ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

MULTISTAGE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF ROAD PROJECTS

GUIDELINES FOR A COMPREHENSIVE PROCESS



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This publication is part of a series on environmentally sound road infrastructure development and operations in the Asia-Pacific region. So far, this series consists of:

- Road Transport and the Environment - Areas of Concern for the Asian and Pacific Region
- Road Development and the Environment - Methodologies for Minimizing Environmental Damage
- Multistage Environmental and Social Impact Assessment of Road Projects - Guidelines for a Comprehensive Process

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
EAP	Environmental Action Plan
EIA	Environmental Impact Assessment
ESIAn	Environmental and Social Impact Analysis
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Screening
ESCAP	Economic and Social Commission for Asia and the Pacific
IADB	Inter-American Development Bank
IESE	Initial Environmental and Social Examination
MESM	Monitoring of Environmental and Social Measures
OECD	Organization for Economic Cooperation and Development
PAF	Project Affected Family
PESE	Post –Construction Environmental and Social Evaluation
PMS	Pavement Management System
RAP	Resettlement/Rehabilitation Action Plan
SPAF	Seriously Project Affected Family
TOR	Terms of Reference
USAID	United States Agency for International Development
USEPA	United States Environmental Protection Agency
UNEP	United Nations Environmental Programme
VEC	Valued Economic Component

GLOSSARY

Biodiversity	Biodiversity refers to the wealth of ecosystems in the biosphere, of species within ecosystems, and of genetic information within populations
Biota	A collective term which denotes all the living organisms in a particular space
Casual water	Refers to standing water which results from roadwork activities and is found in puddles, old tires and barrels on or near construction sites
Checklist	A specific list of environmental parameters to be investigated for possible impacts but does not require the establishment of direct cause-effect links to project activities
Cultural heritage	A concept referring to sites, structures and remains of archaeological, historical, religious, cultural, social and aesthetic values
Ecology	Study of interrelationships of organisms to their environment
Ecosystem	A community and its environment (living and non-living considered collectively)
Environment	The surrounding zone (the specific zone to be affected by the project), all natural resources (physical and biological) and human resources (people, economic development and quality of life values)
Environmental impact	An effect (both positive and negative) on an environmental resource or value resulting from infrastructure development projects
Environmental impact assessment (EIA)	A systematic procedure for enabling the possible environmental impacts of infrastructure development projects to be considered before a decision is made as to whether the project should be given approval to proceed.
Environmental and social screening (ESS)	A process of early determination of potential environmental and social impacts of a infrastructure development project
Environmental and social impact analysis (ESIAn)	To analyse in detail all aspects of environmental and social impacts of development projects identified by the initial environmental examination process for recommending mitigation measures
Environmental management plan	The synthesis of all proposed mitigative and monitoring actions, set to a timeline with specific responsibility assigned and follow-up actions defined

Indicators	Physical, chemical or biological attributes which provide some indication of the health of an ecosystem
Initial environmental and social examination	An initial environmental and social examination is the first review of the potential impacts (effects) which the proposed infrastructure development project will have on both natural and social environments
Landscape	A subjective concept which includes a large number of parameters such as relief, vegetation, buildings, hydography and contour which can be perceived by the eye and enjoyed by the senses
Monitoring	The term is used in several ways but generally refers to the process of repeated observations and measurement of environmental and social quality parameters to enable changes to be observed over a period of time
Monitoring of environmental and social measures	To monitor proper implementation of EIA recommended mitigation measures for adverse environmental and social impacts
Post-construction evaluation	To make necessary measurements of different parameters to evaluate the effectiveness of mitigation measures
Public involvement	The dialogue encompassing consultation and communication between a project proponent and the public. It includes dissemination, solicitation and presentation of information
Rehabilitation/ Resettlement	A term often used to describe the process of re-establishing lifestyles and livelihoods following resettlement. The term is also used to describe construction works that bring a deteriorated structure back to its original conditions
Social impact	An effect (both positive and negative) on a social issue resulting from infrastructure development projects

1. INTRODUCTION

1.1 Roads and environmental damages

Roads facilitate the movement of people and goods, establishing a direct linkage between two places (travel points), origin and destination, with a single mode and with varied means. Motorized road transport has thus become an integral element of modern life, contributing to economic development and enhancing the quality of life. The demand for roads within a country has increased tremendously as the mobility of urban, suburban and regional commuters has increased, as has the transport of assorted agricultural produce, industrial raw materials and finished products. The demand has further increased since road transport has become the means of personalized transport. The remarkable economic growth achieved in the last decade by most developing countries in the Asian and the Pacific region has put a daunting pressure on infrastructure development, of which roads are the starting point. Consequently, the construction, expansion and upgrading of the national road network was already a major aspect of the economic development programmes in most countries of the region in the past decade. This is expected to continue for at least the next 20 to 30 years.

The construction, maintenance and rehabilitation of roads, however, have caused widespread environmental degradation. Poorly planned roads and bad practices in construction, maintenance and rehabilitation have far-reaching and negative effects. The resulting damages, in many cases, are permanent. The negative effects continue for a long time and have lasting consequences. In such cases, the adverse impacts are so severe that they offset their benefits of facilitated linkages, enhanced mobility and improved accessibility.

The extent and coverage of such damage is very extensive to the natural non-living, natural living and human environment (figure 1.1). Road development projects have caused minor to serious damage to land, water and air. They have disfigured topography and landscape, damaged soils, disrupted drainage systems, contaminated water bodies and deteriorated air quality.

Road development is a major source of damage to the natural living environment, including ecological destabilization, habitat instruction, and damage to flora and fauna.

Road development is also a source of damage to the human environment, covering a wide range of fields, particularly human settlements, activities, residences and workplaces, health and safety. Displacement and resettlement caused by road development have presented insurmountable difficulties to affected families and businesses. The sudden accessibility by roads has resulted in a faster pace of life, disruption of lifestyles, and other social impacts of external influences on communities and inhabitants who are ill prepared for the rapid changes brought about by roads. Losses of community, religious and cultural heritage have occurred. Roads also have contributed to poor health caused by air pollution as well as the spread of dust, debris and waste. Road accident rates in many countries in the region are 10 or even 100 times higher than the rates in developed nations, creating fear and severe distress to inhabitants along the roads. The extent of the environmental damage caused by roads is presented in figure 1.1.

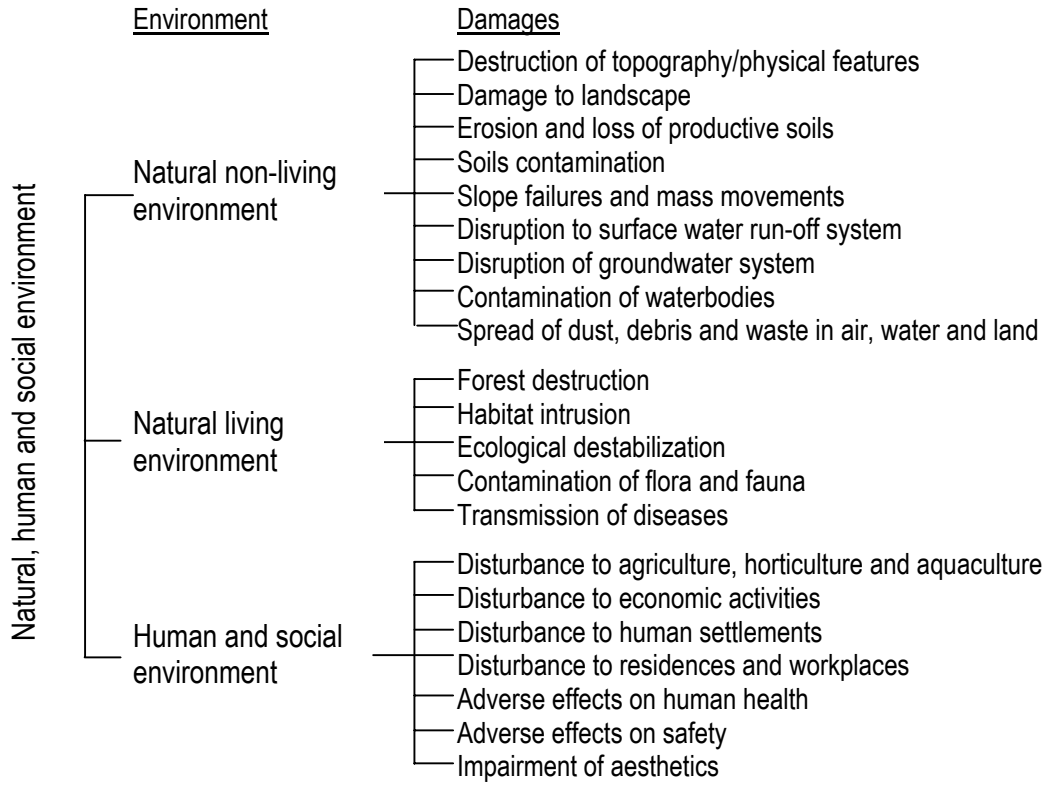


Figure 1.1 Environmental and social damages that are caused by road infrastructure development and traffic operations

Such undesirable environmental and social impacts were still observed in ongoing road projects as reported by a recently completed survey by ESCAP (2000).

1.2 Concept of a mandatory environmental impact assessment of road projects and possible implementation problems in the ESCAP region

Environmental impact assessment (EIA) consists of a systematic investigation into both positive and negative effects of a proposed development project on the natural and human environments in short-term and long-term time frames. It helps develop environment-friendly projects and seeks to reduce environmental degradation caused by development initiatives (ESCAP 1990, 1996, 1997). It also provides a plan to reduce the negative environmental effects of development projects through alternative approaches, design modifications and remedial measures.

To identify and minimize the environmental damage caused by road infrastructure development and transport operations, to reduce the adverse environmental impacts, and to prevent further aggravation of the situation, the concept of a mandatory EIA for road construction, maintenance and rehabilitation, as well as transport operations, has been established as the initial and essential preventive strategy.

Although the concept of EIA is gaining increasing acceptance in the region, in many countries, it has remained very much a planning tool on paper, and the implementation is generally not very satisfactory. One of the major contributing reasons for the absence of EIA in many road projects, and ineffective or incomplete implementation in other projects that did include EIA, is the failure to introduce it as a planning tool early when the project was

conceived and planned (ESCAP 1998, 2000) and the failure to integrate it into the road project cycle: conception, planning, design, implementation, and monitoring and evaluation.

There was a lack of general environmental awareness among administrators, highway professionals, as well as the general public.

Road projects were mostly initiated based on economic needs without taking into account environmental considerations. Except for a few major externally funded projects, the quality of EIA reports was unsatisfactory. Throughout the region, EIA has been conducted in a rather loose form, and often taken as a supplementary requirement, secondary to the overall economic and engineering issues.

In most cases, baseline conditions could not be adequately defined owing to the lack of relevant data. Historical and planning data were incomplete and records of completed projects were often not available. Poor accessibility of environmental data and information (including EIA reports of road projects) has created problems in EIA analysis and implementation by both public agencies and private parties.

Despite the laws and regulations enacted in most countries, there was in general a poor appreciation and understanding of the legal framework set out for EIA planning and implementation.

A critical problem common to the region was the weak delineation of responsibility and accountability in the planning and implementation of EIA. The respective roles of EIA undertaking agencies (the road and highway authorities), and the EIA approving authorities (the Ministry of the Environment, the Forestry Department etc) were, more often than not, unclear and ill defined. Consequently, coordination between highway planners or designers and environmental specialists was weak, ineffective and even totally absent.

In the road project cycle, the interrelationship between the undertaking and approving authorities, and with parties (consultants and contractors) proposing measures to meet and execute EIA requirements, is usually informal and not well set out.

Lack of commitment in EIA implementation among the decision makers and senior management has been identified as a major hindrance to proper EIA implementation. This has given rise to weak enforcement, absence of monitoring and lack of commitment from the various agencies supposedly in charge of undertaking, approving and enforcing EIA.

