visit is also recommended before framing the ToR; this enhances the scope of the EA process and makes it more efficient.

2.2 Terms of Reference (ToR) for tourism development projects

The ToR should include the following conditions, details and components:

2.2.1 General information

- Executive summary of the project, which summarizes the project characteristics, environmental and social issues, and the proposed mitigation measures.

- Information about the project proponent and his/her experience in tourism sector with following details (a) Name of the project (b) Name of the applicant (c) Present mailing address including telephone number, fax, and email (if any) (d) Name of the environmental focal person (e) Telephone number of environmental focal person.

- The justification for the project and consideration of alternative site with reference to environmental and social concerns.

- Project financial statement and the project activity schedule.

- Name of organization/consultant preparing the EIA report, qualifications and experience of experts involved in EIA report preparation.

- List of all regulatory approvals and No Objection certificate (NOC) required for the project and the status of these approvals.

- A declaration stating that the information disclosed in the EIA report is correct.

2.2.2 Essential maps for EIA of tourism projects

Map, cartographic representations of the following:

- A map specifying the location of the project along with demarcation of *Dzongkhag, Geogs* where the tourist site is to be constructed/ planned.

- A map indicating the detailed land use pattern of the study area. Also, a satellite imagery of the study area with explanatory note, if large area is considered for tourism project.

- A study area map specifying the forest cover as well as details on district and geog boundaries, if applicable, and marking the presence of migratory corridors, water-body, occurrence of any endangered/threatened flora and fauna species and/or plants and animals of economic/ecological importance.

- Area map of the study area indicating features such as locations of human settlements and major constructions, roads, or any polluting sources, if applicable.

- A map marking the sensitive zones in the study area, such as forests, fishing grounds, defense installations, international border, protected area etc.

- A contour map of the study area with appropriate scale.

- A map clearly delineating the locations of various monitoring stations (ambient air and meteorology, water, noise and soil).

- The layout plan of the tourist site showing the hotel/motel, commercial and administrative area, green belt plan, roads, parking spaces and other infrastructure including all utilities.

- Diagrammatic sketch and layout of the effluent treatment plant (ETP) and the sewage treatment plant (STP), wherever applicable.

- A layout map showing the solid and hazardous wastes disposal site, if applicable.

- A map showing the wastewater discharge points.

Note: Depending upon the type, size and location sensitivity, NEC can decide the study area and recommend appropriate scale for Environmental Assessment.

2.2.3 Project Description:

- Detail description of project such as name of the project, brief description of project activities as mentioned in *Table 2.1: Summary of project details.*

Table 2.1 Summary of project details

S.No	Description
1.	• Information on existing land use pattern of the study area: a) Area acquired for the proposed project and the land use patterns with explanatory notes. b) Land ownership patterns of the acquired land. c) Details of the topography of the study area, and local area hydrology. d) Inventory of water bodies such as lakes, ponds, wetlands, spring, streams, natural drains and rivers in the project area e) Presence of sensitive areas (if any) such as forests, national parks, historical or archaeological sites, residential areas, parks or playing fields etc in the study area
2.	Nature extent of tourist activity
3.	Total number of tourist influx (expected)
4.	• Construction of new hotel, motel, resort and other infrastructure with details of room, resource requirement and waste generation as a part of project. • Expected quantity of construction material to be required, its sourcing and mode of transportation, and its impact on environment. • Expected numbers of quarries to be opened for supply of construction materials and its impact on environment, if applicable. • Expected pressure on local infrastructures due to increase in construction workers as well as expected rise in tourist number along with management plan to reduce impact on local resources.

5.	Details on expected development of infrastructures such as road, hospital, public utilities etc. and its impact on environment
6.	Estimate water requirement and its sourcing. Details of energy sourcing and requirement: If a captive power plant is proposed, the EIA should provide the following details: installed capacity, daily or annual fuel consumption, pollution potential and its management plan
7.	Renovation or modification of old monuments, cultural heritage, archeological structure, hotels, resort, museum etc. if applicable
8.	Expected breakup of land required for hotel, motel, parking areas, green belt, camping sites etc.?
9.	Selection of alternatives by using Travel Cost Method for large scale tourism
10.	Expected quantity of solid waste to be generated and its management including hazardous waste handling and management.
11.	Expected quantity of demolition waste produced and its management plan.
12.	Expected quantity of sewage to be generated and detailed plan of its treatment disposal, recycle and reuse.
13.	Any litigation pending against the project and /or any direction /order passed by any Court of Law related to the environmental pollution and impacts in the last two years, if so, details thereof.
14.	Has the project examined the possibility of use of technologies such as green buildings, use of decentralized wastewater treatment technologies, use of solar energy which would lessen the impact on environment.
15.	Carrying Capacity analysis of the project area (The project proponent has the liberty to use any model to assess carrying capacity).

Note: For tourism projects such as campsites, trekking routes, hotels/resorts, the details of the activities specific to these projects is given in Table 2.2.

Table 2.2: Activity specific project description format

Project	Description (*Indicate the type of project e.g. camping site, trekking route, hotel, resort or others. Indicate the size of the development e.g. 24 bed tourist class hotel, 22-person campsite.)*	Project Location *(Provide details of the project location by naming the Dzongkhag and Geog, wherever it is applicable)*
Campsites	1. Provide a site plan of the camp area that shows the layout of the site (campsites, toilet and washing areas, grazing areas for horses or yaks). Show on the plan the proximity and type of forest, watercourses, and direction to villages and the direction of slope. Show north and the scale of the site plan. 2. Provide the geo-reference (use an appropriate datum) for the location of the campsite and height of the campsite. 3. Identify the maximum number of people that will be accommodated within the campsite. This includes tourists and tour support staff. 4. Show which months of the year the campsite will operate. 5. The applicant must identify whether the project is located within the proximity of any cultural or heritage listed in the inventory of the Department of Cultural Affairs (DCA). This information can be obtained from the DCA. 6. A general description of the environment of the surrounding area. 7. Is the campsite located within a Protected Area. 8. State the type of sanitation facilities that will be provided. 9. State the source of water supply for the camp.	

