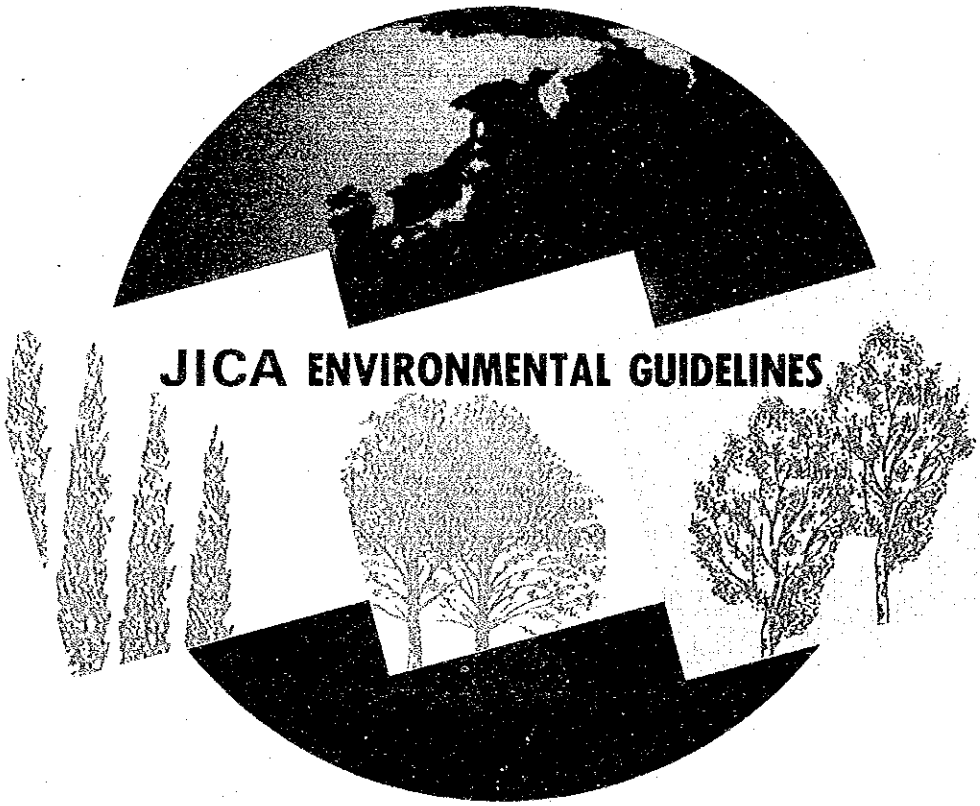
ENVIRONMENTAL GUIDELINES FOR INFRASTRUCTURE PROJECTS

XI TOURISM DEVELOPMENT



SEPTEMBER 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

ENVIRONMENTAL GUIDELINES FOR INFRASTRUCTURE PROJECTS

XI TOURISM DEVELOPMENT

JICA ENVIRONMENTAL GUIDELINES

SEPTEMBER 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

Environmental Guidelines
for Infrastructure Projects

"Environmental Guidelines for Infrastructure Projects" was prepared to enable preparatory study members to conduct screening and scoping of environmental impact studies effectively and efficiently while maintaining a dialogue with their counterparts and officials concerned in the host countries for the purpose of predicting possible environmental problems caused by the infrastructure projects and to incorporate adequate environmental consideration into the projects.

The guidelines consist of the thirteen sectors listed below. This volume deals with environmental consideration for "Tourism Development".

Sector I	Ports and Harbors
Sector II	Airports
Sector III	Roads
Sector IV	Railways
Sector V	River and Erosion Control
Sector VI	Solid Waste Management
Sector VII	Sewerage
Sector VIII	Groundwater Development
Sector IX	Water Supply
Sector X	Regional Development
Sector XI	Tourism Development
Sector XII	Transportation Development
Sector XIII	Urban Transportation Development

Note: The guidelines for dam construction were published in February 1990 as a separate volume.

PREFACE

In order to support sustainable development in developing countries, it is of great importance to give sufficient consideration to the environment in the implementation of development programs.

The Japan International Cooperation Agency (JICA) has continually placed special emphasis on environmental technical cooperation and has taken into account pertinent environmental consideration in development studies and implementation of projects.

Based on the recognition of the importance of environmental issues, JICA has prepared the guidelines concerning screening and scoping methods of environmental impact studies for the purpose of contributing to the planning of infrastructure development projects with sufficient environmental consideration.

The guidelines are to be used by JICA study team members when conducting preparatory studies of social and economic infrastructure development projects.

JICA committed the preparation of the guidelines to the International Engineering Consultants Association and organized an advisory group headed by Mr. Michio Hashimoto, president of the Overseas Environment Cooperation Center. Designated advisors of the group were from the Ministry of Health and Welfare, the Ministry of Transportation, the Ministry of Construction, and the Environment Agency. Also, the Ministry of Foreign Affairs provided sound and useful advice to the advisory group.

To all of these organizations and the personnel involved, I wish to acknowledge their much appreciated support.

September 1992

Akira Kasai
Managing Director
Institute for International Cooperation
Japan International Cooperation Agency

TABLE OF CONTENTS

TERMINOLOGY

Environmental Consideration

To study whether a development project will have serious environmental impacts on the project site and its surrounding areas, analyze the study results, and establish necessary measures for avoiding or alleviating any adverse environmental impacts.

Environmental Impact

The undesirable effect on the existing overall conditions of air, water, soil, and living things, assets, social information and circulation of goods, which are related to human life, or on their combined structures.

Preliminary Environmental Survey

The environmental survey conducted during the preparatory study stage of a development project. This includes screening and scoping of the environmental impacts of a particular project. This survey is regarded as a component of the initial environmental examination.

Initial Environmental Examination (IEE)

The examination undertaken at the outset of the development project planning stage to determine the environmental impacts that may be created by the particular project based on existing information and data, easily accessible information relating to the particular project, and comments and judgements of specialists who are familiar with the environmental impacts of past similar projects. This examination should be carried out in a short period at a low cost.

IEE has the following two objectives : 1) to evaluate whether EIA is necessary for the project and, if so, to define its contents; 2) to examine, from an environmental viewpoint, the measures for alleviating the effects of the project which requires environmental consideration but not a full-scale environmental impact assessment.

Environmental Impact Assessment (EIA)

To study, forecast, and evaluate the environmental impacts of a development project, which is judged a detailed environmental examination, and to propose the establishment of an environmental protection standard and measures for avoiding or alleviating environmental impacts.

Environmental Management Plan

To formulate an environmental monitoring system or methods based on the environmental protection standard to monitor the project's environmental impacts on surrounding areas, aiming at adequately protecting the environment both during and after project implementation.

Screening

To evaluate whether or not it will be necessary to include an environmental consideration in a development project. Screening conducted in Japan before the preparatory study is called preliminary screening.

Scoping

To identify the important environmental impacts among those which can be caused by the implementation of a development plan or development project, and to define the study items of the IEE or EIA based on the findings.

Project Description (PD)

The major contents and features of the project. It includes the background of the project (including its upper level plan), the objectives, the executing agency, the beneficiary population, and the project scale.

Site Description (SD)

The compact description of the project site which includes the natural and social environmental conditions in the areas that may be affected by the project.

Preparatory Study (PS)

To examine the contents of the full-scale study of a requested project and to discuss the scope of work (S/W) of the full-scale study with the host country. This study is conducted at the preparatory stage of the project prior to conducting the full-scale study including the master plan and the feasibility study.

Full-scale Study

The study generally conducted continuously after the preparatory study by carrying out field surveys to prepare the study report of a development project. The study report, with its conclusions and recommendations for project realization or project implementation, is submitted to the government of the host country. The full-scale study includes the master plan study, feasibility study, detailed design study, and map preparation.

Master Plan Study (M/P)

The study for preparing the basic plans for various development projects. In general, it is sectoral, or for each project.

Feasibility Study (F/S)

The study for evaluating the possibility, adequacy, and investment efficiency of a project. In general, it attempts to objectively verify the feasibility of a project from social, technical, economic, and financial viewpoints.

F/S is the core of JICA's development studies. The study report provides the government of the host country with the information needed to decide whether or not to implement the project. It is also used by international financial institutions to evaluate the appropriateness of financing the project once the government submits its loan request.