The general public in the region were relatively weak in their environmental awareness. Most were not aware of the consequences of environmental impacts caused by road projects. Practically, there was negligible involvement of public and non-governmental organizations in all the stages of road projects.

1.3 Review of the existing EIA guidelines

A survey of the commonly available published information reveals that the EIA guidelines covering both general development projects and specific road transport development projects were developed by bilateral and multilateral development agencies and international organizations such as the United States Agency for International Development (USAID), United Nations Environmental Programme (UNEP), United Nations Economic and Social Commission for Asia and the Pacific (ESCAP); Asian Development Bank (ADB); World Bank, Organisation for Economic Cooperation and Development (OECD), and Inter-American Development Bank (IADB).

An extensive literature survey reveals the following existing EIA guidelines:

EIA guidelines covering general development projects:

(a) *Environmental Impact Assessment Guidelines Manual,* United States Agency for International Development (USAID), Washington, DC, 1974
(b) *Environmental Impact Assessment: Guidelines for Planners and Decision Makers* (ST/ESCAP/351), ESCAP, 1985.
(c) *Environmental Impact Assessment: A Management Tool for Development Projects* (ST/ESCAP/762), ESCAP, 1988.
(d) *Environmental Impact Assessment – Basic Procedures for Developing Countries,* United Nations Environmental Programme, Nairobi, 1988.
(e) *Environmental Assessment Sourcebook*, Vols.1-3, World Bank, Washington DC, 1991.
(f) *Environmental Guidelines for Selected Infrastructure Projects*, Asian Development Bank, Manila, 1993.
(g) *Environmental Impact Assessment – Good Practice Guide*, United Nations Environmental Programme, Nairobi, 1995.
(h) *Strengthening Environmental Impact Assessment Capacities and Preparation of Environmental Guidelines*, Asian Development Bank, Manila, 1996.

EIA guidelines specific to road development projects:

(a) "Environmental impact assessment of road transport development: the state-of-the-art in selected countries of the ESCAP region", background paper submitted to the Seminar on the EIA of Road Transport Development, ESCAP, Bangkok, 3-8 November 1986.
(b) "Report of the ESCAP/UNEP Seminar on Environmental Impact Assessment of Road Transport Development", ESCAP, Bangkok, 3-8 November 1987.
(c) *Environmental Impact Assessment of Road Transport Development*: *The State-of-the-Art in Selected Countries of the ESCAP Region,* ESCAP, Bangkok, 1988.
(d) *Environmental Impact Assessment: Guidelines for Transport Development*, (ST/ESCAP/785), ESCAP, 1990.
(e) *Environmental Impact Assessment of Roads*, Organisation for Economic Cooperation and Development (OECD), Paris, 1994.
(f) *Roads and the Environment: A Handbook,* Report TWU 13. Transport Division, World Bank, Washington DC, 1994.
(g) *Environmental Assessment in the Transportation Sector – Guidelines for Managers*, Inter-American Development Bank (IADB). Washington DC, 1996.
(h) *Roads and the Environment: A Handbook,* Transport Division, World Bank Paper No. 376, Washington DC, 1997.

Most countries in the region have already developed environmental impact assessment for development projects. Countries such as Australia, China, India, Japan, Malaysia, the Philippines, the Republic of Korea and Thailand have also developed EIA guidelines for road projects. A brief review of the EIA guidelines adopted by some international organizations and some countries in the Asia-Pacific region was made and some basic differences among them were noted. Some had statutory status and were compulsory. Some dealt mainly with the procedural aspects rather than the technical aspects of EIA, while others dealt with both. Some guidelines concentrated mainly on the procedure for EIA preparation, leaving procedures for reviewing to the agencies responsible for implementation. All the guidelines, however, stressed the importance of carrying out EIA at the earliest stage possible. All dealt in detail with EIA format and various steps to be

taken, while some stressed the importance of an environmental management plan which included mitigating measures, monitoring and environmental auditing.

At the regional level, ESCAP attached high priority to the integration of environmental considerations into development project planning. It organized a number of inter-agency, intergovernmental and expert group meetings on EIA related to general development projects and also road transport development projects. However, none of the countries in the ESCAP region has guidelines for a comprehensive process for road projects on how environmental agencies can effectively perform the EIA process.

1.4 Current issues concerning the EIA process in road projects in the ESCAP region

Since EIA has been conducted rather loosely in the region, and often taken as a supplementary requirement secondary to the overall economic and engineering issues, the first issue is to reorient the conventional planning method and process of road projects. Parallel to the consideration of economic benefit for road projects, equal emphasis should be given to environmental protection.

Against the present one-shot EIA, the process should be integrated into the project cycle from the beginning and continued through, and the environmental professionals need to be involved in the entire process. A strong coordination and interrelationship between various environmental professionals, particularly EIA undertaking agencies and approving authorities, needs to be maintained.

The present EIA process refers mostly only to broad environmental considerations, such as national forest and wildlife conservation, historical sites, critical land features and water bodies, guided by general environmental protection laws. For a better protection of the natural and human environment, the substantive level of environmental consideration needs to be augmented to cover particular aspects.

Until now, the substantive issues covered concentrate on avoiding pre-defined circumstances or environment. Integration of detailed mitigation measures into the standard engineering design, taking care of the majority issues, could successfully get the job done. Consequently, there would be no need for a lengthy EIA report and list of mitigation measures in each project. The standard mitigation measures incorporated into the design should directly transform into standard construction contracts, which would automatically comply with the measures.

In the context of public participation helping to mitigate environmental and social damages during the project cycle, it is important to note that many damages will only surface and be felt after the end of the road construction and the beginning of transport operations. While the number of people affected and the magnitude of direct impacts during the road construction phase are usually limited and relatively easy to deal with, the post-construction consequences tend to last for a long period of time and cover a much wider area geographically. In addition, in the context of the ESCAP region, the adversely affected population are usually dispersed along a long stretch of the road and their voice is often not heard in the implementation of road projects.

As shown in figure 1.2, procedural issues and substantive parameters are two major aspects to be considered in EIA implementation. The major concerns for each procedural issue and substantive parameter are presented in figures 1.3 and 1.4 respectively.

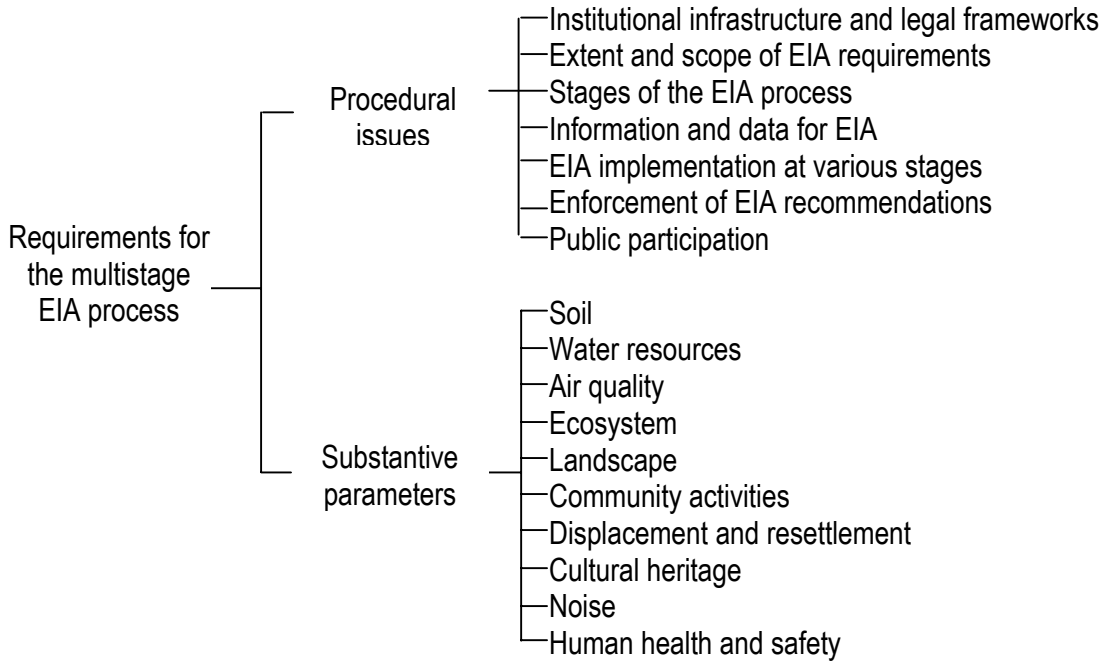


Figure 1.2 Procedural issues and substantive parameters in the EIA process

1.5 An improved EIA process for road projects

For effective implementation and compliance with a mandatory EIA in the developing countries of the region, a comprehensive EIA process for road projects needs to be in place, encompassing the planning, design and implementation phases as well as follow-up analysis and monitoring.

The main focus of this study is to address the EIA implementation issues encountered in the ESCAP member countries, analyse them and propose a comprehensive process for an effective EIA of road projects. The main issues of the EIA process for road projects in the region are discussed based on a review of the existing EIA process in the region and an assessment and evaluation of several recent studies. The justification for an improved EIA process, which contains the following elements: multistage process; equal emphasis on social issues; legal framework, institutional coordination and professional accountability; and public participation, is presented below.