	10. State how solid waste will be disposed. Regulations require that all solid waste be carried out of the area, (except toilet waste where a pit toilet must be constructed). 11. State the source of fuel for the campsite. Regulations also prohibit the use of local fuel wood for cooking, heating and lighting.	
Trekking Routes	1. Plot the trekking route and its start and finish points on a contour map. Identify significant features of the trail such as pass heights, camping areas, villages, location of road head etc. 2. State how many km of trekking route is proposed for Development 3. State the width of the trail. The minimum width is 3 feet for mule tracks. 4. Provide a general description of the trail route. Start at 000m and prepare a table that shows the distance and elevation that applies to a particular feature Start 000m (el 3,100m) – 550m (el 3,400m), trail rises through blue pine forest 550m (el 3,400m), pass 550m (el 3,400m) – 1,200m (el 3,000m), trail descends through mixed broadleaf conifer forest 1,200m (el 3,000m), 30m long rope bridge to be built across __ (name of water course). 5. Provide details of any other structures that will need to be provided e.g. bridges. 6. If the trail passes through a Protected Area, the boundaries of the Protected Area must be shown on the map relevant to the trail route. Name the Protected Area. 7. Will other people, e.g. local communities, use the trail? 8. Provide details as to which communities and the purpose of use. 9. Describe methods that will be used to prevent erosion and maintain the track surface of the trail.	
Hotels and Resorts	1. Provide a site plan of the hotel or resort that shows the layout of the hotel/resort together with support facilities e.g. access road, car parks, buildings, fuel tanks, water and	

	electricity supply etc. Indicate the scale of the site plan, the slope and north. 2. Provide the geo-reference (use an appropriate datum) for the location of the hotel/resort and the height of the hotel/resort (nearest 20m) 3. Provide a general description of the surrounding environment. 4. Provide details of access required. 5. Provide details of the source of electricity. 6. Show the amount of fuel and lubricants that will need to be stored at the hotel/resort and where these will be stored. 7. Show where water will be obtained from? 8. Show how the water will be heated? 9. Explain how spoil material generated from construction will be disposed off? 10. If the project is located within a Protected Area, the location of the project must be shown on a map, together with the Protected Area boundaries. 11. Describe how liquid and solid waste that is generated from the hotel/resort will be treated.	

Source: Reviewer guideline for Tourism, NEC, 2004

2.2.4 Baseline data

- Details of soil, slope analysis, vulnerability to subsidence/landslides, seismicity etc.

- Give details of the quantities of earthwork involved, mode of transport of fill materials from outside the site etc., if applicable.

- Provide details, if any low lying areas are getting modified from the proposed activity, if applicable.

- Give details regarding water supply, waste handling etc during the construction period.

- Detailed information on existing natural drainage/run-off patterns at the project site.

- Inventory of number of rivers, streams, springs, lakes, ponds or any water body in the study area.

- Surface and sub-surface water characteristics in the study area.

- Describe the area subjected to landslides.

- Information regarding surface hydrology and water regime

- Data on ambient air quality: This should include parameters such as PM10, gaseous pollutants, and site-specific information on existing meteorological conditions such as temperature, humidity, rainfall and wind speed and direction.

- Describe the list of potential activities which generate fugitive dust, applicable during the construction phase.

- Ambient noise data at the project site, including the different activities that are likely to generate noise. Information should also be provided on areas likely to be affected by noise as this is crucial from the occupational health point of view.

- Give quantities of various types of wastes generated during construction including the waste generated from construction camp.

- Baseline data on the health status of local communities and common diseases prevailing in the area, if applicable.

- What is the quality of water required, in case, the supply is not from a municipal source? (Provide physical, chemical, biological characteristics with class of water quality)

A. Socio-economic

- Demography details of all the villages falling within the study area.

- Describe with the help of maps the number of villages getting affected, scope of land acquisition and how it is important from investment perspective. The report should provide option for alternative or any substitute to avoid or minimize land acquisition with appropriate justification.

- Present and projected population; present and proposed land use; planned development activities, issues relating to squatting and relocation, community structure, employment, distribution of income, goods and services; recreation; public health and safety; cultural peculiarities, aspirations and attitudes shall be explored in study.

- If land acquisition is involved, the report should give the extent of land to be acquired for the project along with name of affected people village wise with followings information:

  a) Village-wise list of the affected persons or family-wise

  b) The extent and nature of land and immovable property to be acquired from affected persons

  c) A list of agricultural labourers in such area and the names of such persons whose livelihood depends on agricultural activities

  d) A list of persons who have lost or are likely to lose their employment or livelihood or likely to be alienated wholly or substantially from their main sources of trade, business, occupation due to acquisition

  e) Non-agricultural labourers, including artisans in such area

  f) A list of affected landless families, including those without homestead land and below poverty line families

  g) A list of vulnerable affected persons, if any

  h) List of public utilities and government buildings which are affected or likely to be affected

  i) Details of public and community properties, assets and infrastructure, likely to be affected

B. Bio-diversity

- If tourism project is located in ecological sensitive areas or is situated close to a sensitive area, EIA report should provide with the following details:

a) Type of forest being diverted for non forest use and status of forest cover

b) Presence of any unique habitats, endemic, threatened or declining species or species of high economic and cultural value to society or ecosystem.

c) Detail list of flora and fauna

d) Fauna assessment should include nocturnal and diurnal behavior, if applicable.

e) Describe various forest product and areas that provide important biodiversity services to the local people if applicable

f) Inventory on number of trees to be cut down

g) Authentication and verification of the wildlife corridor by the competent authority.