ABBREVIATIONS

TOR (T/R) :	Terms of Reference
S/W :	Scope of Work
M/M :	Minutes of Meeting
Q/N :	Questionnaire
IC/R :	Inception Report
DF/R :	Draft Final Report
F/R :	Final Report
OECD :	Organization for Economic Cooperation and Development
DAC :	Development Assistance Committee

Use of the Guidelines

The guidelines were prepared to provide personnel involved in JICA's preparatory study (including the preparatory work in Japan) with information that can be used to prepare the preparatory study report or compile project specifications while carrying out field surveys, hearings, and holding discussions with the officials of the host country during a short-time visit.

The use of the guidelines is shown in Figure i and explained herewith.

«Preparatory work in Japan»

1) Examination of the request

After examining the request, follow the procedure given below, unless it is judged a soft-type infrastructure project, which is supposed to have no serious environmental impacts, such as the preparation of topographical maps or a telecommunication project.

2) Preliminary screening

Based on the request, collect and analyze the data and information and prepare the PD and SD in Japan, and conduct the preliminary screening by using them.

If any serious environmental impacts are suspected, the preparatory study team should include an environmental specialist.

Prepare questionnaires to the recipient government concerned and the draft of S/W including environment related items.

«Work in the host country»

3) Examination of the country's guidelines

At first, investigate the country's IEE/EIA implementing structure, the laws, and any existing guidelines (hereinafter referred to as the country's EIA guidelines). Then, it should be confirmed whether or not the project is subjected to IEE/EIA.

Case 1: If the contents of the country's EIA guidelines are sufficient, follow their guidelines.

Case 2: If the contents of the country's EIA guidelines are insufficient, follow their guidelines and add JICA's screening and scoping items.

Case 3: If the country has no EIA guidelines, follow JICA's guidelines.

4) Screening

Reexamine the PD, SD, and the contents of screening prepared in Japan, based on the findings of the field surveys and data analysis. If it is evaluated that an IEE or EIA is required for the project, scoping should then be undertaken.

5) Scoping

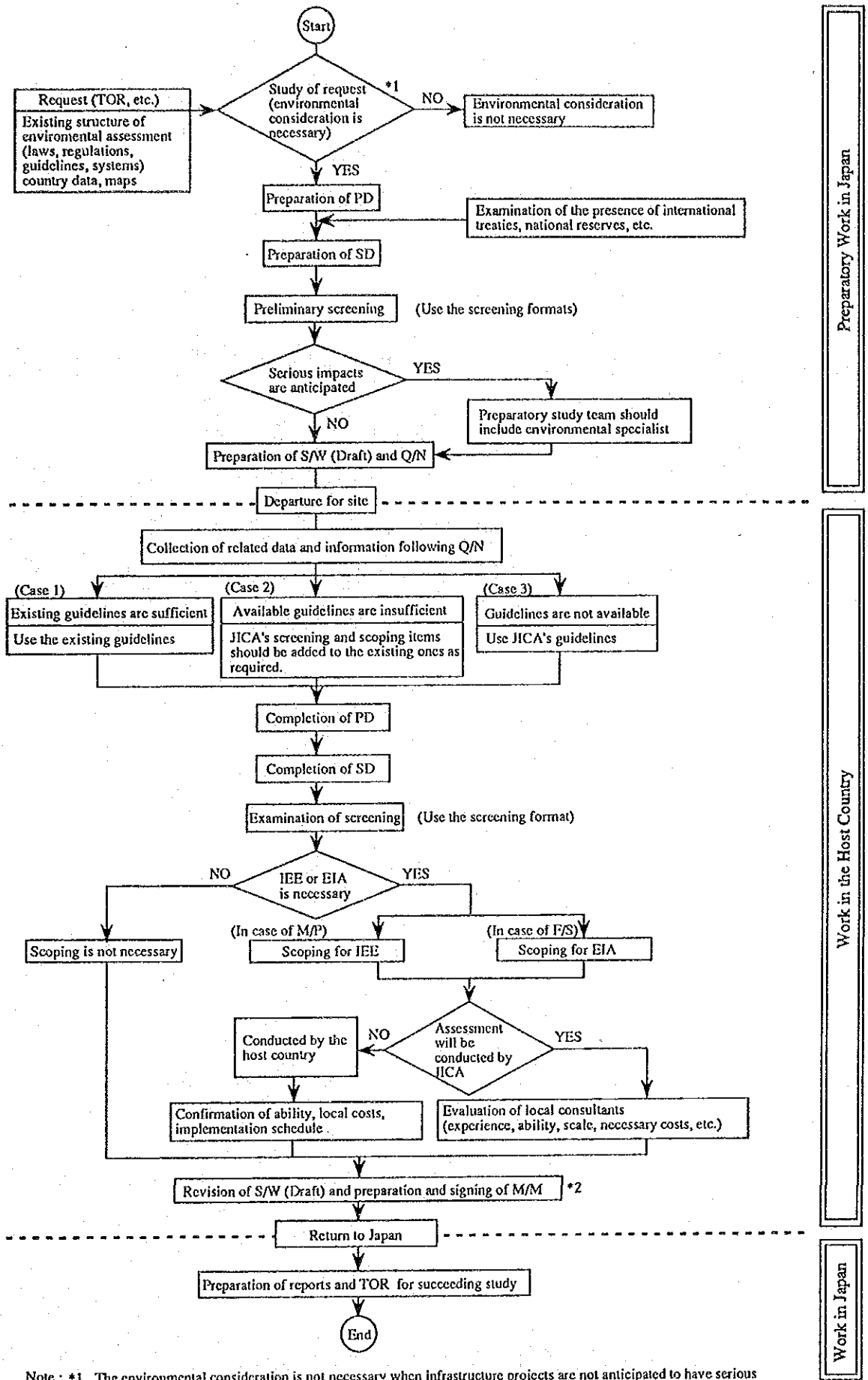
Evaluate the magnitude of impact on each environmental item, using the checklist method, to specify the items that are to be studied in IEE for M/P or EIA for F/S. In this process, making use of the explanation of items in the guidelines, try to grasp the features of possible environmental impacts. The results should be noted in the scope of work (S/W) and the minutes of meeting (M/M). When the environmental factors which may have serious impacts are not identified, it is necessary to mention in the M/M that such factors would be clarified through the full-scale study.

«Work in Japan»

6) Report preparation

Based on the above-mentioned results, compile a preparatory study report which makes it possible to carry out the appropriate IEE or EIA in the full-scale study. TOR for the succeeding study should reflect the contents of the report.

Figure i Procedure of Environmental Consideration



Note : *1. The environmental consideration is not necessary when infrastructure projects are not anticipated to have serious impacts, such as preparation of topographic maps and telecommunication projects, etc.

*2. When the environmental factors that may have serious impact are not identified, it is necesary to mention in the M/M that such items would be clarified in the full-scale study.

CHAPTER 1

OUTLINE OF ENVIRONMENTAL CONSIDERATION

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OUTLINE OF ENVIRONMENTAL CONSIDERATION

1.1 Basic Concept

JICA's aid study report "Sectoral Study for Development Assistance-Environment" published in 1988 defined that "Environmental Consideration" is to study whether a development project will have significant impacts on the environment or not, to assess the impacts and to incorporate measures to prevent or alleviate their effects, if necessary.

The premise of this definition is the understanding that development aid should not end with a one-time involvement but should be continuous and sustainable. Thus, it is believed that environmental consideration is prerequisite for securing the sustainability of the development.

For the implementation of development projects in developing countries with the cooperation of the Japanese government, a careful environmental consideration should be carried out from the early stages of project planning with a long-term perspective in order to accomplish a well-balanced development.

As such development projects are implemented in the host countries, based on the decision making process of these countries, it is necessary to conform to their laws, rules and regulations related to environmental consideration.

In some developing countries, however, such laws, rules and regulations do not exist, while in others they are not properly enforced. The policies and structures for environmental consideration vary from one country to another.

Therefore, when undertaking the environmental consideration, it is necessary to take into account of the developing country's policies and structures and to understand the country's awareness of environmental problems, while holding sufficient discussions with the people concerned in a flexible manner.

With regard to environmental consideration, JICA's basic principles are to promote sustainable development aimed at improving the living standard of the residents, and harmonize the development with a desirable environment based on the country's willingness.

If environmental consideration is not sufficiently undertaken for implementing a development project and, if careful attention is not paid to the management of the surrounding natural resources, the base of the development might be jeopardized and the development might be halted. The base of the people's livelihood or even their subsistence can be also threatened. It is necessary, therefore, to try to ensure the sustainable development by harmonizing the development project with natural resources and the base of livelihood and subsistence of the residents in the area.

The guidelines describe screening and scoping procedures at the preparatory study stage to deal with the negative impacts of a development project on the environment of the project site and its surrounding area.

The process of environmental consideration in a project cycle is shown in Figure 1-1.