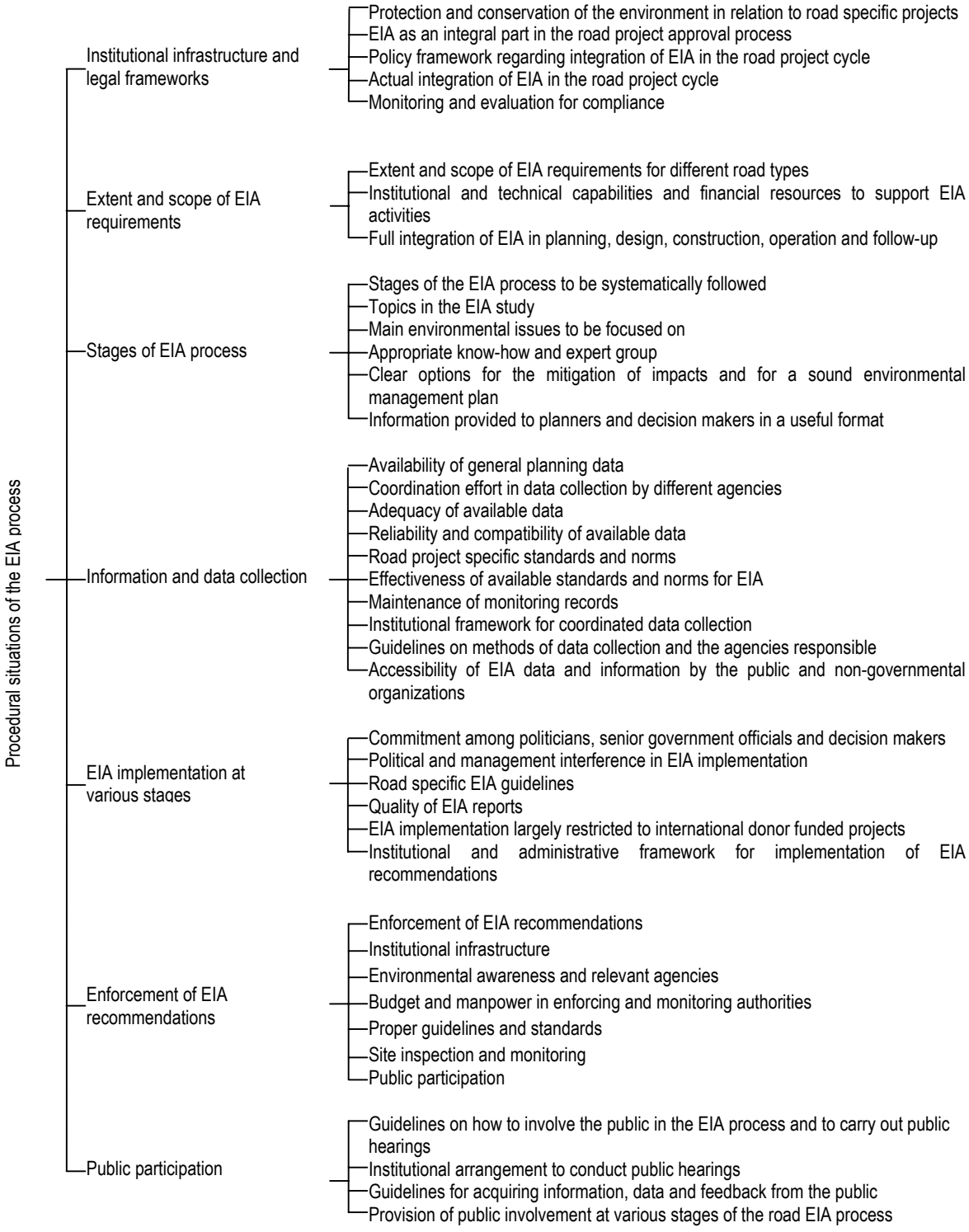


Figure 1.3 Procedural situations of the EIA process in road development

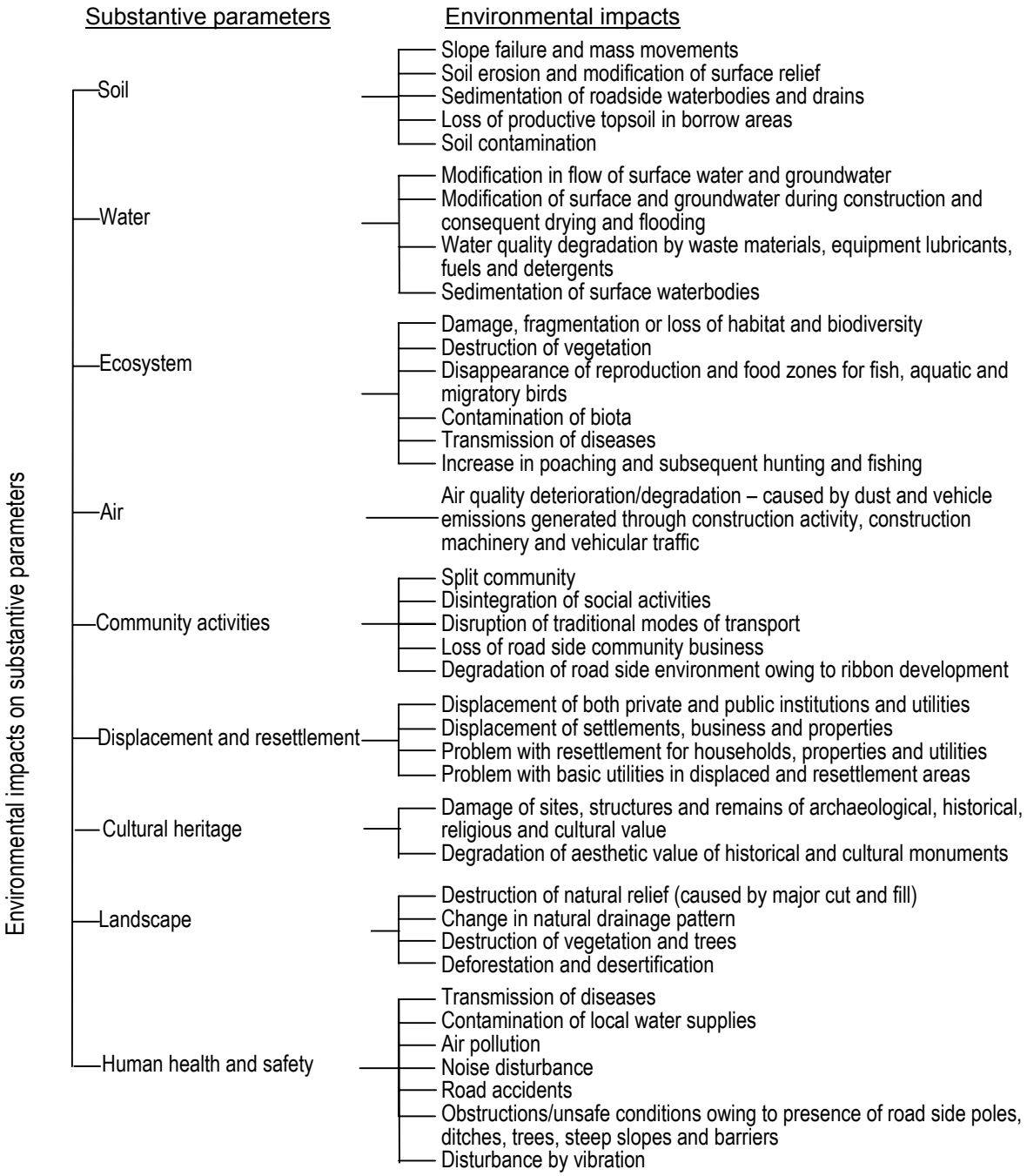


Figure 1.4 Various environmental impacts caused by road development on major substantive parameters

1.5.1 Multistage EIA process

The conventional road development process is detached from environmental considerations, focusing basically on issues of economic and technical feasibility. This has led to widespread environmental degradation evident in many developing countries. In view of the potential severity of the damaging effects of road development on the environment, it

is now widely accepted that a critical assessment of a road development project is incomplete without an EIA study.

To provide a complete assessment of the concerns identified in figure 1.2, it is necessary that an EIA process be developed in such a manner that it provides both short-term and long-term impacts evaluation over the full lifetime of road projects. This calls for the integration of the EIA process into the full cycle of road development, ranging from the initial road development conception phase to post-construction operation, maintenance, and the long-term monitoring and evaluation phase. In other words, the EIA process must be a continuous programme spanning over the entire road development process.

As decision-making in the different phases of road development requires appropriate environmental impact information, the EIA process must be planned and programmed to offer the required information in a timely manner. The roles and responsibilities of highway planners, design engineers and environmental specialists must be specified. Road planners and environmental specialists must work together through all the stages of the road development process. For example, at the initial road project conception phase, an indication of the overall efficiency and environmental impacts is needed to assist in the feasibility assessment of the project. During the road project planning phase, inputs on major environmental impacts of different alternatives are needed. Both qualitative and quantitative environmental impact assessment will be needed next to provide the necessary data for the comparison of different alternatives. At the road construction phase, implementation of environmental remedial measures becomes the main focus. Finally, environmental monitoring and evaluation must be in place for the in-service operational phase of the constructed road.

1.5.2 Equal emphasis on social and environmental impacts

The term environmental impact assessment has been in common use ever since the idea was conceived and promoted in the second half of the last century to incorporate the evaluation of environmental impacts and the needed mitigation measures into the road development process. In the early days of the application of EIA, the major emphasis was largely restricted to the adverse impacts on the physical environment and their direct effects on affected inhabitants. It is now clear that this is inadequate as there are other equally substantial impacts and consequences in respect of the social and economic environment of the people directly affected by the road construction, as well as a large group of people and communities which are adversely affected even long after the project has been completed. There is a need to place equal emphasis on both the traditionally considered impacts on the physical natural environment as well as the human environment.

To correct the misconception about the restricted meaning of EIA, which is rather widespread among the developing countries in the ESCAP region, it is proposed that a revised term environmental and social impact assessment (ESIA), be adopted to stress the need to accord equal emphasis to both the natural and the human environments, and to accurately convey the concern over the negative impacts of road development projects on the human environment. The various aspects of the human environment to be covered in ESIA will include an evaluation of the impacts on the general social and environment issues, encompassing health, safety, economic well-being, security, social values, cultural heritage, community cohesiveness etc.

1.5.3 Legal framework, institutional coordination and professional accountability

To achieve environmentally-friendly roads which is crucial for the long-term economic and social well-being of any nation, the importance of an integrated approach to the

provision of road infrastructure cannot be overemphasized. It requires ESIA input to the traditional road development process at all stages and at all levels. Of particular importance is the introduction of environmental and social impact considerations at the very beginning of the process of road development, during the initial conception phase. An effective institutional framework must be set up to achieve the needed coordination among policy makers, planners, highway authorities, environmental agencies, consultants and specialists, and other related public and private organizations, as well as the general public. For conducting an ESIA, a well-defined legal framework is essential.

Detailed institutional arrangements are required to provide the needed legal framework, coordination among agencies, and the responsibility and accountability of each party in the entire ESIA process. Owing to the relatively large number of parties involved and the lengthy procedures necessary in a properly executed ESIA process, a strong commitment by the government and politicians to the cause of ESIA is vital.

1.5.4 Effective public participation

Effective public participation is an integral component of a successful ESIA process. Public involvement and public-private partnership help raise the awareness of the environmental and social implications of road projects. They also provide the necessary input to minimize the negative impacts of the projects. This requirement for effective public participation is particularly challenging for the ESCAP region because of the following difficulties: (i) a generally low level of awareness concerning the forms and consequences of adverse environmental and social impacts of road projects; (ii) lack of effective dialogue mechanisms or channels in many ESCAP member countries; (iii) political or social structure in many developing countries is not conducive for active interaction between authorities and the general public; (iv) traditional culture and social belief prevailing in some of the member countries do not encourage proactive questioning of official policy or plans; (v) general mistrust of the government departments by the general public; (vi) practically no women participation due to social constraints in many developing countries. Approaches that are tailored for implementation locally must be explored and adopted to achieve active public participation in the ESIA process.

PART ONE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT: A MULTISTAGE PROCESS

2. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROCESS AND ITS DIFFERENT STAGES

2.1 Concept of a multistage ESIA framework

For effective protection of the natural, human and social environment from the damages caused by road infrastructure development and traffic operation (see figure 1.1), the preventative tool of mandatory environmental and social impact assessment needs to be further developed and improved. Unlike the present one-shot EIA, the multistage ESIA concept refers to a quasi-continuous integrated process which consists of the following five successive stages:

(a) environmental and social screening (ESS)
(b) initial environmental and social examination (IESE)
(c) environmental and social impact analysis (ESIAn)
(d) monitoring of environmental and social measures (MESM)
(e) post-construction environmental and social evaluation (PESE).

For each of the above stages, the word “social” has been included to highlight the need to assess social impacts at every stage of the ESIA process; and the importance of considering social and environmental impacts concurrently.

2.1.1 Environmental and social screening (ESS)

This stage marks the beginning of the ESIA process, which should be initiated as early as possible along with the road planning process after the road project is first conceived. During this stage, the important functions that need to be performed is shown in figure 2.1.

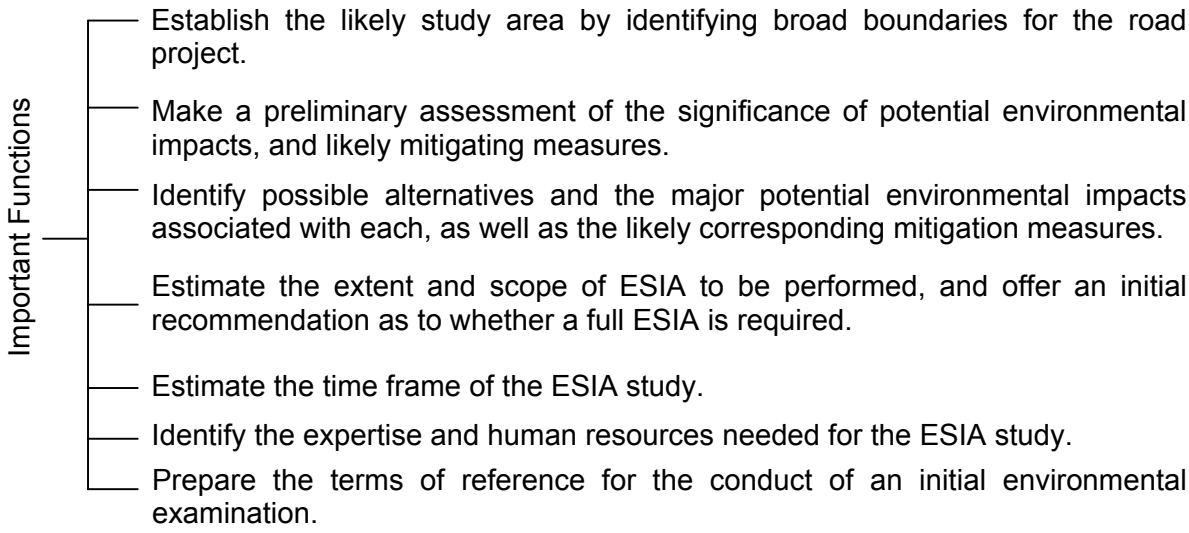


Figure 2.1 Important functions to be performed at the environmental and social screening stage

The value of conducting environmental and social screening at the early conception and planning phase of a road development project is to provide useful technical input to the road project team for their planning and budgeting, thereby eliminating the possibility of costly remedial environmental work and delays caused by problems with adverse environmental damage. Such early input on environmental considerations also provides useful information that helps the project team to gain government approval and win public acceptance.