2.2.5 Impact assessment

- Impact due to land acquisition
- Impacts of the construction phase of the project on ambient air, ambient noise, water environment.
- Impact of project on biodiversity.
- Impact of project on the hilly terrain due to slope destabilization caused due to cutting, filling, blasting, quarry activities, if the project employs construction of road.
- Impact of project on local hydrology.
- Discuss the incremental pollution load from wastewater generated from the proposed activity.
- Impacts of the proposal on the ground water, if applicable
- Impact due to generation of solid and hazardous waste
- Impact on ambient air quality with the help of established models such as ISCST3 or Aeromod, Fugitive Dust Model (FDM), etc., wherever applicable.
- Impact of expected increase in traffic on ambient air and noise environment.
- Impact due to sewage generation

- Impact of tourist influx on local resources and economy.
- Impact of project and its allied activities on water resources.

- Risk of spread of new diseases due to migration/influx of tourists.

- Beneficial impacts of the project.

2.2.6 Mitigation and Environment Management Plan

The EMP should discuss the mitigation measures to be taken against each impact, the timeline for completion, the responsible departments for implementation, the plan budget, post-monitoring provisions and the process of reporting to the concerned regulatory authority.

- Preparation of a Resettlement and Rehabilitation plan (R&R) if displacement is involved. The plan should include details of the compensation provided, including land-for-land compensation, employment or money; provisions at the resettlement colony (such as basic amenities including housing, educational facilities, infrastructure and alternate livelihood potential); a clear timeline for implementation; responsibility; budgets; grievance mechanism, etc.

- Plan for environmental management during initial stage of project construction, e.g. sediment control, noise and dust emissions, etc.

- Details of water pollution control, including justification of selection of treatment schemes, design criteria, size of treatment units and final discharge characteristics; tentative costs of the treatment plant, recurring expenditures and details of reuse of treated wastewater and efficiency of the wastewater treatment plant (the treated wastewater should confirm to prescribed national standards).

- Detailed management plan to reduce flood due to bank erosion caused by river rafting and other activities.

- Detailed mitigation measures for the augmentation of groundwater resources, if applicable.

- Detailed air quality management due to expected increase in traffic.

- A detailed mitigation plan for biodiversity protection and conservation (if the project is likely to impact biodiversity).

- Mitigation plan for slope protection
- Mitigation plan for quarries, if applicable.
- Mitigation plan for storm water management.
- Mitigation plan for the influx of workers during construction period.
- If tracking path or pathway or cycling roads are being developed then measures must be taken to safe guard the biodiversity.
- Detailed management plan to reduce landslides and ensure slope stabilization during road/walkway or track construction, *wherever applicable*.
- Details plan for green belt development as well as landscaping.
- Detailed traffic management plans to improve the road network or existing roads to meet the projected traffic densities.
- Details of energy and water conservation measures.
- Detailed management plan for solid and hazardous wastes.
- Road safety measures to reduce road accidents.
- The organizational set-up and requirement of manpower for environmental, health and safety management, including clear responsibilities.
- Details of the parking spaces, and provision for canteen and rest rooms for workers and drivers.
- Detailed emergency plan in case of unforeseeable events (floods, flash floods, cloud burst, earthquakes, fire, storms).
- Proposed schedule for EMP implementation and environmental monitoring, including post-project monitoring for air, water, soil and noise.

2.2.7Awareness

- Awareness programmes on impacts of tourism on the environment and biodiversity, and focusing on prevention initiatives.

- Setting up training sessions, for hotel chain managers, on following areas, such as:

    a) Improving energy efficiency
    b) using renewable energies
    c) water conservation
    d) waste and resources management

CHAPTER 3

Impact Assessment

3.1 Introduction

The scientific and technical reliability of an EIA study depends on the skills of the EIA practitioners/reviewers, who estimate and review the nature and magnitude of the environmental change that the proposed project may entail. Impact prediction and evaluation is a vital exercise for assessing impacts, deciding alternatives, setting down mitigation measures and developing an environmental management plan. Predicting the magnitude of impacts and evaluating their significance is the core exercise of impact assessment. This process is also known as impact analysis and can be broadly broken down into three overlapping phases:

- *Identification*: To specify the impacts associated with each phase of the project and the activities undertaken
- *Prediction:* To forecast the nature, magnitude, extent and duration of the main impacts; and
- *Evaluation:* To determine the significance of residual impacts after taking into account how mitigation will reduce a predicted impact.

In assessing environmental impacts and their significance, some key concerns have to be kept in mind:

- Identity who or what is affected
- Description of how they are affected
- Evaluation against a set of consistent assessment criteria

Normally, in impact assessment, potential impacts can be categorised into various parameters ranging from its type and nature to magnitude and reversibility, each signifying its importance in impact prediction and decision making (*See Table 3.1: Parameters which determine impact characteristics*).

3.2 Impact identification

In the EA of a tourism project, the potential impacts are globally well documented, and do not normally require extensive impact identification. However, there are some impacts such as displacement, loss of livelihoods, influence of topography and meteorology on water and air pollution, feasibility with respect to land use, geological characteristics,

other sensitive receptors such as forest/biodiversity etc., which are site-specific and can only be identified once the data on them is available or generated. There are various tools that can be used for impact identification, such as questionnaires, checklists, network method, comparison with other similar projects, matrix and ad-hoc methods.