A development project begins with its finding and formulation. At each stage of the cycle, a series of environmental considerations, such as a preliminary environmental survey, an initial environmental examination (IEE), environmental impact assessment (EIA), and the design of environmental protection measures take place. Environmental monitoring is then conducted with project implementation. Through this process, sustainable development can be attained.

Definition of the environmental management plan mentioned here is limited to the monitoring system which handles the environmental impacts caused by the project.

Tables 1-1 and 1-2 illustrate the time flows corresponding to the project implementation stages and the environmental consideration stages. The flows start with an environmental survey, followed by the EIA, proceed to the examination of environmental conservation measures, and then to the monitoring stage.

Figure 1-1. Flow of Environmental Considerations in Project Cycle

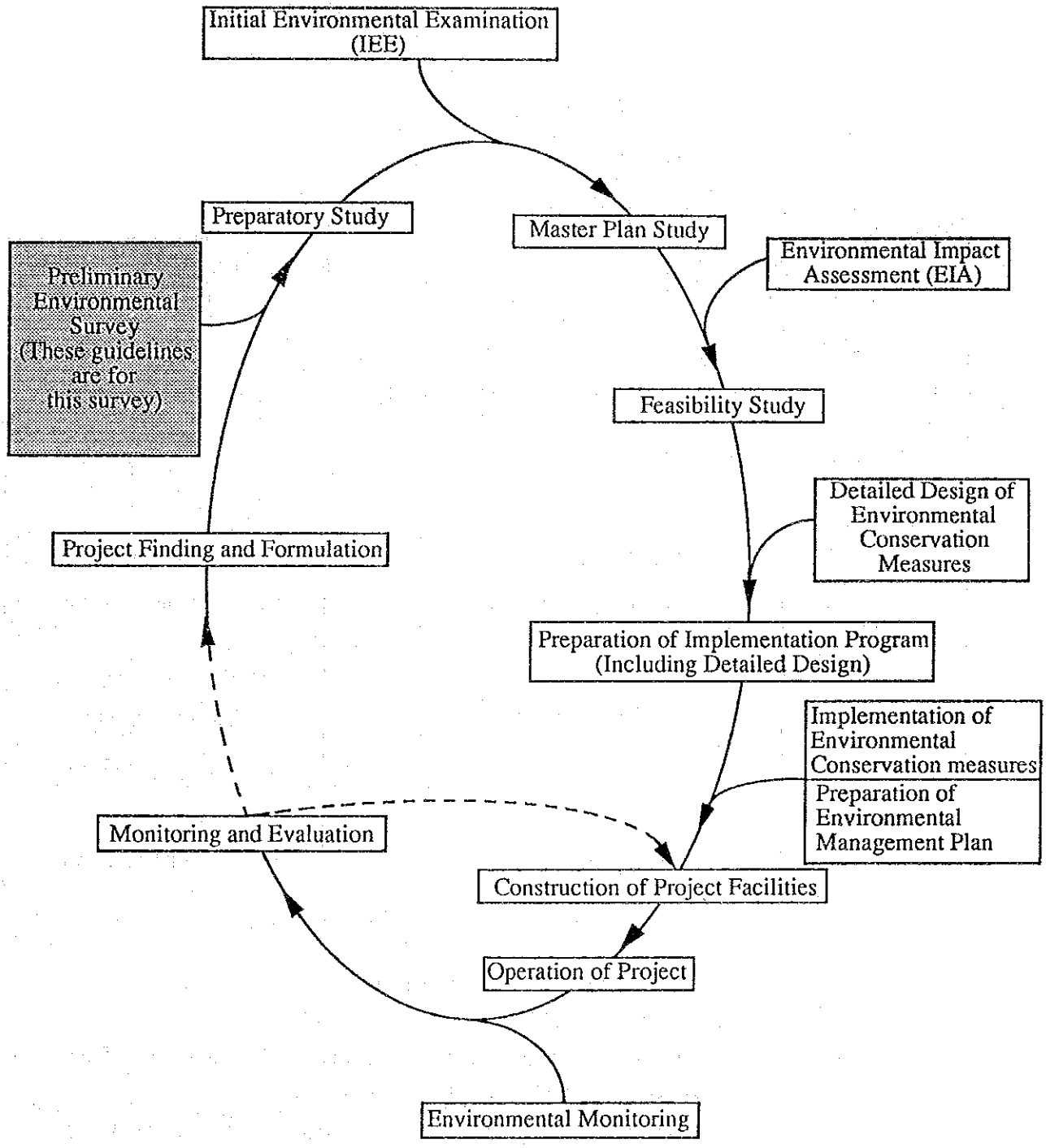

Table 1-1 Project Implementation Stages and Corresponding Environmental Consideration Stages

<table>
<tr><td colspan="4">Project Implementation Stages</td><td>Environmental Consideration Stages</td></tr>
<tr><td rowspan="3">Implementation by JICA</td><td colspan="3">Preparatory Study</td><td>Preliminary Environmental Survey</td></tr>
<tr><td rowspan="2">Full-scale Study</td><td>Master Plan Study</td><td rowspan="2">Feasibility Study</td><td>Initial Environmental Examination (IEE)</td></tr>
<tr><td>Feasibility Study</td><td>Environmental Impact Assessment (EIA)</td></tr>
<tr><td rowspan="3">Implementation by Executing Agency</td><td colspan="3">Preparation of Project Implementation Plan (Including Detailed Design)</td><td>Examination of Environmental Conservation Measures</td></tr>
<tr><td colspan="3">Project Construction</td><td>Implementation of Environmental Conservation Measures</td></tr>
<tr><td colspan="3">Project Facility Operation</td><td>Environmental Monitoring</td></tr>
</table>

Notes: 1. This table does not indicate strict correspondence.
2. Some projects do not require IEE or EIA.
3. Preparation of the project implementation plan includes the detailed design of the environmental conservation facilities and their construction.
4. The item enclosed in a separate box indicates the major boundary for the guidelines.

Table-1.2 Incorporation of Environmental Consideration into JICA's Development Studies

Study Flow		Contents and Timing Investigation	Examination Items
Project Finding	Request/Project Finding ↓ Acceptance of TOR ↓ Study on TOR	(Preliminary Screening) Judgment on necessity of IEE or EIA	The project judged to cause serious environmental impact shall be rejected.
Prepa-ratory Study	↓ Preparatory Study	(Screening) Review of preliminary screening (Scoping) Decision of important items for IEE or EIA Decision of work boundaries	
	↓ Discussion and Agreement on S/W ↓ Preparation of Preparatory Study Report		(Preparation of M/M, S/W) Examine the description of agreed items on screening and scoping. (Reporting) Clarification of background and agreed items.
Selec-tion of Consul-tants	Preparation of Project Specification ↓ Selection of Consultants		(Project Specification) Define the boundary and work volume of IEE or EIA to be conducted by consultants (Selection of consultants) Evaluate the appropriateness of the proposal for the project specification.
Full-scale Study	Preparation of and Discussion on IC/R ↓ Implementation of IEE or EIA ↓ Explanation of and Discussion on DF/R ↓ Preparation of F/R		(IEE or EIA) Discussion and decision on IEE/EIA items and methods based on the results of scoping. (Supervision of survey) Check whether IEE or EIA is conducted properly. (Final reporting) Clarification of IEE or EIA results and recommendations.

Source: JICA, "Sectoral Study for Development Assistance-Environment", 1988.
Note: The shaded part is mainly covered by the guidelines.

1.2 Environmental Consideration for Tourism Development Plans

1.2.1 Definition of Tourism Development Plans in the Guidelines

Tourism development projects are a series of plans aimed at promoting area development by attracting more tourists by means of creating comfortable spaces through the development or preservation of natural resources, such as coasts, beaches, hills, mountains, etc., and cultural and social resources or by means of promoting cultural understanding through the improvement of historical buildings and museums.

1.2.2 Typical Possible Impacts and the Points of Environmental Consideration

The purpose of tourism development plans is to attract a large number of tourists, who are mostly outsiders, to the area concerned. A characteristic of resort development is the creation of pleasant conditions by altering the existing natural environment.

Attracting a large number of tourists will contribute to the area's prosperity. On the other hand, the inappropriate alteration of rich natural environment may result in its fatal destruction. Thus, it is necessary to study and find out how much of the natural environment could be altered without affecting the area's ecosystem.

Typical environmental impacts that may be caused by tourism development projects are as follows:

(1) Inland or Coastal Resort Development

Impacts on economic activities, water pollution, and plants and animals

When a large-scale reclamation or landfill for construction of lodging and leisure facilities is undertaken, soil erosion, water pollution, forest destruction, and a decrease in wildlife may occur. Also, the operation of construction machinery and vehicles will generate unwanted noise and vibrations.