The environmental and social screening process considers the following aspects in the recommendation: project type, environmental and social setting, and magnitude and significance of potential environmental and social impacts. Some of the typical questions asked in the environmental and social screening process are outlined in figure 7.2. Such a checklist is useful for agencies in which experienced expertise is not readily available.

2.1.2 Initial environmental and social examination (IESE)

The initial environmental and social examination is essentially a preliminary environmental impact evaluation to review the environmental integrity of a road project by assessing the potential environmental and social impacts. Important functions of this stage are highlighted in figure 2.2.

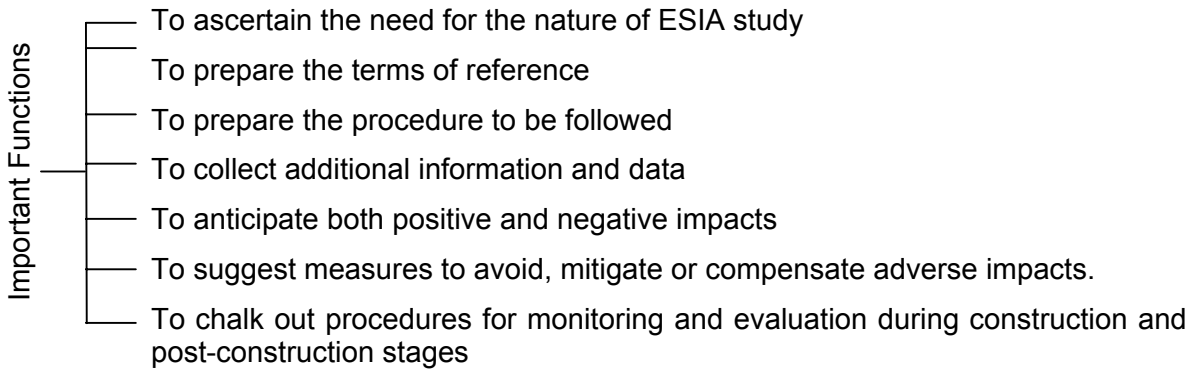


Figure 2.2 Important functions to be performed during the initial environmental and social examination stage

If the initial environmental and social examination results conclude that a full-scale ESIA is not required, then the mitigation measures and action plan should be prescribed for the project, and no further ESIA is required. This is usually the case for small road projects where no significant adverse environmental and social impacts are anticipated. On the other hand, in the case of large road projects for which a full-scale ESIA is recommended by the initial environmental and social examination study, further information and data collection and more elaborate environmental and social analysis will be needed to either confirm or improve on the proposed mitigation measures and the action plan. Based on the findings of the IESE, terms of reference for the proposed environmental and social impact analysis should be prepared, complete with a recommended budget.

2.1.3 Environmental and social impact analysis (ESIAn)

The findings of the environmental and social screening study and initial environmental and social examination study form the basis for identifying the key issues that

merit full analysis in the ESIA. Other issues that deserve only a brief discussion should also be mentioned and a supporting rationale offered. The important functions to be performed under the environmental and social impact analysis are shown in figure 2.3. Data collection is time consuming and costly. A minimum period of one year would be required for data collection taking into account of seasonal variations. Furthermore, necessary equipment and expertise are also not generally available.

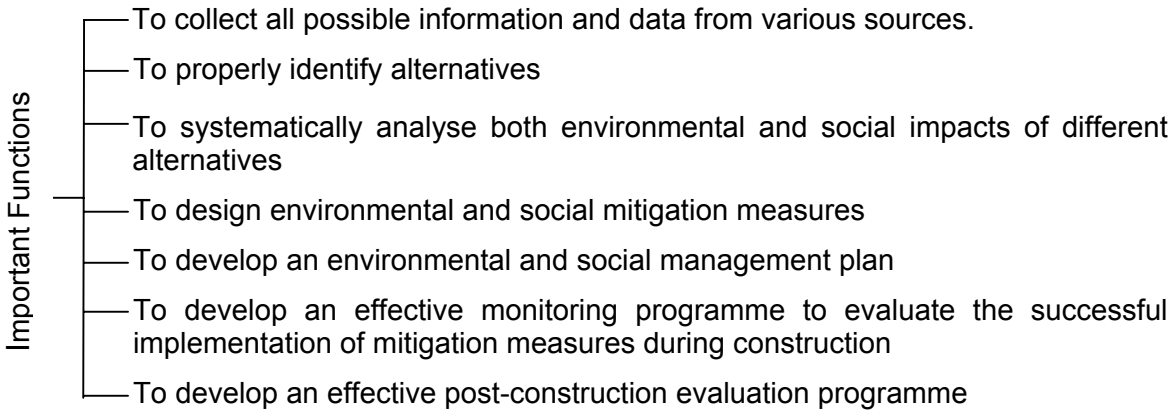


Figure 2.3 Important functions to be performed during the environmental and social impact analysis

The end product of the environmental and social impact analysis is an ESIA report that provides decision makers with information regarding the important environmental issues, the impacts of various alternatives, proposed mitigation measures, and recommendations of the relative desirability of different alternatives. The evaluation should take into account three major factors: (i) cost, (ii) achievement of project objectives, and (iii) adverse environmental and social impacts.

Owing to the large amount of detailed, supporting information and data needed, an ESIA report is typically rather lengthy with in-depth analysis and evaluation. This makes its use and comprehension difficult for most users. Presenting important information and findings in the form of informative tables, graphics and maps is a necessity. Tables, graphs and bar-charts are useful for comparing the quantifiable impacts of different alternatives, and presenting the contrast of before and after conditions. Flow diagrams can be employed to highlight the sequential and interactive nature of events. Maps are especially effective in dealing with geographical impacts and location sensitive issues. The extent and severity of area-wide environmental and social impacts can be emphasized with graphical representations meaningful to users who may not be familiar with technical terms.

2.1.4 Monitoring of environmental and social measures (MESM)

Monitoring of environmental and social measures is an important stage of the ESIA process that deals with the implementation of recommendations during the road construction phase. It comprises essentially “follow-up” activities after the approval of the ESIA report. Based on its findings, the monitoring of environmental measures defines the scope of environmental monitoring with respect to the remedial measures to be implemented, and the substantive environmental and social impacts to be addressed. Important functions of the monitoring of environmental and social measures as a major component of the ESIA implementation are shown in figure 2.4.

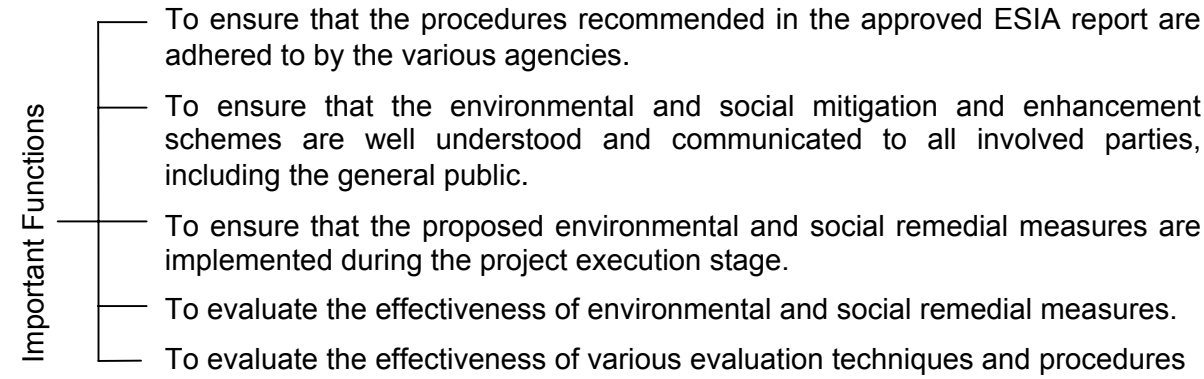


Figure 2.4 Important functions to be performed during monitoring of environmental and social measures

The key to the success of applying the monitoring of environmental and social measures is to clearly define the agency responsible for its implementation, and to establish an evaluation and reporting procedure. Experience has shown that either the environmental agency or the road authority could be tasked to implement such monitoring (World Bank 1997). In view of the special knowledge and expertise needed and possible conflict of project interests, the environment agency would be the ideal independent party to perform the monitoring of environmental and social measures.

Another substantial aspect of the monitoring of environmental and social measures during implementation is to evaluate the effectiveness of the recommended remedial measures and effectiveness of the evaluation techniques themselves. But environmental agencies may not be suitably staffed or equipped to undertake monitoring. In such a case, a better approach would be to hire reputable and experienced consultants for this job. Guidelines with respect to various substantive parameters need to be established. Such guidelines are covered in part two.

2.1.5 Post-construction environmental and social evaluation (PESE)

Post-construction environmental and social evaluation is the last stage of the entire ESIA process. It is a “follow-up” activity initiated after the end of road construction. Important functions to be performed during the stage of post-construction environmental and social evaluation are given in figure 2.5.

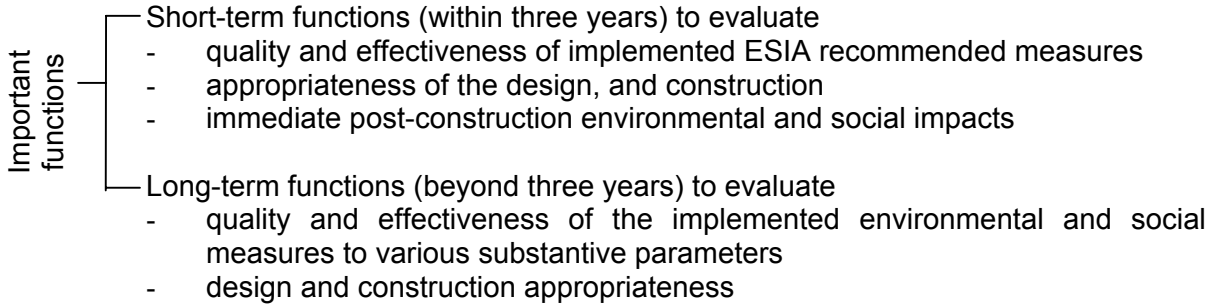


Figure 2.5 Important functions to be performed during the stage of post-construction environmental and social evaluation

The follow-up studies of the post-construction environmental and social evaluation are classified as short-term and long-term activities. Short-term activities refer to those conducted within three years after the end of road construction. Activities taking place beyond the three-year period are grouped under the long-term category. Short-term activities focus mainly on the quality and effectiveness of the implemented environmental and social remedial measures, the appropriateness of the design, and measurements of immediate post-construction environmental and social impacts. Long-term activities will continue to monitor the environmental and social impacts with respect to various substantive parameters. It will also evaluate the long-term effectiveness of the environmental and social remedial measures.

2.2 Integration of the different stages of ESIA into various phases of road projects

The road development process has five phases: (a) conception, (b) planning, (c) design, (d) construction, and (e) operation. To ensure that sustainable economic and social growth can be achieved through the implementation of a road development programme, it is necessary that ESIA be carried out giving full consideration to environmental requirements in all the five phases. This section presents the guidelines for ESIA implementation in the five phases.