To ensure effective impact identification, one should always opt for a simple, logical and systematic approach. As a good practice in EA, it is always recommended to consider all potential project impacts and their interactions. At the same time, it is important to ensure that indirect and cumulative effects which may be potentially significant are not unintentionally omitted. All the identified impacts may not require a detailed analysis and evaluation – the level of detailing should match the scale, sensitivity and complexity of the impact. The choice of the chosen methodologies should reflect these criteria.

Table 3.1 Parameters which determine impact characteristics

Parameters	Description
Type	Positive or negative
Nature	Direct, indirect, cumulative
Magnitude or severity	Low, moderate, high
Timing	Short term, long term, intermittent, continuous
Duration	Temporary/permanent
Reversibility	Reversible/irreversible
Significance	Local, regional or global

Source: *EIA Training Resource Manual*, Second Edition 2002, United Nations Environment Programme (UNEP), p 263

3.3 Impact prediction

Predictions of impacts are normally based on commonly used qualitative and quantitative methods and models. Expert judgment and comparison with similar projects can also be used for impact prediction. While there are a number of models for predicting impacts on physical environment (air, water and noise), modeling socio-economic and cultural impacts is difficult and is generally done through qualitative assessment or economic analysis. A model can be effective only if the input data is correctly inserted. The use of models, therefore, should be done with care and prudence considering factors like availability and reliability of data.

The sophistication of the prediction methods to be used should be kept in proportion to the 'scope' of the EIA. For instance, a complete mathematical model of atmospheric dispersion should not be used if only a small amount of relatively harmless pollutants is emitted. However, if the project has a very high air pollution potential – as in the case of a large open-cast mine — then all possible modeling exercises should be done to predict the impact on ambient air quality. All prediction techniques involve assumptions and uncertainties. While quantifying and stating an impact, these assumptions should be clearly identified. Also, uncertainty of prediction in terms of probability and the margins

of error should be mentioned. *Table 3.2 gives the list of general prediction models/methods used for assessing the impact of Tourism projects.*

Table 3.2: General models/methods used for impact prediction

Impacts	**Assessment method/model**
Air quality, *if applicable*	Air dispersion models • **ISCST 3** (appropriate for point, area and line sources; applicable for flat or rolling terrains; requires source data, meteorological data and receptor data as inputs). Note: *ISCST 3 is a common model widely used in India for the air pollution modeling* • **CTDM Plus(complex terrain dispersion model)** Point source steady state model. Can estimate hourly average concentration in the isolation of hills/array of hills.
Soil erosion, *if applicable*	• Soil loss models such as revised universal soil loss equation (RUSLE)
Water quality, *if applicable*	• **Explore-I USEPA** (A river basin water quality model) • Storm water Management Model (**SWMM)** • **QUAL-IIE**, the model is found excellent to generate water quality parameters.
Ecology, *if applicable*	• Ecological models • Comparative evaluation of conservation value • Expert opinion
Land use	• Map overlay techniques • GIS and Remote sensing software. • Comparative valuation against structure and/or local plans
Land slide, *if applicable*	• Land Slide Prediction Model
Noise	• *Dhwani:* For prediction of impacts due to multiple noise sources, developed by NEERI, Nagpur, India • Sound PLAN: Noise and air pollution planning and mapping software
Socio-economic	• Cost-benefit analysis • Metaphors and analogies: Experience gained in similar kinds of projects is used to predict the socio-economic impacts. • Extrapolative methods: Prediction based on the linear extrapolation of current trends. • Normative methods: Desired socio-economic goals specified, and an attempt made to project the social environment backwards in time to examine whether existing or planned resources and environmental programmes are adequate to meet the goals.
Risk/hazards /disaster	• Risk assessment

3.4 Impact evaluation

Box 3: Possible evaluation criteria for determining impact significance

- No impacts
- No significant impacts without or with available and practicable mitigative measures
- Impacts, but significance not quantifiable
- Significant impacts even with

In impact evaluation, the predicted adverse impacts are judged for their significance. Therefore, the criteria for evaluating the significance of impacts and their effects should be set in advance (*See Box2: Impact evaluation criteria*).The criteria for evaluating the significance should be based on local standards wherever possible. Where local standards are not available, acceptable international standards should be used (e.g. IFC, WHO or USEPA standards and guidelines of others countries, etc.). In all cases, the choice of the appropriate standard must be robust, defensible and relevant to the local situation. If there are no appropriate existing standards available, then the criteria should be developed and their use must be clearly explained in the EIA. As a good practice in impact evaluation, it is better to use established procedures or guidelines, or relevant criteria which are comparable. While doing impact evaluation, it is equally important to understand the nature and characteristics of impacts on potential target areas, such as air, water, land, human beings, etc. to understand the significance, importance and intensity (*See Box 3: Possible evaluation criteria for determining impact significance*). It is also essential to find out the answers to the following three questions:

Box 2: Impact evaluation criteria

- Comparison with laws, regulations or accepted national or international standards.
- Consistency with international conventions or protocols.
- Reference to pre-set criteria such as conservation or protected status of a site, features or species.
- Consistency with government policy objectives.
- Comparison with best practices
- Existing environmental and social stress in the area.
- Extent of impact on biodiversity.
- Acceptability to local community or general public.
- Severity of the impact (reversible or irreversible).

- Are there residual environmental impacts?
- If yes, are these likely to be significant?
- If yes, are these significant effects likely to occur? Is the probability high, moderate or low?

CHAPTER 4

Mitigation and Environment Management Plan (EMP)

4.1 Introduction

Mitigation is the process of providing solutions to prevent impacts, or reduce them to acceptable levels.