Inappropriate treatment of sewage and waste generated by the lodging and leisure facilities might possibly cause water pollution.

(2) Urban Tourism Development

Impacts on present traffic and public facilities

As a result of a sudden flood of tourists into historical sites and museums, an increased load will be placed on the existing transportation system and on other public facilities. This situation would lead to an increase in the number of traffic accidents and the worsening of traffic jams thereby downgrading the functions of urban activities.

CHAPTER 2

PROJECT DESCRIPTION AND SITE DESCRIPTION

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PROJECT DESCRIPTION AND SITE DESCRIPTION

2.1 Basic Concept

To conduct screening and scoping of the potential environmental impacts that may be caused by a development plan or project, it is essential to fully understand the "project description" and "site description" at the earliest stage.

Project description includes the contents and features of the project, such as its background, objectives, location, executing agency, number of beneficiaries, scale, structure, construction method, operation and maintenance, etc..

Site description includes the present conditions of the natural and social environment and pollution in and around the project area.

In particular, if the project site includes such areas as follow, they should receive special attention:

a) Areas requiring soil conservation (high risk areas of erosion, salinization, etc.).
b) Arid and semiarid areas subject to desertification.
c) Tropical forests.
d) Water sources.
e) Habitats of value for the protection and conservation and/or sustainable use of fish and wildlife resources (wetlands, mangrove, swamps, coral reefs, etc.)
f) Areas of unique interest (historical, archaeological, cultural, aesthetic and scientific).
g) Areas of concentrations of population or industrial activities where further industrial development or urban expansion could create significant environmental problems.
h) Areas of particular social interest to specific vulnerable population groups (e.g., nomadic people or other people with traditional life styles).

It should be borne in mind that the above items must be thoroughly studied in each project step.

2.2 Project Description and Site Description of Tourism Development Plans

The project description and the site description should be clarified in the formats shown in Tables 2-1 and 2-2 for screening and scoping.

However, at the project finding and preparatory study stages, sufficient information for the project description and site description may not be available. Thus, during the preparatory work prior to the preparatory study in the host country, the formats of Tables 2-1 and 2-2 should be filled in as complete as possible using all available information. The additional necessary information should be supplemented during the field surveys.

Table 2-1 Format for Project Description (Tourism Development)

Item	Description
Project Name	
Background	
Objectives	
Location	
Executing Agency	
Beneficiaries	
Project Components	
Tourism Resources	Natural Resources (coast, highland, scenic spot, fauna/flora) /Remains. Cultural Assets/Museum/Food and Drink/Shopping/ Sports (diving, yachting, golf, climbing, etc.)/Others ( )
Major Plans	Demand Forecast/Middle and Long-term Planning/Planning for Infrastructure: Traffic Facilities (port/harbor, airport, road, railroad, river), Public Facilities (water supply, sewerage, garbage disposal, etc.), and Tourism Resources Development.
Others	

Note: The format should be filled in on the basis of the available existing data and information.

Table 2-2 Format for Site Description (Tourism Development)

Item		Description
Project Name		
Social Environment	Inhabitants: (residents/indigenous people/their views on the project, etc.)	
	Economic Activities/ Transportation/Public Facilities: (commerce, transportation network, water supply, sewerage, garbage)	
	Remains/Cultural Assets: (conservation and utilization) Public Health (diseases, etc.)	
Natural Environment	Topography and Geology (scenic spots, mountainous areas, wetlands, etc.)	
	Lakes, River System, Coast, Climate (water quality, coastal zone, rainfall days, etc.)	
	Valuable Fauna and Flora and Their Habitats: (rare species, mangroves, coral reefs, etc.)	
Pollution	Complaints: (pollution of the upmost concern, etc.)	
	Measures Taken: (institutional measures/ compensation, etc.)	
Others		

Note: The format should be filled in on the basis of the available existing data and information.

CHAPTER 3

SCREENING

CHAPTER 3
SCREENING

3.1 Basic Concept

JICA's 1988 report, "Sectoral Study for Development Assistance-Environment," defines screening as "a process of judgement on whether a development project requires an environmental impact study or not." That is to say, screening is the first judgement in the process of environmental consideration and should commence at the initial stage of the project, such as project finding.

Screening in the guidelines is also based on the above definition. However, the evaluation of whether or not the IEE/EIA is required for a project should be based on appropriate ideas and views for harmonizing the sustainable development with the residents' livelihood and surrounding environment by taking into consideration the project features and its environment, but not on the quantitative standards.

3.2 Screening Methods

3.2.1 Outline

As for the procedures for screening in addition to the provisions detailed in the annex to the 1985 OECD council recommendations, JICA's report, "Sectoral Study for Development Assistance-Environment", describes the following cross-sectional viewpoints:

- Can the project adversely affect the sustainability of production which depends mainly on natural resources ?
- Will the project significantly affect people's health ?
- Will the project lead to a deterioration or loss of valuable living resources and their habitats ?
- Will the project have an unreasonable impact on the livelihoods and subsistence of the people concerned ?

Based on the above viewpoints, the screening method should be examined in detail.

If there are laws or regulations concerning the environmental impact assessment for the project in the host country, it is necessary to discuss with the officials concerned of the country to make better environment considerations in accordance with the laws and regulations by referring to the guidelines.

On the other hand, if there are no such laws or regulations in the host country, it may be possible to formulate a standard with respect to the project scale and the land-use conditions for evaluating whether the development project requires an environmental

impact assessment or not. However, setting up a quantitative standard for judgement is not only difficult but its effectiveness is also doubtful because Japanese development assistance is provided to various countries and their environmental characteristics are vastly different.

It is considered to be more effective, therefore, to formulate certain ideas and viewpoints with qualitative expressions for evaluating screening.

3.2.2 Screening of Tourism Development Plans

Based on the above consideration, the following concepts are established in the preliminary environmental survey :

- The development project should be planned in such a way as to provide society with sufficient benefits while securing the areas' sustainable development and growth without being detrimental to the lives and existence of the residents.

- The development project should be planned in such a way as to maintain harmony with the natural environment, while avoiding significant damage to the existing environment, and preserve valuable natural environmental assets.

The examination of screening should be conducted from practical viewpoints for each environmental item based on the above concepts. The results of the examination should be clarified by using the screening format as shown in Table 3-1 and should be included in the preparatory study report.

The evaluation result of each environmental item should be noted on the format whether or not environmental impacts exist. As the overall evaluation, the conclusion and the reason for evaluating whether or not IEE/EIA is required should be described briefly on the format.

The guidelines should be applied for all environmental impacts that may be caused by the project implementation not only in the project area but also in any area that may be directly or indirectly affected during the construction and after the operation of project facilities.

Table 3-1 Format for Screening (Tourism Development)

No.	Environmental Item	Description	Evaluation	Remarks (Reason)
Social Environment				
1.	Resettlement	Resettlement due to land occupancy (transfer of rights of residence/land ownership)	[Y][N][?]	
2.	Economic Activities	Loss of bases of economic activities, such as land, and change of economic structure	[Y][N][?]	
3.	Traffic and Public Facilities	Impacts on schools, hospitals and present traffic conditions, such as the increase of traffic congestion and accidents, etc.	[Y][N][?]	
4.	Split of Communities	Split of communities caused by the construction of tourism facilities and transportation means	[Y][N][?]	
5.	Cultural Property	Damage to or loss of the value of churches, temples, shrines, archaeological remains or other cultural assets	[Y][N][?]	
6.	Water Rights and Rights of Common	Obstruction of fishing rights, water rights, rights of common	[Y][N][?]	
7.	Public Health Condition	Deterioration of public health and sanitary conditions due to generation of garbage and outbreak of pathogenic insects	[Y][N][?]	
8.	Waste	Generation of construction waste, debris and disposal	[Y][N][?]	
9.	Hazards (Risk)	Increase in risk of ground failure, cave-ins, and accidents	[Y][N][?]	
Natural Environment				
10.	Topography and Geology	Changes of valuable topography and geology due to excavation or fill work	[Y][N][?]	
11.	Soil Erosion	Topsoil erosion by rainfall after reclamation and removal of vegetation	[Y][N][?]	
12.	Groundwater	Lowering of water table caused by over-draft and water pollution	[Y][N][?]	
13.	Hydrological Situation	Changes of river discharge and riverbed conditions due to fill and drainage inflow	[Y][N][?]	
14.	Coastal Zone	Coastal erosion and change of vegetation due to coastal reclamation and coasta changes	[Y][N][?]	
15.	Fauna and Flora	Obstruction of breeding and extinction of species due to changes of habitat conditions	[Y][N][?]	
16.	Meteorology	Change of micro-climate, such as temperature, wind, etc., due to large-scale reclamation and construction	[Y][N][?]	
17.	Landscape	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by structures	[Y][N][?]	
Pollution				
18.	Air Pollution	Pollution caused by exhaust gas or toxic gas from vehicles and factories	[Y][N][?]	
19.	Water Pollution	River water and groundwater pollution caused by drainage from tourism facilities	[Y][N][?]	
20.	Soil Contamination	Contamination caused by discharge or diffusion of sewage or toxic substances	[Y][N][?]	
21.	Noise and Vibration	Noise and vibration generated by vehicles, airplanes and factories	[Y][N][?]	
22.	Land Subsidence	Deformation of the land and land subsidence due to the lowering of groundwater table	[Y][N][?]	
23.	Offensive Odor	Generation of offensive odor and exhaust gas	[Y][N][?]	
Overall Evaluation: Either IEE or EIA is necessary for the project implementation?			[Y][N]	