The multistage framework of the ESIA process must be fully integrated with the road development cycle. ESIA implementation is an ongoing process that should extend to cover the full life cycle of the road constructed, covering the post-construction road maintenance and operation as well. It is important to ensure that the ESIA process should be activated with the initiation of environmental screening as and when the road project conception phase commences. It is equally important to ensure that the ESIA process must not be terminated prematurely with the conclusion of the road construction project. It must be continued into the post-construction environment evaluation stage, covering the entire life cycle of the road concerned. Figure 2.6 shows the integration of the five stages of ESIA of road projects into the corresponding five phases of road projects.

Phases of a road project	**Stages of ESIA for road projects**				
	ESS	IESE	ESIAn	MESM	PESE
Conception	X				
Planning		X			
Design			X		
Construction				X	
Operation					X

Note: ESS = environmental and social screening
IESE = initial environmental and social examination
ESIAn = environmental and social impact analysis
MESM = monitoring of environmental and social measures
PESE = post-construction environmental and social evaluation

Figure 2.6 Integration of different stages of the ESIA process into various phases of the road development process

A description of the various phases of road projects in conjunction with the corresponding stages of ESIA is discussed in sub-sections 2.2.1 to 2.2.5.

2.2.1 Road project conception and environmental and social screening

In most cases, the development of new roads is conceived at the policy level, along with a master plan for city or regional development. The development strategies adopted and the constraints imposed at the conception stage have wide-ranging effects on the environmental, social and construction issues in the subsequent stages of the road development process. Performing a comprehensive, system-wide, macro-analysis of the master plan must be considered at this stage along with a consideration of the socio-economic implications and environmental impacts.

The overall efficiency and the impact of the proposed road development need to be evaluated at this conception phase because remedial considerations can be incorporated to achieve the best results. Hence, the environmental and social screening stage of the ESIA process should be initiated during this phase of road development. It serves the important function of identifying projects that would potentially create adverse environmental and social impacts and short-listing these projects for further examination.

2.2.2 Road project planning and initial environmental and social examination

The road project planning process consists of identifying goals and developing alternatives. It includes taking inventories, and forecasting economic and transport needs. Inventories are conducted to determine current conditions and existing facilities as a basis for predicting the future situation. The environmental and social screening is reviewed and the initial environmental and social examination of ESIA play important roles during this phase of road projects.The environmental and social screening identifies the probable adverse environmental and social impacts of the proposed road project, while the initial environmental and social examinaiton provides estimates of the impacts to ascertain if a full-scale ESIA is needed. The road authority must work closely with environmental specialists on various substantive parameters (both environmental and social) in order to arrive at the correct assessment.

2.2.3 Road project design and environmental and social impact analysis

In this stage of the road development process, the viable alternatives identified during the planning stage are simultaneously considered and compared with one another to determine the best option. The effectiveness of various mitigation measures and the environmental scheme is assessed and the best are recommended to meet prescribed criteria and requirements. This falls within much of the scope of the environmental and social impact analysis stage of the ESIA process. Based on the findings of the environmental and social screening and initial environmental and social examination, the analysis examines in detail all the major aspects of the environmental and social impacts of the road project. The analysis also make recommendations on suitable remedial measures for each of the adverse environmental and social impacts analysed.

2.2.4 Road project construction and monitoring of environmental and social measures

The implementation phase of the road development process encompasses detailed design, right-of-way acquisition, and construction. The required ESIA activities in this phase consist of incorporating the recommendations of the ESIA report into the final design, implementing pre-construction mitigation schemes, and executing recommended environmental and social measures during the actual construction of the road. These activities cover three stages of the ESIA process, namely the environmental and social impact analysis stage which produces the ESIA report with the environmental and social management plan, the monitoring of environmental and social measures stage which ensures that the procedures recommended in the approved ESIA report are adhered to by the various agencies, and the post-construction monitoring and evaluation stage during which monitoring and evaluation will be performed on those mitigation measures implemented during various stages of the project construction period. For effective implementation of the recommended environmental and social measures, a combined team of road engineers and environmental specialists is required for the work in this phase.

2.2.5 Road project operation and post-construction environmental and social evaluation

The post-construction environmental and social evaluation phase extends beyond the end of the construction of a road. It examines the performance of the road during its service life. The ESIA implementation during this phase ensures that adverse environmental and social impacts are properly controlled, and helps to identify good practice and technology for road construction. These cover both the short-term and long-term environmental and social impacts of the road project. Hence, it involves the monitoring of environmental and social measures as well as the post-construction monitoring and evaluation stage of the ESIA process. As post-construction road maintenance and operations constitute an ongoing phase of the entire life cycle of the road development and management, it is important that the post-construction environmental and social evaluation must also monitor and evaluate the impacts of these activities. It is important that the engineers responsible in this phase be familiar with various environmental and social requirements. Regular consultation with environmental specialists is recommended.

3. LEGISLATION AND LEGAL FRAMEWORK, INSTITUTIONAL AND ADMINISTRATIVE INFRASTRUCTURE

3.1 Legislation and legal framework

To incorporate environmental and social considerations into every phase of the road infrastructure development process and to ensure an appropriate formulation of mitigation measures and effective implementation of these measures, a sound legislation and legal framework must first be established. A holistic approach must be adopted to develop a comprehensive set of legislation to adequately cover the overall policy of environmental protection in road development. The attributes of sound legislation and legal frameworks are: (a) to have road project specific acts, policies and legal directives, incorporating environmental requirements; (b) to develop institutional and administrative infrastructure with clearly defined roles and responsibilities for road and environmental agencies; (c) to formulate rules and regulations concerning operations, procedures and methodologies; (d) to set up technical standards and benchmarks; (e) to arrange environmental training; and (f) to develop enforcement mechanisms.

3.2 Road project specific acts, policies and legal directives

General environmental and social acts or policies not directed specifically at road projects do not create the necessary conducive conditions for ESIA of road projects. They have not been found effective in promoting ESIA implementation in the road sector. The development of road specific acts, policy and legal directives should be undertaken as the first step in the overall efforts to establish the legal framework.

Road specific environmental and social acts or similar legislation would assign responsibility to an agency for conducting and managing the road-project-related ESIA process. In most countries, the road authority is the appropriate agency to be assigned this responsibility. Environmental and social assessment acts are desirable, with the creation of an environmental and social assessment agency to oversee the conduct of ESIA by agencies such as the road authority. The ministry of environment and the Ministry of Social Welfare are normally responsible for developing all environmental laws, policy statements, regulations and directives. The environment ministry or authority should also be mandated with the responsibility to incorporate ESIA into the various phases of road infrastructure development.

A common weakness of general legislation or acts on the present EIA process has been their inadequacy in addressing the responsibility requirements at different stages of the process. The legislation and relevant acts should mandate an adequate ESIA coverage for road projects of different scales, and explicitly identify the agencies responsible for the enforcement and execution of the implementation of ESIA. In every stage, the roles of the roads and environment agencies should be stated to ensure an integrated approach incorporating environmental and social considerations into road infrastructure development.

3.3 Institutional and administrative infrastructure

The various stages of the ESIA process involve more than one government agency and different management levels within each agency. The success of the implementation of ESIA in road development depends heavily on the ability of the road agency's management

personnel, in collaboration with specialists from other agencies such as the environment authority, to take appropriate actions throughout the various stages of the entire road development process. There is a need to define the roles and responsibilities of the agencies clearly both horizontally and vertically. Figure 3.1 identifies the common institutional and administrative functions that need to be performed in the ESIA process. Various salient features of the institutional requirements include: (a) the institutional context within which a road agency is expected to carry out ESIA for a road development project; (b) the transformation of the initial mandate to promote environmental and social assessment into an environmental and social assessment act; (c) follow-up actions after environmental and social assessment, (d) supportive functions of the environmental and social assessment agency; and (e) interaction of the road agency with other government agencies.

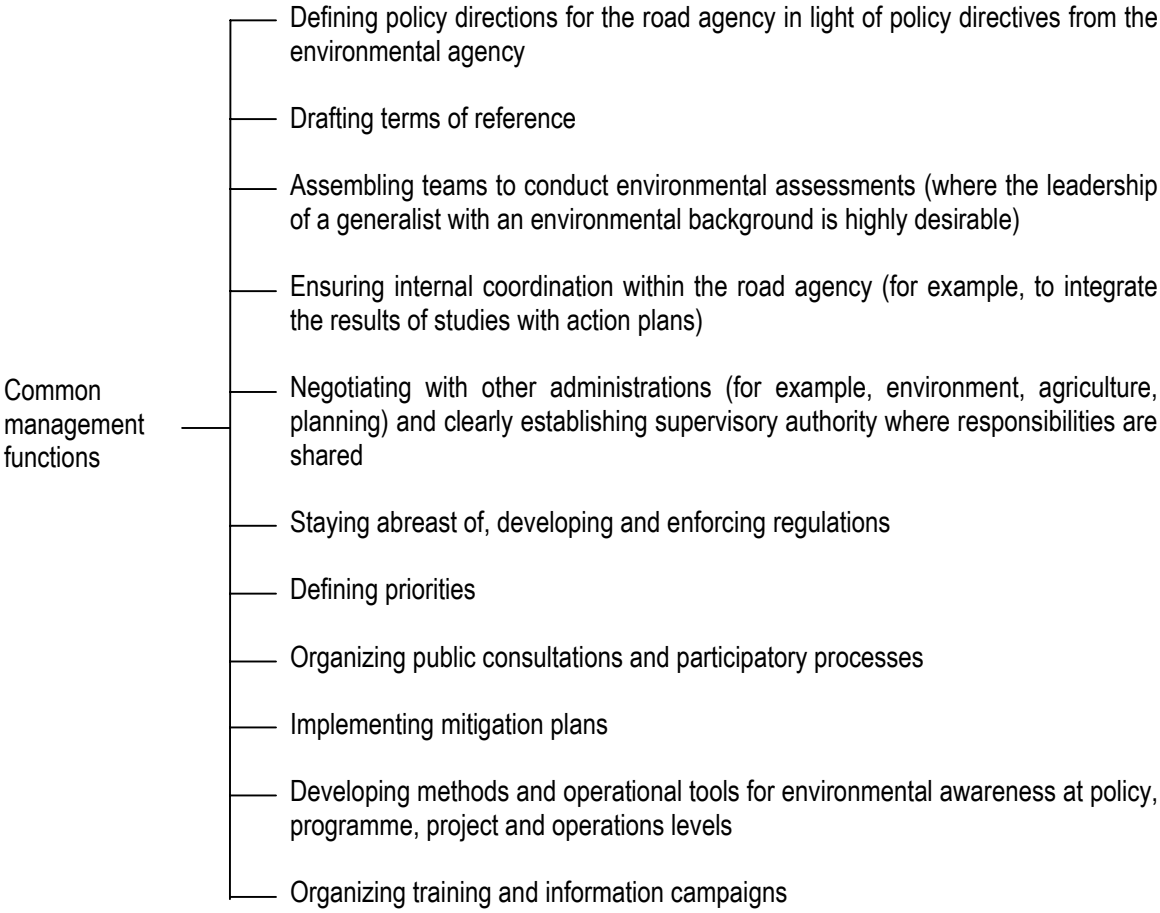


Figure 3.1 Institutional and administrative functions in the road-development-related ESIA process

3.4 Rules and regulations

The road infrastructure development project itself and the implementation of environmental protection schemes or damage mitigation measures involve the responsibilities of national, regional and local governments, as well as requirements by financial and legal institutions. Failure to observe rules and follow regulations would delay or jeopardize the smooth implementation of ESIA in a road project. Appropriate rules and regulations should be compiled or developed to facilitate the execution of ESIA implementation. Two main categories of rules and regulations can be identified: (a) rules

and regulations concerning procedures, and (b) rules and regulations concerning methodologies. Listed in figure 3.2 are some rules and regulations for ESIA implementation.