The objectives of mitigation are:

- To enhance the environmental and social benefits of a proposal;
- To avoid, minimize or remediate the adverse impacts; and
- To ensure that the residual adverse impacts are kept within acceptable levels.

A good tourism development project should incorporate environmental and social alternatives at the initial stages of project development. However, there are some which can be managed only after impact identification and prediction.

Mitigation measures can be classified into structural and non-structural measures.

- ***Structural measures*** include design or location changes, engineering modifications and construction changes, landscape or site treatment, mechanization and automation, etc.

- ***Non-structural measures*** include economic incentives, legal, institutional and policy instruments, provision of community services and training and capacity building. Non-structural measures are increasingly being used now. They can be applied to reinforce or supplement structural measures or to address specific impacts.

An Environmental Management Plan (EMP) is a framework for the implementation and execution of mitigation measures and alternatives. As indicated in chapter 3 the project proponent can exercise Travel cost method for evaluating alternatives for the project area. One of the best practices used to address the impact on the environment due to tourism project is *Carrying Capacity Analysis*. The concept of tourism carrying capacity is based on a general statement that any form of development within the carrying capacity of ecosystem so that impact on environment can be minimum. The EMP usually covers all phases of the project, right from pre-construction to the operation and maintenance phases of the tourism project. The plan outlines mitigation measures that will be undertaken to

ensure compliance with environmental laws and regulations and to eliminate adverse impacts by the Carrying capacity analysis. The objectives of an EMP, thus, are:

- To ensure that mitigation measures are implemented;
- To establish systems and procedures for this purpose;
- To monitor the effectiveness of mitigation measures
- To ensure compliance with environmental laws and regulations
- To take any necessary action when unforeseen impacts occur.

The EMP outlines:

- The technical work schedule to carry out the mitigation, including details of the required tasks and reports, and the necessary staff skills and equipment;
- The detailed accounting of the estimated costs to implement the mitigation plan;
- A plan for operation or implementation of the mitigation plan, including a staffing chart and proposed schedules of participation by the members of the project team, and activities and inputs from various government agencies.
- The EMP should also address the formation of a monitoring committee, with the objective of finding out whether different pollution-related issues and social development programmes related to health, education, infrastructure, employment etc., are keeping to the time schedule or not. In case of delays, the reasons for the delays need to be identified and suggestions made for removing them.

A good EMP should contain the following:

- A summary of all potential impacts
- A detailed description of recommended mitigation measures
- A time-line for implementation of mitigation measures
- Resource allocation and responsibilities for implementation
- A programme for surveillance, monitoring and auditing

- A statement of compliance with relevant standards
- A contingency plan when the impacts are greater than expected

An EMP should also incorporate a monitoring plan that is carefully designed and is related to the predictions made in the EIA and to key environmental indicators. The EMP should also outline the need for monitoring, its duration and reporting procedures. The programme for surveillance, monitoring and auditing should clearly identify the following:

- Parameters for monitoring all significant impacts, including impacts on bio-diversity and socio-economic impacts.
- Monitoring locations, including sample surveys, to assess the socio-economic impacts
- Frequency of monitoring
- Reporting frequency to the regulatory agency
- Provision for annual environmental and social audit of the project

4.2 Mitigation measures and EMP for the tourism sector

Some of the mitigation measures related to tourism projects are illustrated in *Table 4.1*.

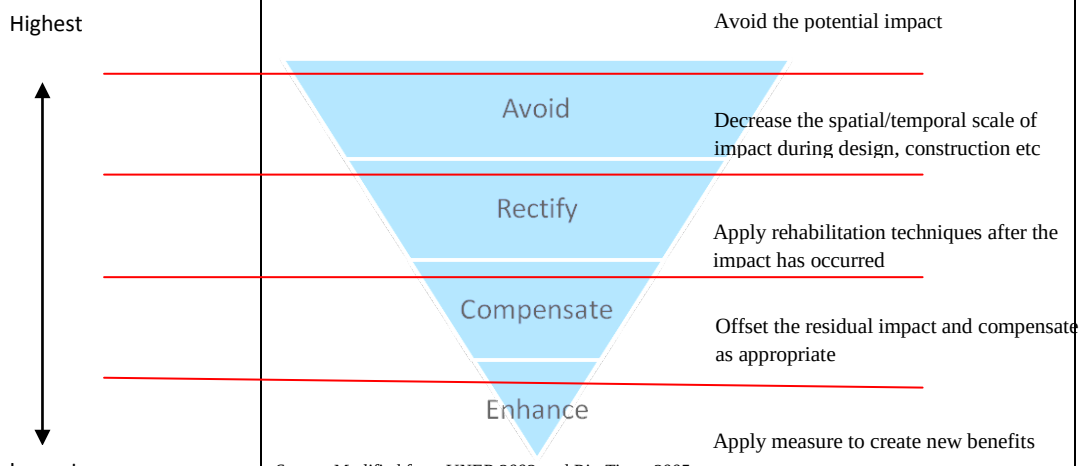
Table 4.1: Mitigation measures and EMP for tourism project

Mitigation measure to reduce impact on land	• Minimizing the area of ground clearance • Avoiding sensitive sites, such as those which include steep hillsides • Balancing filling and cutting requirements through route choice • **Slope Protection:** Some of the well-established engineering measures for slope protection include: a) Terraced or stepped slopes to reduce the steepness of a slope. A berm (or risberm) is the level section between slope faces, riprap, or rock material embedded in a slope face, sometimes combined with planting. b) Retaining structures, such as gabions (rectangular wire baskets of rocks), cribs (interlocking grid of wood or concrete beams, filled with earth or rock), or other types of wooden barricades and gridwork, usually battered back against the slope • **Topsoil management**