CHAPTER 4

SCOPING

CHAPTER 4
SCOPING

4.1 Basic Concept

In JICA's 1988 report, "Sectoral Study for Development Assistance-Environment," scoping is defined as "a process of identification of the critical environmental impacts out of the possible environmental impacts of a development project. Through the scoping process, the priority fields or items of an environmental impact assessment are also identified". Further, it recommends that scoping should be carried out through discussions with the government of the host country. These discussions are to be based on discussion items prepared in advance, and by taking into account the aforementioned cross-sectional judgement provisions.

With the above definition and the methods used by various agencies, the guidelines provide material for conducting adequate scoping. The guidelines would enable even those who are not IEE and EIA specialists to understand the overall picture of the development project to conduct the sufficient scoping work during the short-term preparatory study period.

4.2 Scoping Methods

4.2.1 Outline

There are several technical methods for environmental impact assessment and its scoping. Each of them is selected in accordance with the project type, the project planning level, the features of the environmental conditions, etc. The most common methods are the checklist method, the matrix method, the overlay method, and the network method. In particular, the checklist and the matrix methods are commonly used by most agencies.

For "identification of the critical environmental impacts out of the possible impacts of a development project," as required by the definition of scoping in the "Sectoral Study for Development Assistance-Environment," it is necessary to include all environmental items which can be predicted to arise along with implementation of the project. To accomplish this, the checklist method seems to be the easiest to understand and the most useful.

Based on the above consideration, the checklist method is proposed for scoping in the guidelines.

To clarify important fields and items among those listed on the checklist, it is necessary to understand the causal relationships between the environmental items and the project related activities during the construction and the operation periods. Thus, to make it easier to understand scoping, the guidelines show typical causal relationships between development activities and environmental items by using the matrix as well as the checklist.

For reference purposes, a comprehensive matrix covering 13 sectors of social and economic infrastructure development projects is shown in Table 4-1.

4.2.2 Scoping of Tourism Development Plans

The checklist for scoping of tourism development plans is shown in Table 4-2. The matrix for understanding the causal relationship between the development activities and the environmental items is shown in Table 4-3.

To use the checklist for scoping, the following conditions and procedures should be taken into account:

(1) Application conditions

1) Periods covered by scoping
   Scoping should cover both the construction and operation periods.
2) Spatial extent of scoping
   Scoping should cover the whole planning area including tourism facilities and related facilities.
3) Types of Environmental Impacts
   Environmental impacts subject to scoping are those having negative impacts on the existing environment.

(2) *Evaluation method of important fields and items*

The evaluation of each item should be rated according to the following categories:

A (serious impact is expected);
B (some impact is expected);
C (extent of impact is unknown but further examination is required because it might become clear as the study progresses);
D (no impact is foreseeable and IEE/EIA is not required).

Important fields and items for IEE/EIA should be identified with reference to "possible environmental impacts," "useful factors for evaluation," "measures," and "related subjects for study" as listed in Table 4-5.

The opinions and views of the host country should also be taken into consideration for the evaluation.

(3) Overall Evaluation

The evaluation results of each environmental item and the reasons for the evaluation should be clearly described on the checklist. The items evaluated as A, B, or C should be examined based on the screening concept to determine whether or not IEE/EIA is required, and the policies for further study of those items should be outlined. If it is possible to alleviate or avoid some environmental impacts by taking adequate measures, the contents should be described.

If, as the result of the evaluation, there are items which are evaluated as "C" or higher, some studies should be conducted for these items.

For the overall evaluation, opinions and views of the host country should be taken into consideration.

The overall evaluation form is shown in Table 4-4.

Table 4-1 Comprehensive Matrix

		Project Type / Sectors / Environment Items	Sectoral Development									Comprehensive Development			
			1. Ports and Harbors	2. Airports	3. Roads	4. Railways	5. River and Erosion Control	6. Solid Waste Management	7. Sewerage	8. Groundwater Development	9. Water Supply	10. Regional Development	11. Tourism Development	12. Transportation Development	13. Urban Transportation Development
Social Environment	1	Resettlement	◎	◎	◎	◎	◎	○	○		○	○	○	○	○
	2	Economic Activities	○	○	○	○						○	○	○	○
	3	Traffic and Public Facilities	○	○	○	○	○	○				○	○	○	○
	4	Split of Communities		○	○	○	○					○	○	○	○
	5	Cultural Property	○	○	○	○	○					○	○	○	○
	6	Water Rights/Rights of Common	◎	○	○	○	◎			○	○	○	○	○	
	7	Public Health Condition				○		○				○	○	○	
	8	Waste	○	○	○	○	○	○	○			○	○	○	○
	9	Hazards (Risk)	○	○	○	○						○	○	○	○
Natural Environment	10	Topography and Soil Condition	○	○	○	○	○					○	○	○	
	11	Soil Erosion		○	○	○						○	○	○	
	12	Groundwater			○	○		○		◎		○			
	13	Hydrological Situation	○	○	○	○	◎	○			○	○	○	○	○
	14	Coastal Zone	◎	○	○	○	○	○				○	○	○	
	15	Fauna and Flora	◎	◎	◎	◎	◎	○	○		○	○	○	○	○
	16	Meteorology										○		○	
	17	Landscape	○	○	○	○	○	○	○		○	○	○	○	○
Pollution	18	Air Pollution	○	○	◎			◎	○			○		○	○
	19	Water Pollution	○	○	○	○	○	◎	○	○	○	○	○	○	
	20	Soil Contamination	○		○			○						○	○
	21	Noise and Vibration	○	◎	◎	◎	○	○	○	○	○	○	○	○	○
	22	Ground Subsidence								◎					
	23	Offensive Odor	○					◎	○			○		○	

Note:◎ : The environmental items to which special attention has to be paid
They might cause serious impacts that may affect the project formulation depending on the magnitude of the impacts and the possibility of the measures.

○ : The environmental items which may have a significant impact depending on the scale of project and site conditions

No mark : The environmental items requiring no impact assessment since the anticipated impacts are, in general, not significant.

In case of the comprehensive development projects, all the items are classified in ○, because their studies are usually at the master planning stage and the extent of impacts are not clear.

Table 4-2 Checklist for Scoping (Tourism Development)

No.	Environmental Item	Evaluation	Reason
Social Environment			
1.	Resettlement		
2.	Economic Activities		
3.	Traffic/Public Facilities		
4.	Split of Communities		
5.	Cultural Property		
6.	Water Rights and Rights of Common		
7.	Public Health Condition		
8.	Waste		
9.	Hazards (Risk)		
Natural Environment			
10.	Topography and Geology		
11.	Soil Erosion		
12.	Groundwater		
13.	Hydrological Situation		
14.	Coastal Zone		
15.	Fauna and Flora		
16.	Meteorology		
17.	Landscape		
Pollution			
18.	Air Pollution		
19.	Water Pollution		
20.	Soil Contamination		
21.	Noise and Vibration		
22.	Land Subsidence		
23.	Offensive Odor		

Note 1: Evaluation categories :

A: Serious impact is expected.
B: Some impact is expected.
C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses.).
D: No impact is expected. IEE/EIA is not necessary.