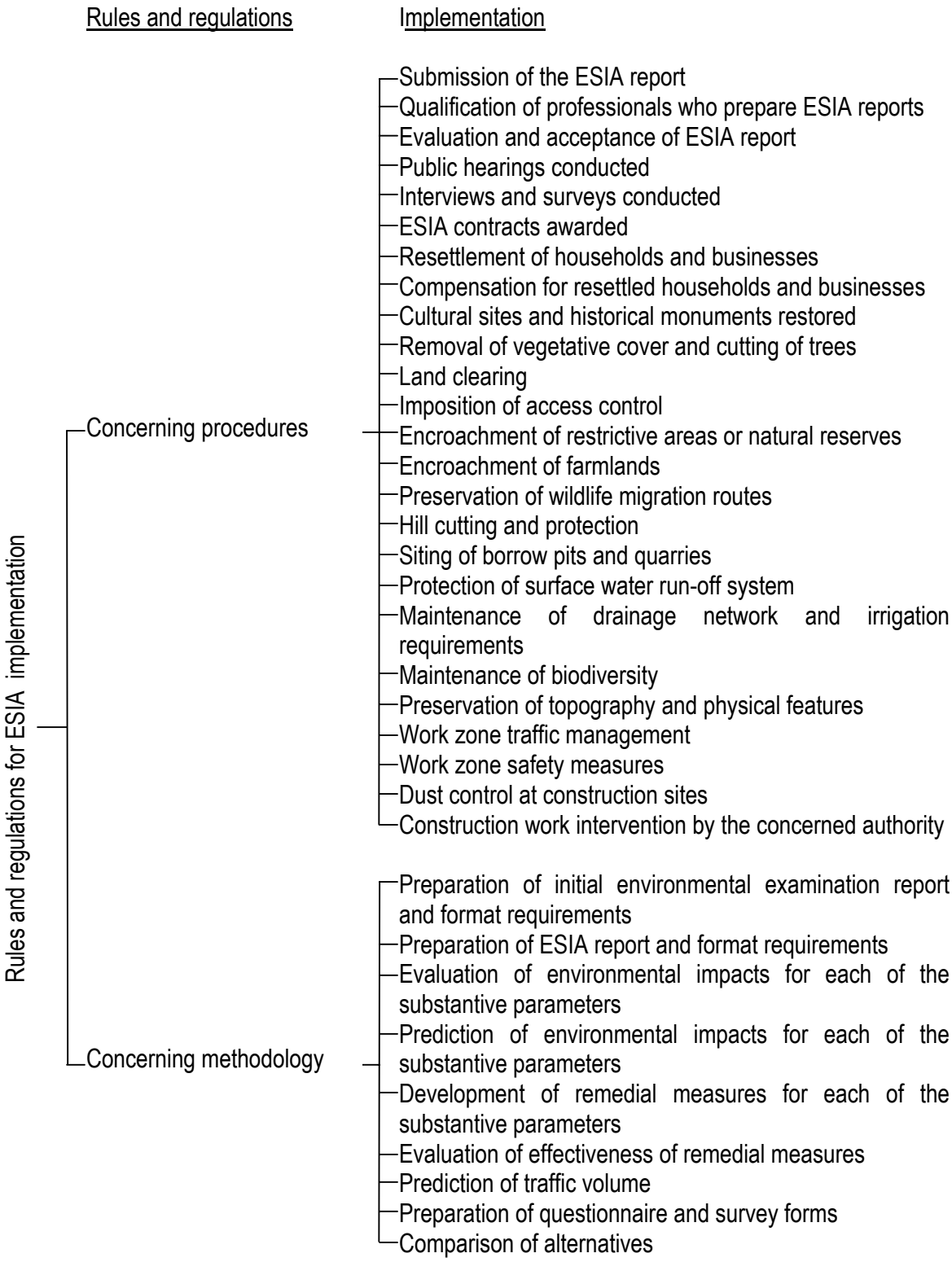


Figure 3.2 Some rules and regulations for road-development-related ESIA implementation

3.5 Technical standards and benchmarks

Standards and benchmarks need to be established in road infrastructure development and transport operations to provide the evaluation basis for a diverse range of environmental protection measures. These include quality standards for soil, air, water and noise disturbance for the protection of natural, human and social environments, archaeological sites and public health and safety. Mitigative measures are often based on the degree to which damages change the environment, relative to standards. There are also standard techniques to ensure consistency and uniformity in assessment. Assessment of environmental and social damages by adopting appropriate methodologies may simply refer to the appropriate standards without providing details, except where they are particularly relevant. In the monitoring of the effectiveness of environmental and social mitigation schemes, the regulatory standards should be stated in road infrastructure development project documentation or be readily available.

National benchmarks and targets for various aspects of ESIA implementation should be established as part of the long-term programme towards full implementation of a comprehensive ESIA process. While long-term national benchmarks and targets can be set with respect to regional and international benchmarks and targets, realistic short- and medium-term national benchmarks and targets should be developed for effective phased implementation of the ESIA process within the practical means of the country.

3.6 Environmental training for persons involved in road infrastructure development projects and transport operations

The proper long-term functioning of the institutional and management infrastructure requires the service of knowledgeable professionals and trained technical supporting staff. Environmental training is needed for authorities and professionals who do not have the required knowledge or experience. University degree holders in relevant disciplines are required to hold responsible positions for interpreting environmental policy and evaluating alternatives with respect to their relative merits and degree of conformance to regulations and standards. These include such disciplines as environmental science, engineering and physical sciences. For countries in the beginning stage of building up their ESIA capability, sending existing staff for environmental training overseas may be necessary to acquire the needed expertise.

For other professionals and technical supporting staff in the road agency who are involved in road development projects and transport operations but are unfamiliar with the requirements of the ESIA process, training programmes should be conducted to increase their environmental awareness and to enhance the level of conformity with environmental policies and standards. Figure 3.3 lists the groups of people in a road agency who require environmental training.

Special training programmes, such as short courses, seminars, workshops and conferences, are some of the ways and means by which environmental awareness and related technical capability can be improved. During the early stage of developing ESIA capability in the private sector, the relevant authority or tertiary educational institutions may organize training courses to impart the required knowledge and skills. Subsequently, periodic seminars and workshops should be conducted to provide an update on new requirements. The effective implementation of the complete ESIA process also calls for competent consultants in formulating environmental mitigation measures and preparing quality ESIA reports, as well as capable contractors to carry out the proposed environmental protection measures satisfactorily.

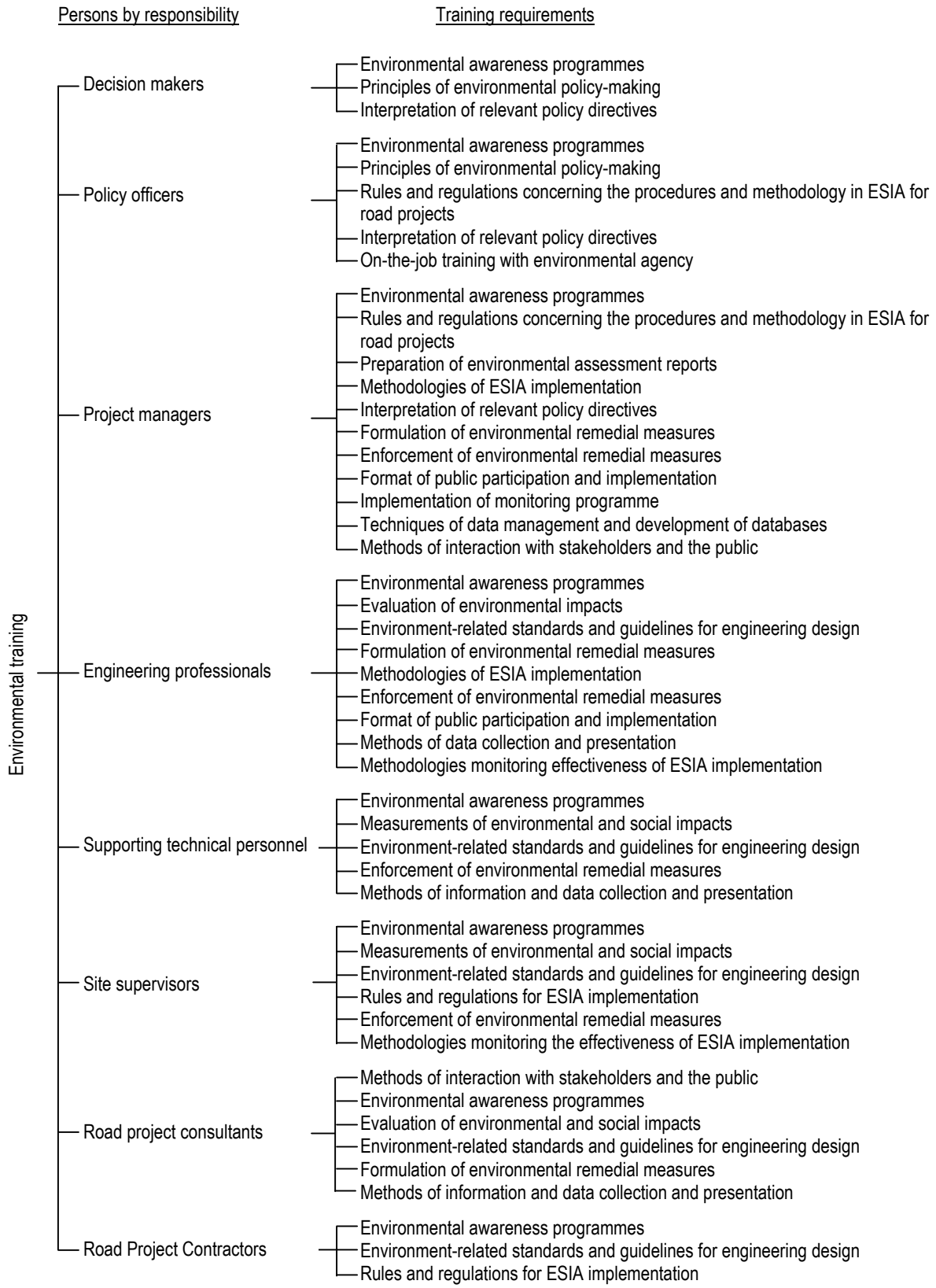


Figure 3.3 Requirements of environmental training for persons involved in road infrastructure development and transport operations

3.7 Enforcement mechanisms

Effective enforcement of ESIA requires the clear delineation of the respective roles and responsibilities of concerned agencies, coordinated inter-agency arrangements, institutional strengthening of environmental agencies including those responsible for ESIA, improved enforcement of environmental laws and regulations, and strict application of penalties for non-compliance. It is necessary to formalize and strengthen the arrangements for the involvement of all stakeholders in the enforcement of the ESIA process.

Properly set out legislation and directives provide the necessary mandate to perform ESIA in road projects. Clear definitions must be given for the type and scale of projects for which ESIA is mandatory, and the extent of ESIA needed to be performed in each. Effective enforcement during implementation of the ESIA process is undoubtedly a major requirement to achieve the overall goal of environmental protection. Rules for penalties of non-compliance should be explicitly stated and be adhered to strictly.

There should be a clear description of the designation and responsibility of those agencies or departments that are to perform the following duties: (a) authorization to conduct the ESIA process, (b) evaluation of ESIA reports, (c) acceptance of ESIA reports, (d) execution of the ESIA process at various stages of road development, and (e) post-construction assessment of environmental and social impacts. Figure 3.4 lists the agencies that are likely candidates to be designated for each stage of the ESIA process.