	The best practices for topsoil management are as follows: a) Scrap the topsoil prior to construction of hotel,motel, commercial centres and other infrastructures, quarry, etc. b) Scraped topsoil should be used immediately for plantation/agriculture. c) If it is not possible to use the topsoil immediately, then it should be stacked at a designated area. The location of the storage site should ensure that it does not lead to erosion. The probability of erosion is high if the storage site is proposed at an elevated area. d) If the topsoil is to be stored for a long duration, it should have a vegetal cover of, preferably, leguminous species (grasses and shrubs).
Mitigation measures for conservation and protection of water resources	• Option of STP or decentralized wastewater treatment technologies should be explored for the treatment of domestic sewage. The practice of decentralized wastewater treatment technologies at individual hotel and motel should be ensured for sewage treatment (*Refer Box 4.1: Decentralized Waste Water Treatment Techologies*). • Option for the recycle/reuse of the treated sewage should be explored in hotels/motels after meeting the desired standards. • During the construction phase, labour camps should not be located near to water bodies. No discharge from such establishments should follow their path into nearby water bodies. Dumping of debris in or nearby water bodies should be strictly avoided. All the waste generated from the camps should be collected, stored and disposed in environmentally suitable manner. • Using only "clean" fill materials around watercourses, such as quarried rock containing no fine soil • Leaving buffer zones of undisturbed vegetation (width increased in proportion to slope) between road and bodies of water which will reduce siltation and increase groundwater recharge. • If sewage wastewater is discharged to local water body it should comply with the national discharge standard. • Separate drains for storm-water runoff. • Practicing the rainwater harvesting to enrich the ground water table, *if applicable.*
Mitigation measures to prevent air pollution	• Hot mix units, if used on site, should be equipped with requisite air pollution equipment to meet the prescribed standards. • The crushing plants shall be operated with approved fitted dust control devices, *if applicable.* • Provision of air pollution control systems in stone crushers to meet the desired standards, applicable where road construction is required for a tourist project. The stone crushing units should adopt the following pollution control measures: - Dust containment cum suppression system for the equipment - Construction of wind breaking walls - Construction of the metalled roads within the premises - Regular cleaning and wetting of the ground within the premises - Growing of a green belt along the periphery • Water sprinkling and transporting construction materials with proper coverage during the construction stage. During the sub-grade construction, sprinkling of water should be carried out on regular basis during the entire construction period. Planting tall, leafy, and dense vegetation between roads and human settlements to filter pollutants (*See table below*)

<table>
<tr><td></td><td>
Table : Best practices for fugitive dust control, wherever applicable
<table>
<tr><th>Activities</th><th>Best Practices</th></tr>
<tr><td>Site preparation and civil works</td><td>• Water spray
• Use of personnel protective equipments (PPE)</td></tr>
<tr><td>Transportation of construction material</td><td>• Covering of the trucks/dumpers to avoid spillage of material</td></tr>
<tr><td>Dust emission during road construction</td><td>• Speed control on vehicles used during transportation of material
• Provision for mobile water sprinklers</td></tr>
<tr><td>Crushing Units</td><td>• Usage of Bag filters
• Mobile water sprinklers</td></tr>
</table>
• Water spray to suppress dust at all times.
• Keep stockpiles and exposed soils compacted and re-vegetate as soon as practicable.
• Assign speed limit control for vehicles in populated areas.
• Integration with the local government awareness campaign programmes on good practices of vehicle maintenance etc. to reduce the air emissions
• Providing a management plan to avoid traffic congestion, even with projected increases in traffic flow during the peak tourist time. Ambient air quality should be in accordance with the national air quality standards.
</td></tr>
<tr><td>Mitigation measures for noise environment</td><td>
• Providing silencers or enclosures for noise generating machines such DG sets, compressors, etc;
• Use of protective devices like earmuffs/earplugs to workers, who are continuously exposed to high levels of noise during road construction activities.
• Creating a green belt around potential noise-prone areas
• No horn at places with high population densities, also putting up of appropriate signages.
• Noise levels must confirm with the Noise standards.
</td></tr>
<tr><td>Mitigation Measures for Biodiversity</td><td>
• When planning a new tourist project, sensitive natural environments should be identified early in the planning process so that alternate site and construction designs may be considered. (See Figure 4.2: Hierarchy of biodiversity mitigation measures).
</td></tr>
</table>

Figure 4.1 Hierarchy of biodiversity mitigation measures



Source:Modified from UNEP 2002 and Rio Tinto, 2005

- If the site is very sensitive, the best practice in an EA is to conduct an independent biodiversity assessment, rather than making it a part of the EIA process. The mitigation measures for biodiversity include a Biodiversity Action Plan (BAP) for biodiversity conservation, Species Action Plans (SAPs) where mitigation is targeted for the protection of a specific species, and Habitat Action Plans (HAPs) to protect the habitats of rare, endemic, threatened and endangered species.
- ***Compensation for Habitat Fragmentation or Loss***, wherever applicable

  The choices for compensatory measures include:

a) Re-establishment of wildlife habitats
b) Creation and restoration of habitat areas (for compensating biologically impoverished landscapes)
c) Upgrading other suitable and similar habitats to protected area status (creation of legally protected habitat units)

- ***Preventing Vehicle-Wildlife Collisions***

  For projects located near eco-sensitive hotspots, many wildlife deaths can be prevented by careful planning alternative route of alignment. Measures used to discourage animals from moving onto the road surface are:

a) Flash mirrors or game reflectors on roads with moderate traffic. These work best with larger ungulates such as deer.
b) Warning signs for drivers to slow down in areas where high-use crossing points or wildlife corridors are known.
c) Regulating traffic during times when animals are most active, usually at night
d) High fences (>3 m) in areas heavily used by large ungulates must be constructed in close consultation with wildlife ecologists.