Note 2: The evaluation should be made with reference to the "explanation of item" (Table 4-5)

Table 4-3 Matrix for Scoping (Tourism Development)

		Major Facilities / Activities	Inland Resort / Coastal Resort / Urban Tourism development						
		Activities which may cause impacts / Environmental Items	Overall Evaluation	Before Operation		After Operation			
				Reclamation and Spatial Occupancy	Operation of Construction Equipment and Vehicles	Spatial Occupancy	Operation of Vehicles, Ships and Airplanes	Operation and Maintenance of Tourism Facilities	Accumulation of People and Goods
Social Environment	1	Resettlement	○	○					
	2	Economic Activity	○	○				○	○
	3	Traffic and Public Facility	○		○		○		
	4	Split of Communities	○			○			
	5	Cultural Property	○	○					○
	6	Water Rights/Rights of *Common*	○	○		○			
	7	Public Health Condition	○					○	○
	8	Waste	○	○				○	○
	9	Hazards (Risk)	○	○					
Natural Environment	10	Topography and Geology	○	○					
	11	Soil Erosion	○	○					
	12	Groundwater							
	13	Hydrological Situation	○	○				○	
	14	Coastal Zone	○	○		○			
	15	Fauna and Flora	○	○	○	○	○	○	○
	16	Metcorology							
	17	Landscape	○	○		○			
Pollution	18	Air Pollution							
	19	Water Pollution	○	○				○	
	20	*Soil Contamination*							
	21	Noise and Vibration	○		○		○	○	
	22	Land Subsidence							
	23	Offensive Odor							

Note:○ : The environmental items which may have a significant impact depending on the scale of the project and site conditions

No mark : The environmental items requiring no impact assessment since the anticipated impacts are, in general, not significant.

Table 4-4 Overall Evaluation Form (Tourism Development)

Environmental Item	Evaluation	Study Plan	Remarks

Note: Evaluation categories :

A: Serious impact is expected.
B: Some impact is expected.
C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses.).
D: No impact is expected. IEE/EIA is not necessary.

Table 4-5 Explanation of Item 1 (Tourism Development)

Item	1. Resettlement
Description	Resettlement due to land occupancy (transfer of rights of residence/land ownership)

Causes of Impacts

1. Land acquisition for the construction of various accommodations and tourism facilities.

Possible Environmental Impacts

1. Loss of living foundation of inhabitants to be resettled. Social and cultural inadaptability to the new resettlement area may occur.
2. Conflict between permanent population and relocated residents (new settlers) because of the social and economic over-burden on the host population.
3. Some countries do not have a sufficient compensation system for resettlement. In some areas, inhabitants to be resettled are illegal dwellers who are not eligible for compensation. Thus, new settlers may have to live under worse conditions after resettlement.

Useful Factors for Evaluation

1. Resettlement may be difficult for those people who live on special environmental resources which are peculiar to the area.
2. Their resettlement may be more difficult when the inhabitants are currently well-off.
3. Careful attention should be paid to the resettlement where racial or tribal problems exist.
4. Impacts may be greater when there is no favorable resettlement area nearby.

Measures

1. Selection of resettlement area by taking into account the wishes of the inhabitants
2. Meetings with the inhabitants and provision of necessary information
3. Improvement of the living and economic situation in the resettlement area
4. Provision of sufficient compensation
5. Provision of job training and guidance

Related Subjects for Study

1. Number of inhabitants to be resettled and their economic conditions
2. Conditions of the resettlement area
3. Past cases of resettlement

Table 4-5 Explanation of Item 2 (Tourism Development)

Item	2. Economic Activities
Description	Loss of bases of economic activities, such as land, and change of economic structure

Causes of Impacts

1. Change or loss of farmland, forests, and coastal fishing grounds due to facility construction and reclamation
2. Appearance of or increase in tourism service industries
3. Inflow of tourists and tourism businessmen

Possible Environmental Impacts

1. Reduction of agriculture and forestry production due to the loss of farmland and forests
2. Reduction of fishery production due to the loss of coastal fishing grounds
3. Change of population distribution due to land-use change and the effects on local economy due to the change of commercial and industrial activities, and employment opportunities

Useful Factors for Evaluation

1. When important local industries have to be relocated, special attention should be given.
2. Creation of new employment opportunities in the area may make it difficult for existing local industries with low productivities to survive.
3. In self-sufficient areas, the inflow of people and commodities would have a great impact on the local economy.

Measures

1. Examination of alternative project areas
2. Sufficient compensation to landowners and inhabitants who are engaged in primary industries
3. Revitalization of local industries
4. Securing of alternative land

Related Subjects for Study

1. Local economy and local industries
2. Future development plans for surrounding areas
3. Laws related to employment and working conditions

Table 4-5 Explanation of Item 3 (Tourism Development)

Item	3. Traffic and Public Facilities
Description	Impacts on schools, hospitals and present traffic conditions, such as the increase of traffic congestion and accidents

Causes of Impacts

1. Operation of vehicles, ships, and airplanes to transport tourists and commodities
2. Operation of large vehicles for construction work

Possible Environmental Impacts

1. Newly created traffic would increase the load on existing transportation facilities and may create traffic congestion and increase traffic accidents.
2. Increase in traffic may cause noise, vibration, and air pollution that may affect public facilities, such as schools and hospitals.

Useful Factors for Evaluation

1. Traffic and transportation conditions in the area should be taken into consideration.
2. Special environmental consideration should be given when there are such public facilities as schools, hospitals and religious sites in the project area.

Measures

1. Examination of the project contents
2. Improvement of transportation facilities (especially, access methods for tourists)
3. Installation of traffic safety facilities
4. Establishment of environmental protection measures for public facilities

Related Subjects for Study

1. Land use and traffic conditions
2. Future land use and transportation plans
3. Traffic forecast

Table 4-5 Explanation of Item 4 (Tourism Development)

Item	4. Split of Communities
Description	Split of communities caused by the construction of tourism facilities and transportation means

Causes of Impacts

1. Interference with the movement of people and commodity distribution in local areas by the construction of tourism facilities or the access roads, railroads, or new transportation systems

Possible Environmental Impacts

1. Inconvenience in the daily life of the inhabitants and impacts on economic activities.
2. Access to public facilities, such as schools and hospitals, in the area may be interfered with by the construction of large-scale tourism facilities or transportation facilities. Elderly people and children may suffer the most in their daily life.
3. Existing local society may change due to the loss of places where community work or religious ceremonies are held by large-scale facility construction.

Useful Factors for Evaluation

1. Measures should be taken when some areas are expected to be geographically isolated.
2. Special attention should be paid if there are such communities that have long existing customs or traditions and that are tightly united in their social activities.
3. Special consideration should be given if the access to the public facilities, such as hospitals or schools and community centers, will be interrupted.

Measures

1. Providing sufficient compensation
2. Securing alternative road routes
3. Providing new communication centers

Related Subjects for Study

1. Local community structure
2. Transportation system, commodity distribution and local economy
3. Higher level regional development plan

Table 4-5 Explanation of Item 5 (Tourism Development)

Item	5. Cultural Property
Description	Damage to or loss of the value of churches, temples, shrines, archaeological remains or other cultural assets

Causes of Impacts

1. Reclamation for facilities construction
2. Inflow of tourists

Possible Environmental Impacts

1. Remains and cultural assets that are not regarded as tourism resources will be destroyed by reclamation.
2. Remains and cultural assets may be damaged or stolen by or sold to tourists.

Useful Factors for Evaluation

1. Special attention should be paid to the area's unique and valuable cultural assets which are recognized historically and culturally important from global viewpoints.
2. Special consideration should be given to cultural assets that are specified by laws and regulations.
3. Careful attention should be paid to buildings and other facilities in unique communities, even if they are small.

Measures

1. Preservation or relocation of the archaeological or cultural assets
2. Preservation or repair of the remains and cultural assets when they are used for tourism

Related Subjects for Study

1. Laws and regulations related to preservation of archaeological remains and cultural assets
2. Local history and folklore

Table 4-5 Explanation of Item 6 (Tourism Development)

Item	6. Water Rights and Rights of Common
Description	Obstruction of fishing rights, water rights, rights of common

Causes of Impacts

1. Land acquisition for tourism facility construction
2. Decrease in natural resources due to development

Possible Environmental Impacts

1. Existing fishery activities may be interfered with by tourism facilities which are located along rivers and coastlines.
2. Land acquisition for tourism facility construction may interfere with charcoal making and animal hunting activities in forest areas.
3. When river water is used for drinking, irrigation, or industrial use, such tourism facilities that cross the river may interfere with the water use.