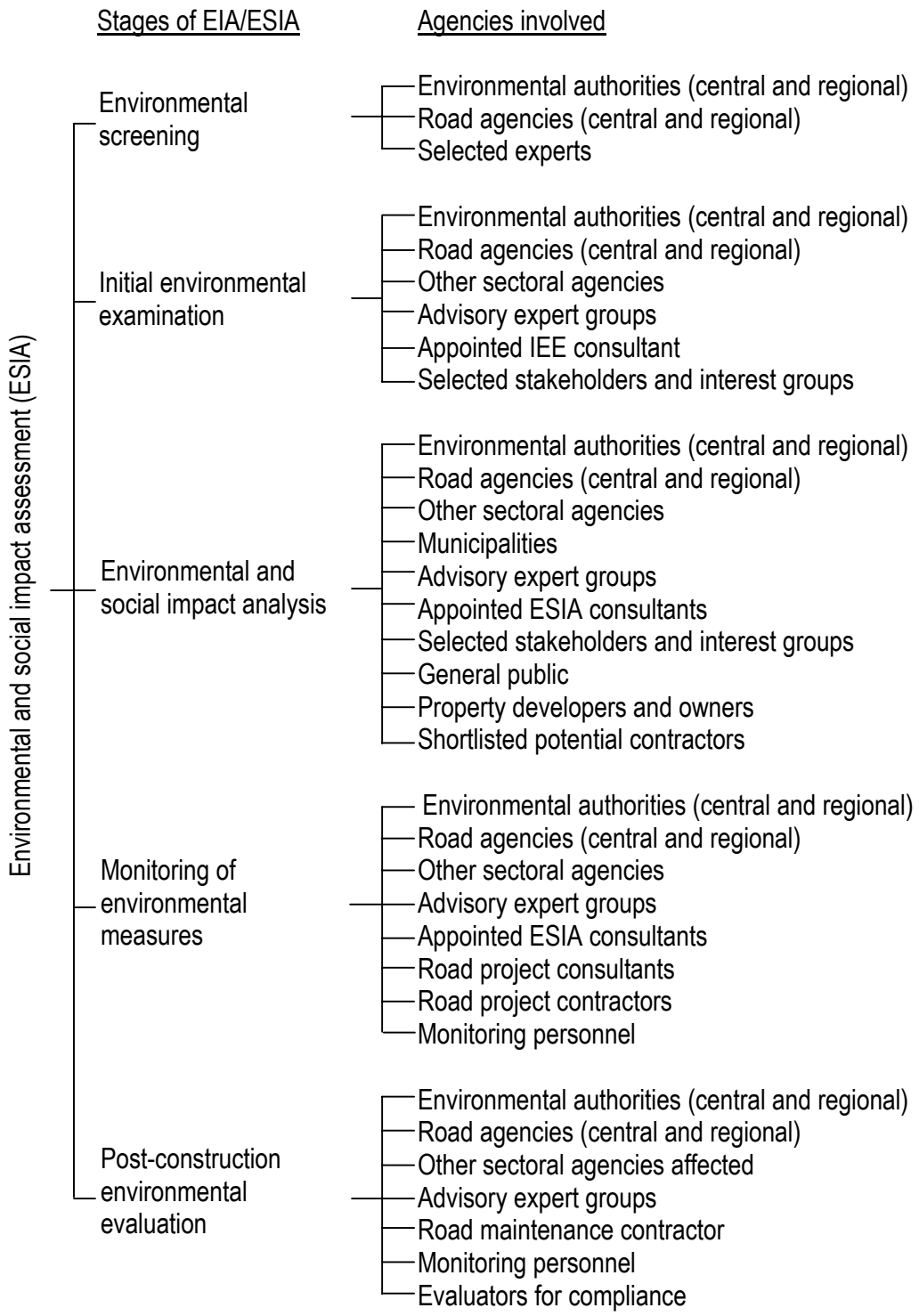


Figure 3.4 Agencies involved in various stages of the ESIA process in road development

4. PUBLIC PARTICIPATION

The ESIA process is incomplete without effective public participation. Public participation is an integral part of the ESIA process. Important functions of the public participation is shown in figure 4.1.

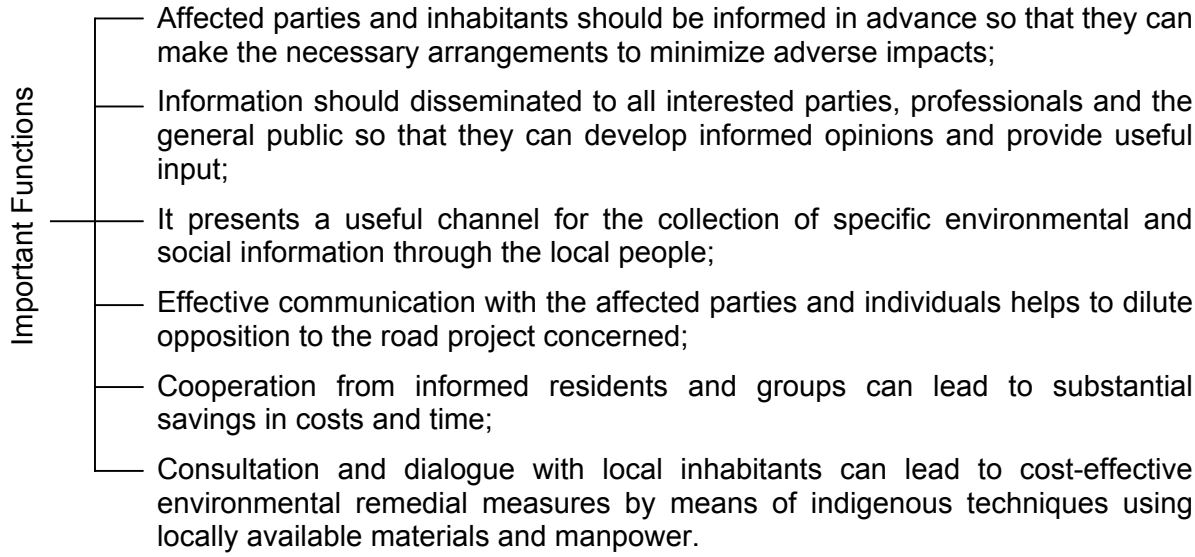


Figure 4.1 Important functions of public participation

Guidelines on the requirements for public participation and the formats of achieving effective public participation are presented in the following sections 4.1 and 4.2.

4.1 Requirements for public participation

A successful public participation programme requires the following three elements to be effectively executed: dissemination of information to the stakeholders; solicitation of information from affected parties and inhabitants; and consultation with interest groups and the public. The first two elements are usually applied in the early stages of the ESIA process, and are particularly useful in the environmental screening stage. The consultation element is required in the environmental and social impacts analysis stage when detailed information is needed for the analysis of alternatives and their impacts. The main inputs to a public participation programme are shown in figure 4.2.

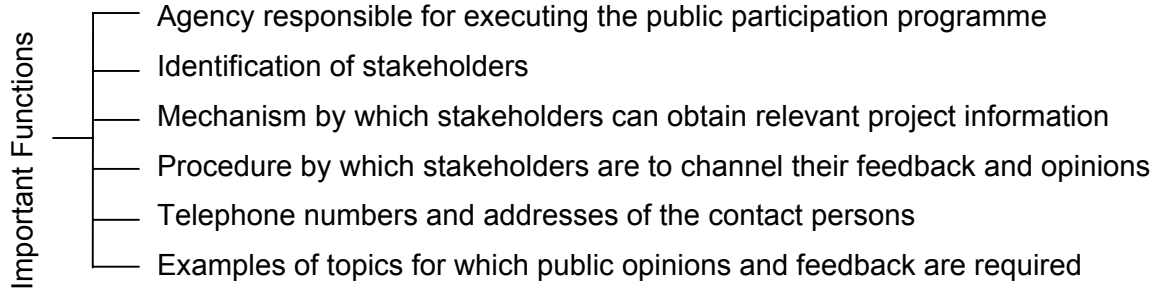


Figure 4.2 Main inputs to a public participation programme

4.2 Formats for achieving effective public participation

To achieve effective public participation in the ESIA process, it is necessary to study the profile of communities and inhabitants, to plan in advance how the relevant information will be disseminated and solicited, and how consultation will be conducted to obtain the needed feedback. Depending on the profile of the stakeholders, their cultural and educational background, different formats of executing the public participation programme may be adopted. The following nine formats of public participation should be practised (World Bank 1997):

(a) *Public displays*: This format includes displays in public areas, project specific exhibitions, distribution of newsletters and leaflets. Though passive in nature, contact numbers and addresses can be gathered to encourage feedback;

(b) *Interview survey*: Interviewers are trained to conduct face-to-face interviews with a selected representative of the stakeholders. Special survey forms should be designed with a pre-defined set of questionnaires to gather socio-economic information and data, opinions, priorities and concerns. Responses, usually in the form of short answers, are recorded by the reviewer on the standard form. Experts should be engaged to design the interview survey;

(c) *Questionnaire and written survey*: Questionnaires and printed survey forms should be distributed by mail or other convenient means to a representative sample of people. Professional assistance is required in the design of the questionnaire and the survey form and the interpretation of the test results;

(d) *Public hearings*: This is a formal form of public meeting that includes official announcements in official circulars or public media. It is organized with a well defined agenda format and rules. However, the specific arrangement may vary from country to country, allowing for prevailing cultural approaches to collective decision-making and handling of public disagreement. Formal notes or minutes are recorded, along with the names of participating individuals and their affiliations. Special attention should be paid to the methods of announcement and the choice of meeting venue and time to achieve the maximum possible attendance and participation. An experienced and respected moderator who can facilitate effective discussions is crucial to the success of a public hearing;

(e) *Local meetings*: In rural areas where the public hearing format is not applicable, a series of meetings with local residents and communities may be organized to gather feedback and concerns. Local meetings are less formal than a public hearing and they are an effective means to communicate project details to the local community and receive their response;

(f) *Interest group consultation*: Public hearings may not be suitable for special professional groups or individuals who are unlikely to speak up in public forums. Separately arranged meeting sessions with different professional groups would provide an appropriate avenue for consultation to receive professional views and advice;

(g) *On-site discussions*: On-site discussions are needed to better understand specific environmental and social issues and formulate suitable remedial measures. Such visits are often conducted with potential contractors to ensure that the issues are understood and potential remedial measures are discussed;

(h) *Rapid social appraisal*: This covers less formal forms of data collection methods such as informal interviews, less-structured forms of social survey, and focus group discussions. They are less time-consuming and less costly;

(i) *Rapid rural appraisal*: When time and other resource constraints prevent an elaborate public participation programme, a rapid appraisal covering a large sutdy area may be adopted. This can be conducted by a multidisciplinary team comprising project officers, community development experts, technical specialists and local representatives.

Various forms of public participation are presented in figure 4.3.