Mitigation measures for socio-economic environment	• Government should plan to boost the local economy. • Skilled training to local people for employing them so that they can compete with the upcoming economy. • Mechanism for providing effective guidance in financial planning to effected people • Best practices in land acquisition and R&R are as follows: a) Land should not be acquired without the consent of the majority of the project-affected population. The project proponent should receive 'free, prior and informed consent' from the affected population. b) The affected population should include not only landholders but also people dependent on land for livelihood like share-croppers, landless labourers, etc. c) The R&R plan should be a comprehensive framework within which compensation, and community development plans are integrated and the roles of local communities, governments and road/highway construction authorities are clearly delineated d) Compensation for land should be based on the current market price. e) The R&R plan should be framed in consultation with the PAP. f) The affected population should have a say in the selection of the resettlement site and design of the housing and other infrastructure facilities. g) Attempt should be made to resettle the displaced people as near as possible to the project sites, so that they can obtain access to facilities as well as economic benefits generated from the project. The R&R plan should recognise not only landholders, but also those dependent on land for livelihood like share-croppers and landless labourers, etc. Compensation should also be provided to them. h) Basic amenities should be provided at the new resettlement site. This should include roads, safe drinking water, sanitation facilities, educational and health facilities, markets, community centers, playgrounds, etc. i) Financial assistance and training for self-employment should be provided to the affected population. j) There should be a provision for land-for-land compensation for indigenous communities.
Mitigation measures for Quarry management, *if applicable*	• Waste rock/spoil materials should be placed at designated areas with proper biological reclamation. • Compaction and re-vegetation of exposed areas as soon as possible. • Water spray • Topsoil deteriorates in quality while stockpiled. To help maintain soil quality, topsoil should be kept separate from overburden, gravel and other materials; and should be protected from erosion. Also, wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated. • If the topsoil is to be stored for a long duration, it should have a vegetal cover of, preferably, leguminous species (grasses and shrubs). • Good housekeeping

Sanitation and solid waste management	• Provision of mobile toilets for construction workers as well as movable accommodation. • Proper management and disposal of solid waste generated from hotel, motel, commercial places etc. • Management plan for the appropriate usage of construction debris for landscaping.
Others	• Adoption of the concept of green buildings to minimize the energy requirements in hotel/motel/commercial area etc. • Creation of parks, playgrounds and landscapes to improve aesthetics • Plan to ensure law and order • Plan for landscaping • Plan for better mobility
Risk	• Installation of firefighting equipment in strategic places, in hotel/motel. • Showing and having signage on fire escape routes, and assembly points at hotels/motels. • Formulating a clear policy and guidelines on safety • Ensuring that a First Aid Kit is available in facilities, vehicles, boats, etc for emergencies • Putting systems in place to address social issues like AIDS/HIV • Developing housekeeping standards on cleanliness and hygiene • Preventive measures against unforeseeable events such as flash floods, earthquakes, natural calamities etc. • Outlining what compensation measures will be put in place in case of accidents e.g. workman compensation or insurance

Box 4: Decentralized wastewater treatment in hotel industry

In hotel industries the key activities for which water is consumed to a large extent include guest bathrooms for showers, bath tubs, and toilet cisterns; kitchen for cooking, dish washing, drinking water; restaurants and staff canteens; swimming pools; laundry; vehicle washing; gardening and landscaping. This not only leads to an increase in fresh water consumption but simultaneously increases the wastewater generation i.e. approximately 80% of the total water consumption.

The Black and Grey wastewater generating from hotels/ eco resorts are characterized by its main constituents that normally comprise high concentration of solids, organic matter and nutrients (N,P) apart from pathogens, oil and grease. If such untreated wastewater is disposed off without being treated, it can lead to pollution of groundwater / surface water bodies. Moreover the presence of nutrients in wastewater results in eutrophication of the water body.

The centralized sewage treatment technologies for such type of wastewater are expensive, complex in operation and management and thereby fail to cater to the treatment efficiency. The decentralised wastewater management employs collection, treatment and disposal/reuse of wastewater onsite near the point of generation. Decentralised systems cater to both the liquid and solid components of the wastewater. The treated wastewater can achieve the standards prescribed and can be recycled and reused. These decentralised systems are site specific, innovative and can be designed on the basis of techno-socio-economic feasibility.

In decentralised wastewater treatment systems, both aerobic and anaerobic techniques are applied. These systems are based on natural wastewater treatment technologies which are combined together in order to provide improved efficiency. These systems generally include:

- Settler for primary treatment
- Anaerobic baffled reactors for secondary treatment
- Planted filter bed/reed bed for tertiary treatment
- Polishing ponds for tertiary level aerobic treatment

Highlight of the decentralised wastewater treatment system include:

- Low cost with minimum maintenance
- Site specific according to the characteristics of wastewater
- Promote better watershed management
- Provide a suitable alternative for varying site conditions
- Effective solution for ecologically sensitive area
- Tolerant to inflow fluctuations
- Fulfils discharge standards and environmental laws
- Sustainable, reliable and affordable systems

CHAPTER 5

Review of an EIA report for a tourism project

5.1 Introduction

The purpose of reviewing an EIA report is to take decisions with respect to the following:

- Should the project be cleared in the form proposed by the project proponent?
- Should the project be modified to reduce the impacts and then cleared?
- Is the 'No project' option justified, considering the social and environmental costs?
- If the project is cleared, then what conditions may be prescribed for compliance during design, construction and operation of the project?