Useful Factors for Evaluation

Special attention should be paid to the following items:

1. Old villages which may have common forests or land
2. Fishery activities which have large fishing grounds in the project area
3. Such areas where the people have difficulties in obtaining water for living due to natural conditions or to the specific characteristics of the community

Measures

1. Reexamination of project contents
2. Provision of new common lands
3. Meetings with inhabitants and provision of necessary information
4. Sufficient compensation

Related Subjects for Study

1. Local history and folklore
2. Types of land ownership (by laws or custom)

Table 4-5 Explanation of Item 7 (Tourism Development)

Item	7. Public Health Condition
Description	Deterioration of public health and sanitary conditions such as generation of garbage and the increase of vermin

Causes of Impacts

1. Generation of sewage and waste from tourism facilities after operation
2. Inflow of tourists from other areas

Possible Environmental Impacts

1. Deterioration of public health, such as the outbreak of epidemics, caused by the increase of vermin and the use of contaminated water, as the result of the generation of untreated water and uncollected garbage due to the concentration of population which surpasses the capacities of waste disposal and sewage treatment
2. It may become more serious, in the case of the expansion of squatter areas.
3. Tourists may bring in communicable diseases from other areas, which would possibly cause the spread of diseases in the project area.

Useful Factors for Evaluation

1. Special attention should be paid if there has been the experience of epidemics in the past.
2. Special attention should be paid to the squatters existing in the area.

Measures

1. Examination of the location and capacities of the final disposal plants or garbage incineration facilities
2. Improvement of water supply and sewerage systems
3. Prevention of vermin by spraying chemicals
4. Promotion of health education for the residents to prevent diseases
5. Improvement of living standard by providing vocational training and employment guidance

Related Subjects for Study

1. Public health conditions in the area
2. Living and breeding conditions of harmful animals, such as rats and crows, and of harmful insects, such as mosquitoes and flies, etc.
3. Meteorological data, such as rainfall and humidity, etc.

Table 4-5 Explanation of Item 8 (Tourism Development)

Item	8. Waste
Causes of Impacts	Generation of construction waste, waste dumps, sludge, and general waste

Cause of Impacts

1. Generation of construction waste and waste dumps due to the construction of accommodations and tourism facilities, parks, museums, etc.
2. Generation of general waste from these facilities after operation

Possible Environmental Impacts

1. When the waste generated from accommodations and tourism facilities exceeds the capacity of waste disposal plants or is inadequately disposed of, the excess or inadequately treated waste would eventually be dumped into the sea, rivers or lakes nearby and cause water pollution or possibly the problem of hazardous substances.
2. When local agencies take responsibility for waste disposal, a heavy economic burden may be placed on local residents who do not use the tourism facilities.

Useful Factors for Evaluation

1. Amount of debris can be estimated from the scale of excavation work.
2. Large amounts of construction waste may be produced when building structures are demolished.

Measures

1. Securing of sufficient disposal site
2. Establishment of waste volume reduction plan
3. Careful construction work and management
4. Establishment of user's fees for tourism facilities, including the cost for solid waste disposal

Related Subjects for Study

1. Physical and chemical characteristics of waste
2. Land ownership and land use conditions for obtaining disposal sites
3. Laws and regulations related to solid waste management

Table 4-5 Explanation of Item 9 (Tourism Development)

Item	9. Hazards (Risk)
Description	Increase in danger from landslide, cave-ins, and accidents

Causes of Impacts

1. Large-scale cut, filling and excavation work for construction
2. Construction of hazardous material storage and handling facilities

Possible Environmental Impacts

1. Landslide or failure of cut or filled slopes which may cause damage to the residents' land and houses, and possibly threaten their lives
2. Occurrence of large-scale disaster in the case of the destruction of hazardous material storage facilities caused by a natural disaster

Useful Factors for Evaluation

1. Special attention should be paid to such areas that often suffer from natural disasters.
2. Special attention should be paid to facility development or use-plans for aircraft, ships, and railroad transportation.
3. Landslides may occur on steep slopes composed of soft soil with high porosity.

Measures

1. Examination of project site
2. Provision of safety education to facility employees
3. Provision of safety measures and safety education for inhabitants

Related Subjects for Study

1. Topographical, geological, and meteorological surveys
2. Case studies of past hazards

Table 4-5 Explanation of Item 10 (Tourism Development)

Item	10. Topography and Geology
Description	Change of valuable topography and geology due to excavation or filling work

Causes of Impacts

1. Large-scale cut and filling work for large tourism facility construction in sloping areas
2. Change of coastlines due to filling work or appearance of facilities in coastal zones

Possible Environmental Impacts

1. Considerable change of natural topography and geology may affect the fauna and flora in the area.
2. Large-scale slope cut and filling work may cause soil erosion and the failure of both natural and artificial slopes.
3. Changes of littoral sand in coastal zone may cause coastal erosion or sand deposits and result in the alteration or destruction of the beaches or vegetation.

Useful Factors for Evaluation

1. Special consideration is required when there is scientifically valuable topography or geology.
2. Special attention should be paid to such areas having high intensity rainfalls.
3. In particular, special attention should be paid to such areas where coastal erosion has already progressed.

Measures

1. Examination of alternative facility construction site
2. Reexamination of construction schedule and methods
3. Restriction on land use in surrounding areas

Related Subjects for Study

1. Topographical and geological surveys
2. Conditions of coastal zone

Table 4-5 Explanation of Item 11 (Tourism Development)

Item	11. Soil Erosion
Description	Topsoil erosion by rainfall after land reclamation and deforestation.

Causes of Impacts

1. Reclamation for the construction of large-scale tourism facilities in sloping area
2. Deforestation for the development of tourism facilities, such as golf courses

Possible Environmental Impacts

1. Topsoil would be washed out after reclamation or deforestation.
2. Eroded soil would cause turbid water in rivers.
3. Turbid river water may decrease the clearness of the sea water along the coast and may have negative effects on bathing places or beaches.

Useful Factors for Evaluation

1. Serious soil erosion may occur on steep sloping area.
2. It tends to occur in such areas that have heavy or intense rainfall or strong wind.
3. It tends to occur in the case of low vegetation coverage.

Measures

1. Soil erosion control, such as reforestation and slope protection work, etc.
2. Reexamination of routes, alignment and project contents

Related Subjects for Study

1. Soil, topographical, geological, and meteorological surveys
2. Land use survey

Table 4-5 Explanation of Item 13 (Tourism Development)

Item	13. Hydrological Situation
Description	Changes of river discharge and riverbed condition due to reclamation work and drainage inflow

Causes of Impacts

1. Reduction of vegetation due to reclamation work
2. Change of runoff coefficients due to the construction of large-scale tourism facilities including accommodation facilities
3. Increase in drainage as a result of increased water use

Possible Environmental Impacts

1. An increase in peak discharge of flood and the shortening of the flood peak reaching time (time of concentration) may increase flood damage.
2. In closed water areas, an increase in the lake water level may cause the inundation of lakeshore areas and affect the livelihood of local residents and the fishery and tourism industries.

Useful Factors for Evaluation

1. Special attention should be paid to the condition of valuable aquatic life.
2. Special consideration is required for areas where lakes and rivers are utilized for tourism or fishery.

Measures

1. Examination of the project contents
2. Compensation for fishery

Related Subjects for Study

1. Study of valuable aquatic life
2. Water use and watershed use in the surrounding area

Table 4-5 Explanation of Item 14 (Tourism Development)

Item	14. Coastal Zone
Description	Coastal erosion and change of vegetation due to coastal reclamation and coastal changes

Causes of Impacts

1. Reclamation for the construction of tourism facilities in coastal zone
2. An increase or decrease in the littoral sand supply due to the change of tide or current

Possible Environmental Impacts

1. Impacts on natural environment, such as mangroves and coral reefs, due to the change of coastal topography; an increase in coastal disasters due to the reduction of the wave-breaking function of the natural coast; and the impacts on fishing grounds and fishing industries
2. In particular, the reduction of tourism resources is a serious problem in coastal resort areas.
3. When river ports are to be constructed as a means of access for tourists, sediment supply in the river would change.

Useful Factors for Evaluation

The following conditions will be conducive to significant environmental impacts:

1. There is valuable natural environment, such as mangroves and coral reefs, around the area.
2. There are favorable industrial conditions, such as good fishing grounds, around the area.
3. There is tourism that uses the coastal zone as a tourist attraction.
4. The area tends to suffer from natural disasters, such as high waves.

Measures

1. Examination of the contents of the project plan
2. Construction of breakwaters
3. Provision of beach nourishment
4. Compensation for fishery

Related Subjects for Study

1. Valuable natural environment, such as mangroves and coral reefs
2. Fisheries
3. Industries that utilize the coastal zone
4. Disasters such as high waves

Table 4-5 Explanation of Item 15 (Tourism Development)

Environmental Item	15. Fauna and Flora
Contents	Obstruction of breeding and extinction of species due to changes of habitat conditions

Causes of Impacts

1. Deforestation, and change of vegetation and topography due to the construction of tourism facilities
2. Reclamation work in coastal zone
3. Inflow of people, generation of noise, vibration, and air and water pollution as a result of the use of tourism facilities

Possible Environmental Impact

1. The existing ecosystem would be changed by large-scale land reclamation, and the number of plant and animal species and their habitats would change significantly.
2. The reduction of valuable plants and animals and, in some cases, the extinction of species may occur and the diversity of species may be adversely affected.
3. When rare plants and animals are used for tourist attractions, their reduction would directly affect tourism itself.

Useful Factors for Evaluation

1. Special attention is required when there are vulnerable ecological systems, such as virgin forests, marshes, and mangroves in the area.
2. Careful consideration should be given to the unique species in the area.
3. If there are many residents who live by hunting animals or utilizing valuable animals, the problems will be more serious.
4. Special attention should be paid to endangered and/or rare species in the area that are listed in the Red Data Books of the International Union for Conservation of Nature and Natural Resources (IUCN).
5. Special attention should be paid to bilateral and/or multilateral conventions on wildlife.

Measures

1. Protection measures for fauna and flora
2. Sufficient compensation
3. Careful construction planning and management
4. Relocation of fauna and flora

Related Subjects for Study

1. Condition of ecosystem
2. Food chain
3. Residents' livelihood

Table 4-5 Explanation of Item 17 (Tourism Development)

Item	17. Landscape
Description	Change of topography and vegetation due to reclamation. Deterioration of aesthetic harmony by appearance of structures

Causes of Impacts

1. Change of topography and vegetation due to reclamation
2. Appearance of various tourism facilities
3. Appearance of high-rise buildings, such as large-scale hotels

Possible Environmental Impacts

1. Appearance of continuous artificial landscape due to the reclamation in sloping or mountain areas by inland resort development
2. Destruction of aesthetic harmony with natural coasts by coastal resort development, depending on the scale of the project and the height and colour of buildings

Useful Factors for Evaluation

1. Special attention should be paid to landscape that has cultural values
2. Particular meaning of the landscape (religious object, tourist attraction, etc.) should be studied.
3. Examination of laws and regulations related to landscape is required.

Measures

1. Reexamination of the project contents
2. Landscape architecture
3. Forestation using indigenous plants

Related Subjects for Study

1. Distribution of cultural assets
2. Landscape study from the viewpoints of local history and ethnology
3. Livelihoods of inhabitants

Table 4-5 Explanation of Item 19 (Tourism Development)

Item	19. Water Pollution
Description	River water and groundwater pollution caused by drainage from tourism facilities

Causes of Impacts

1. Soil erosion caused by reclamation or deforestation for large-scale tourism facility construction
2. Generation of waste, sewage, and drainage from lodging facilities

Possible Environmental Impacts

1. Inflow of turbid water and eutrophication would damage the living and growth of aquatic life and, as a result, may have negative effects on fishery.
2. Water use by area residents would be affected and, when their drinking water is contaminated, their health may be impaired.
3. Water pollution may decrease the area's tourism and recreational values and eventually affect the tourism industries.

Useful Factors for Evaluation

1. Special attention should be paid to the water-use by residents or water basin-use industries in the area or in the downstream region (in case of the river related plan).
2. Special attention should be paid to the valuable aquatic life in the area or its downstream region.
3. Water pollution problems may become more serious when the planning area includes enclosed water areas, such as lakes.

Measures

1. Adequate sewage treatment and waste management plan
2. Appropriate construction management
3. Compensation to inhabitants and industries
4. Creation of habitats for valuable aquatic life

Related Subjects for Study

1. Condition of the industries that use water and water basins in the area
2. Present water quality condition

Table 4-5 Explanation of Item 21 (Tourism Development)

Item	21. Noise and Vibration
Description	Noise and vibration generated by vehicles, airplanes and factory operations

Causes of Impacts

1. Operation of vehicles, ships, or airplanes for access to tourism facilities once they open for business
2. Tourism and recreational activities at or around tourism facilities
3. Operation of construction equipment and vehicles, blasting work

Possible Environmental Impacts

1. Impacts of noise and vibrations on hospitals and schools and interference with the daily life of area residents, such as the disturbance of sleep caused by the construction work at night
2. Interference with cattle breeding and the dispersion of wildlife may occur
3. Emotional friction may arise between area residents and the tourism development project when there are places that require quiet environment, such as religious sites.
4. Vibration may cause cracks in buildings.

Useful Factors for Evaluation

Serious impacts may occur under the following conditions:

1. Densely populated areas or such facilities that require a quiet atmosphere are located nearby.
2. There are cattle related industries in the area.
3. There are valuable wildlife habitats in the area.
4. The planning area is located on soft ground, such as reclaimed land, clayey soil layer, etc..

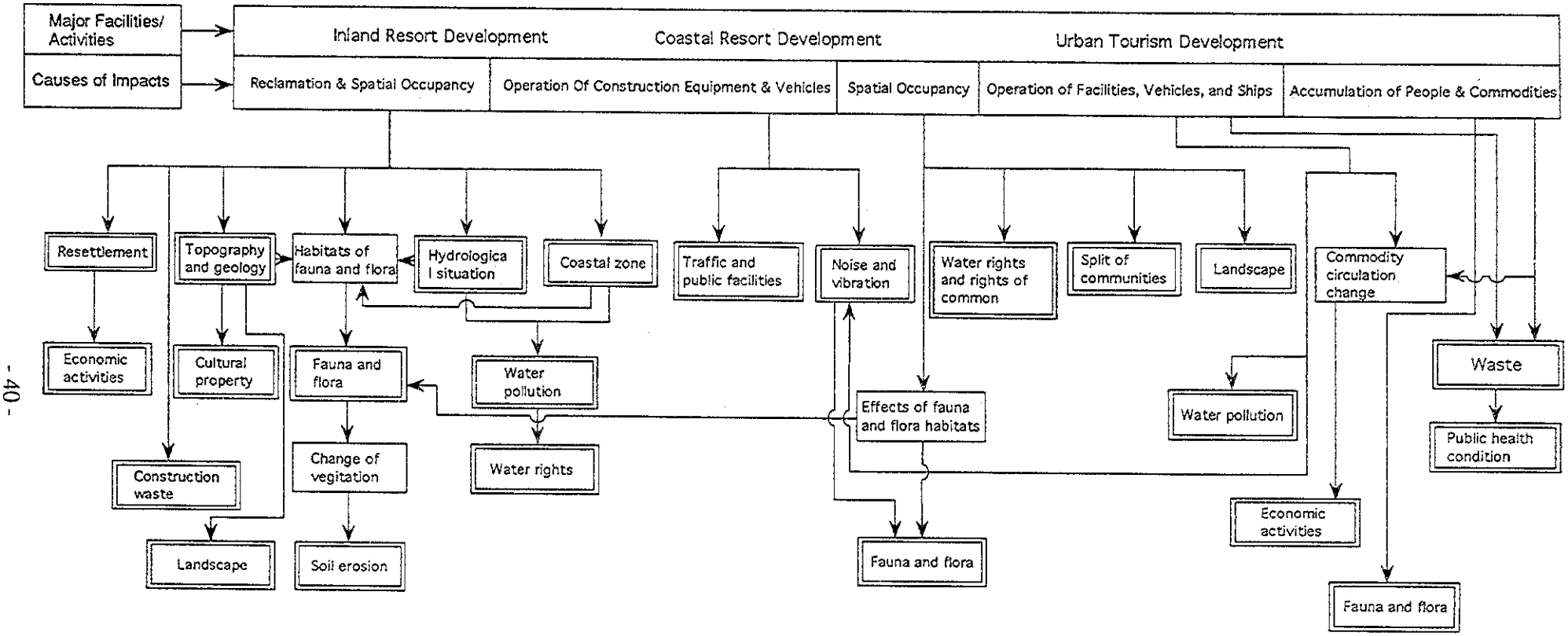
Measures

1. Examination of access methods to tourism facilities
2. Use of low-noise and low-vibration construction equipment
3. Careful construction planning and management (e.g. examination of construction schedule and working hours)
4. Compensation for negative impacts on livestock

Related Subjects for Study

1. Land use, locations and conditions of public facilities, and inhabitants' living conditions
2. Living conditions of valuable wildlife
3. Geological survey

Appendix Flow Chart of Environmental Impacts of Tourism Development Plan



Note : ▭ : indicates the environmental item shown in Table 4-3

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