5.2 Composition of the EIA review team

To ensure a proper review of the EIA report, the monitoring committee should include experts from diverse fields with a good understanding of the process and potential impact areas. The reviewers should be technically sound and competent enough to review the report. They should be able to make valuable suggestions/ recommendations to the project proponent for taking corrective action. Ideally, in case of tourism projects, the team should comprise of the following experts:

- **A civil engineer/planner** who is well versed with the planning and design, landscaping, sewage and waste management of tourism development projects.

- **An environmental scientist/engineer** to overview the adequacy of mitigation options suggested for air, water and waste management.

- **A groundwater expert/hydrologist** to review and assess the impact on hydrology.

- **A social science expert/anthropologist** to review the social issues and the resettlement and rehabilitation plan

- **A biodiversity expert/botanist** who can review the biodiversity issues, biodiversity conservation and afforestation plan

- **A geologist** to review the geological risks and associated impacts

- **A safety engineer and occupational health expert** who can review the levels of safety, mechanization, disaster management plans, occupational hazards and mitigation strategies to combat these hazards at the planning and operational stages

- **Local administration**

5.3 Reviewing of an EIA report for a tourism project

While reviewing the EIA report, the following key aspects needs to be carefully examined:

- Has the EIA report evaluated the beneficial and adverse impacts of the project properly and clearly?

- Which are the unavoidable adverse impacts? Are they acceptable?

- Is the proposed mitigation plan sufficient to manage and control all adverse impacts?

- What kinds of safeguards need to be incorporated to ensure that the mitigation plan is implemented effectively?

- What are the parameters which need to be monitored during project construction and operation so that the state of the environment can be studied throughout the project life?

- Is the project acceptable to the local communities?

- Are the concerns of the local communities genuine and has the EIA report adequately addressed these concerns?

- Will the project improve the socio-economic status of the local communities?

Guidelines for using the reviewer checklist:
By using the reviewer checklist for a tourism project, the reviewer will be able to gauge the acceptability of the EIA report. This can eventually assist in determining the environmental feasibility of the project being assessed.

Scorecard approach: The checklist is designed to follow a "scorecard" approach, using a possible scoring range of 0-10. Scores for each relevant item in the checklist are totaled, and a calculation of the percentage of the total possible score is made.

Relevance: The checklist is a generic checklist for the tourism projects. Not all questions may be relevant to all the tourism projects. Therefore, the first step is to determine the ***relevance*** of each question, for the specific project being considered. For each question that is relevant, "1" is entered in the box under Column "A" of the checklist, "Is question relevant for *this* project?" Because the number of relevant parameters varies from project to project, the possible total score for each EIA report will vary accordingly.

Adequacy: It is then necessary to determine the ***adequacy*** of the EIA report in answering only those questions that are judged to be relevant. Under the "adequacy" heading (Column "B"), the reviewer is asked to assign a numeric score from 0-10. The numeric scoring for the various elements of the EIA report, based on their level of completeness, clarity, and quality, is as follows:

9-10: **Excellent:** Information provided is clear, comprehensive and detailed, with no gaps or weaknesses.

7-8: **Good:** Information provided is comprehensive, has only very minor weaknesses which are not of importance to the decision-making process.

5-6: **Adequate:** Information provided has some minor weaknesses, but the deficiencies do not strongly compromise the decision process; no further work is needed to add to the environmental information.

3-4: **Weak:** Information provided has gaps and weaknesses which will hinder the decision process; some additional work is needed to complete the information.

1-2: **Very poor:** Information provided has major gaps or weaknesses which would prevent the decision process from moving ahead; major work is required to rectify.

0: **Absent:** Information needed for decision-making is not included in the report, and needs to be provided in its entirety.

Importance: It is also necessary to determine the importance. In many cases, some of the issues is relevant for the project but is not very important or significant in impact assessment. For instance; name of project, project schedule is relevant for the project but it has not much importance in environmental and social impact assessment. Therefore, while assigning the value for ***importance***, reviewer should always keep in his/her mind the level of importance, a) relevant but least important, b) relevant but average important, c) relevant but most important.

In addition, for each relevant item, the reviewer is instructed to fill in comments for each relevant item. This should be made a mandatory procedure, so that the justification for assigning a specific value for adequacy as well as importance is well documented. For

those items where the information provided in the EIA report is not adequate, it should be indicated in the far-right column what types of information are still required, in order to adequately address the question.

As a rule of thumb, an EIA report achieving a score in the range of 50-60% or higher should be considered acceptable. Borderline scores, or scores much lower than this limit, indicate that the EIA report is likely not acceptable. It should be noted, that while this design (i.e., using a numeric scorecard, and requiring reviewers to provide comments and justifications for their itemized determinations) is intended to minimize subjectivity, this "semi-quantitative" approach cannot totally eliminate all subjectivity from the review process, because the assignment of numeric scores is itself, by nature, a subjective process.

At the end of each section of the checklist, space is left for "other questions." The space provided here may be used to elaborate on the listed questions in each section (referencing the question number), or to add questions that may be have specific relevance for the project being reviewed.

Overall Evaluation: There are six components that need to be evaluated to give the total score.

1. Applicant Information
2. Project Description
3. Baseline information
4. Impact Assessment
5. Mitigation and Environmental Management Plan (EMP)
6. Other Requirements

The final section of the checklist provides a framework for giving an overall evaluation of the EIA report. Each topic covered in the checklist is assigned a score, from 1-10, according to the same system used in the main section of the checklist. The resulting value provides a further basis for determining whether or not the environmental information presented is adequate ("acceptable" or "not acceptable") for making an informed determination about the quality of the EIA report. This is simply a way to cross-check the results that were obtained through a detailed itemized review of the EIA report *(Refer reviewer checklist)*.