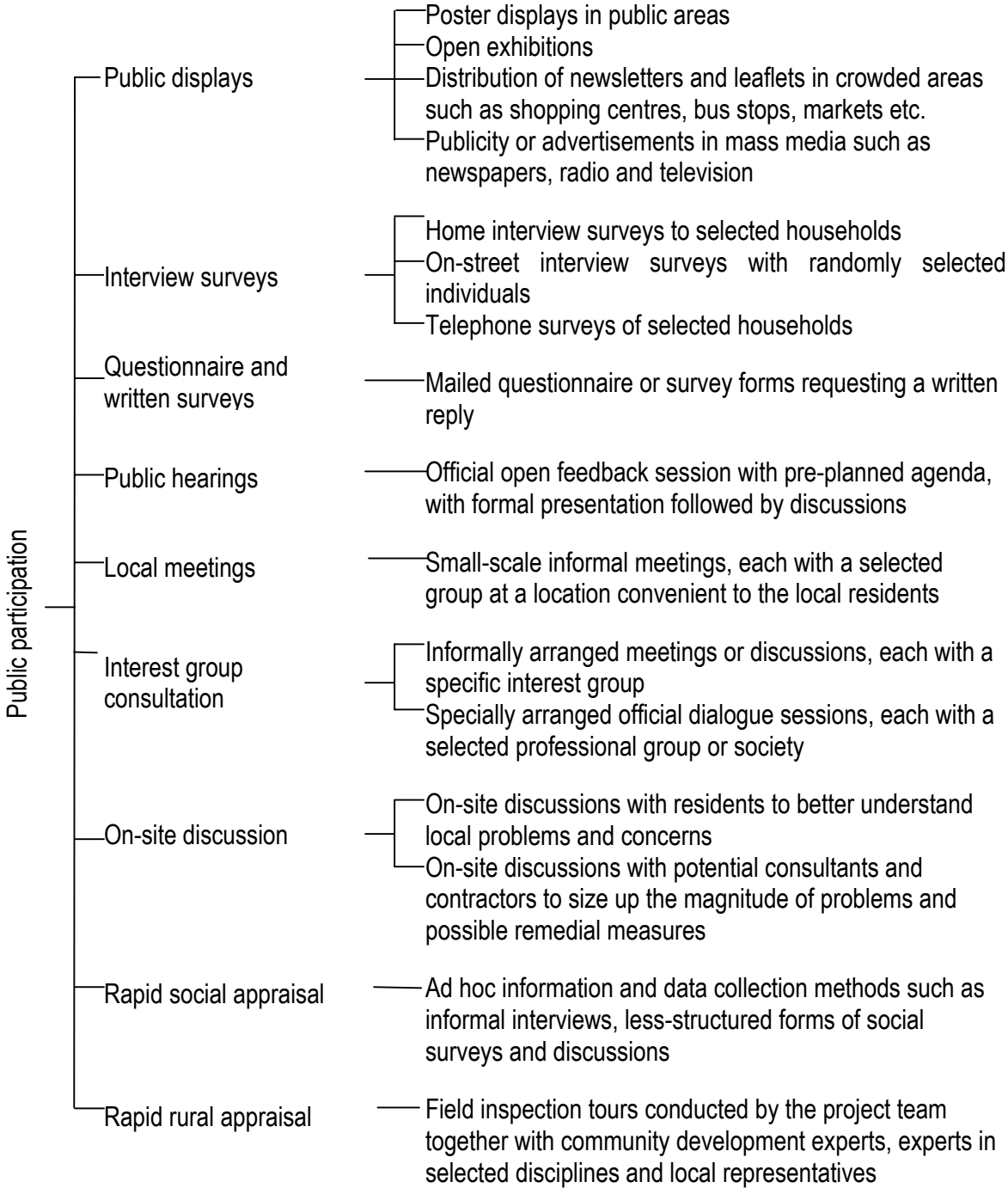


Figure 4.3 Various forms of public participation

5. INFORMATION AND DATA REQUIREMENTS

5.1 Types of information and data requirements

The types of information and data requirements vary with the various stages of the ESIA process. At the environmental screening stage, a broad range of general information and data covering all the substantive parameters (both environmental and social) is needed. This is followed by gathering more detailed information and data for the subsequent stages of ESIA. During the road construction and implementation of environmental remedial measures, measurements made in the process of monitoring environmental conditions should be compiled promptly for timely corrections or adjustments of field activities. Upon completion of the construction project, the as-constructed conditions should be surveyed and filed for the purpose of post-construction environmental evaluation, which should be supported by subsequent long-term data collection efforts.

The types of information and data requirements for decision-making during the ESIA process can be grouped into five categories: existing environmental conditions, standards and norms, conditions during construction, as-constructed conditions, and post-constructed conditions.

(a) *Existing environmental conditions*: These are the baseline conditions describing the physical characteristics of the pre-project situation. They cover the built and visual environment, as well as the biological and socio-economic conditions. Depending on the environmental and social impacts identified as important for the project concerned, information may be required of some or all of the substantive parameters (both environmental and social).

(b) *Standards and norms*: Standards for environmental design, safety and operations, as well as norms for civil works and construction for various types of road projects are needed to assess the adequacy of the mitigation measures and construction methods proposed by the consultants and the contractors.

(c) *Conditions during construction*: Environmental and social impacts during the road construction phase, although of a temporary nature, can create unbearable inconvenience to the affected community and inhabitants. Some of the adverse impacts may last beyond the construction period. A system of regular monitoring and reporting must be established.

(d) *As-constructed conditions*: The as-constructed conditions, in various items corresponding to the pre-project “existing environmental conditions” should be surveyed and recorded. In addition, the physical characteristics of the road constructed, including the material and structural data, should be recorded. The two sets of information should form the basis for the assessment of the environmental and social impacts of the road project.

(e) *Post-construction conditions*: Many of the environmental and social impacts of road projects are long term in nature. Monitoring of such long-term impacts requires the evaluation of post-construction changes of environmental and social conditions during the service life of the road. This monitoring activity is an extension of the information and data collection efforts for the “as-constructed conditions”.

5.2 Methods of collecting information and data

Based on the scope of the ESIA established for the road project concerned, the party responsible for the preparation of the ESIA report must develop a data collection plan. The data collection plan should comprise the following main elements: (a) identifying the types of information and data needed for the given scope of the ESIA; (b) defining the time frame for the collection of information and data; and (c) determining the methods of information and data collection suitable for the project.

Data collection, compilation, documentation and management is the responsibility of the road agency responsible for the road development project. The environmental agency, however, must be represented in this effort to ensure that relevant information and appropriate data are collected and documented properly. The typical methods of data collection of existing environmental and social conditions consist of the following:

(a) *Database search*: This is probably the first step in the data collection efforts to gather all the data available from ready sources. The availability of good databases of relevant information greatly reduce the costs, time and efforts needed to collect the baseline conditions. The results of this search will identify the information gaps and needs, thereby forming the basis for formulating the data collection plan;

(b) *Drawings and maps*: Officially published drawings and maps as well as unpublished drawings for internal use within government agencies are of great use for an ESIA study. They offer a valuable basis for the initial assessment of the potential environmental and social impacts based on spatial relationships. Good drawings and maps could be relied on to estimate the impacts on ecosystems, topography, landscape, drainage, vegetation and the built environment;

(c) *Physical site inspection*: A number of visits to the study areas must be made to verify the information and data already collected through other sources. Efforts should be made to collect data to fill the gaps;

(d) *Interviews with residents and officials of local authorities*: This is a useful avenue to collect information and data which is not readiliy avaialble from official records and databases. Such information and data should include community needs, social and cultural activties, and existing environmental and social conditions;

(e) *Consultations and discussions with experts and experienced officials*: Input and interpretation by professionals and experienced officials are important sources of in-depth information and data valuable for decision-making concerning the choices of alternatives for environmental measures;

(f) *Visits to and interaction with key government departments and ministries*: Interaction with various government departments and ministries is needed to identify constraints and additional information specific to the individual departments and ministries;

(g) *Questionnaires and surveys*: Questionnaires and surveys are often employed to obtain feedback and opinions from a representative sample of stakeholders. Survey forms must be specially designed to provide the needed information.

A summary of the type of information and data that should be obtained through various methods is given in figure 5.1.

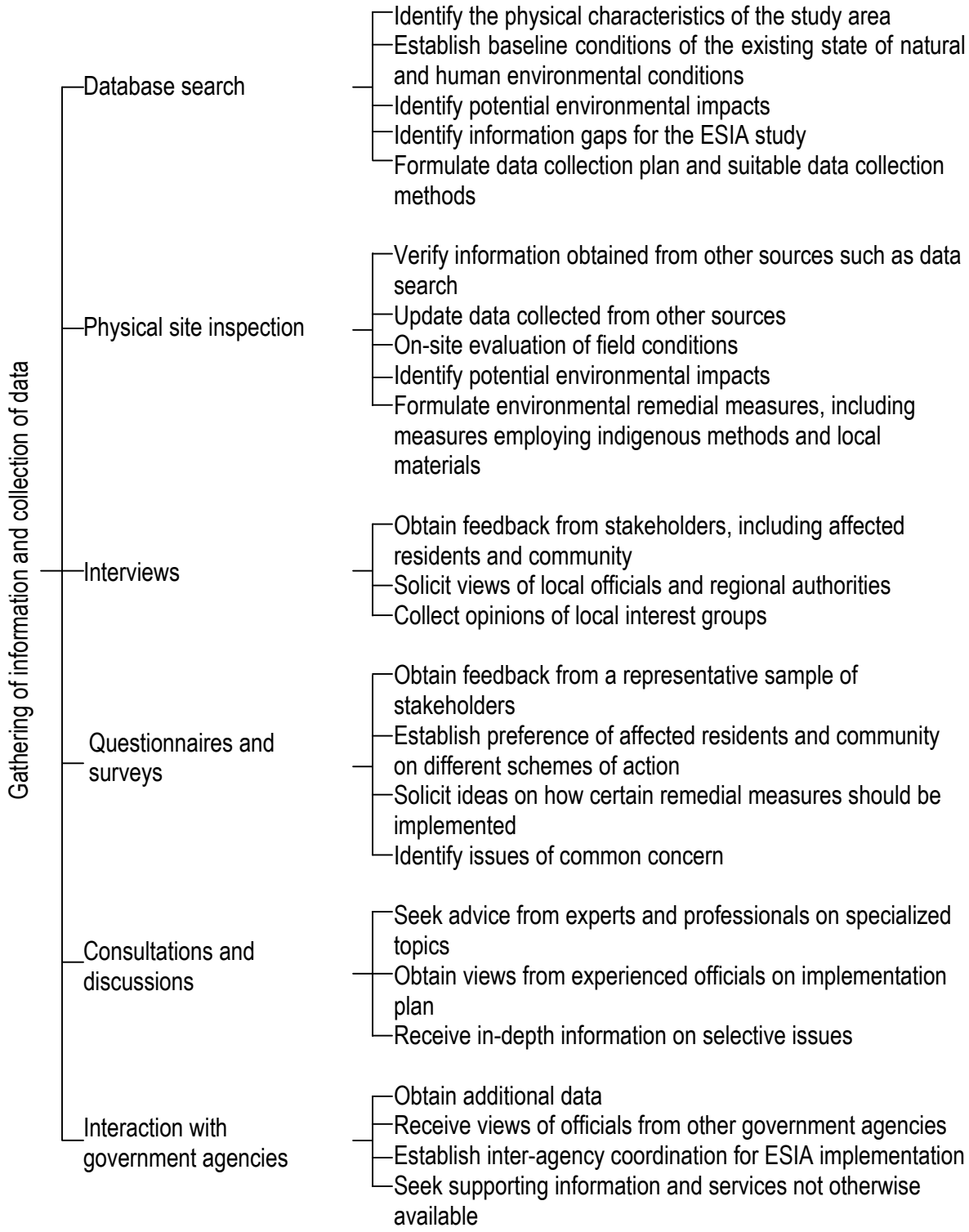


Figure 5.1 Methods of gathering information and data collection for an ESIA study

5.3 Development and management of databases

The development of network-wide databases and information centres is probably one of the most neglected aspects of the implementation of the ESIA guidelines. An apparent reason is the amount of costs and resources needed. Another reason is the difficulty in coordinating and collating information and data from the large number of agencies under different involved ministries. The development of databases is a major long-term undertaking requiring the commitment of the central administration at the authority or at the ministry level.

There is a need to set up a unit within the road agency devoted to the development, maintenance and management of the database. This special effort is required to generate the specific information and data for the road-transport-related ESIA process. As far as the road authority is concerned, there is already an accepted practice in some developed countries to include a pavement management system within the road authority establishment. Many developed countries in the ESCAP region require their road agency to implement systematic pavement management measures, which include the maintenance of a road management database. There are also trends to do the same in many developing countries of the region. While information and data have not been a required item in the pavement management system database, it should be logical to expand the database to cover the needs of ESIA. A standard pavement management system database usually contains the basic inventory of the road network infrastructure, as well as the condition of the road pavements over time. The ESIA database can simply be an added module to the pavement management system module.

PART TWO

GUIDELINES FOR A COMPREHENSIVE MULTISTAGE ESIA PROCESS

6. FUNDAMENTAL APPROACH TO DEVELOP PRACTICAL GUIDELINES FOR THE ESIA PROCESS

The fundamental approach to developing practical guidelines for the multistage ESIA process for road projects should address the following main parameters:

(1) Focusing on the main issues
(2) Involving appropriate professionals and groups
(3) Consulting the public
(4) Linking information and data to the decision-making process
(5) Presenting clear options for mitigating adverse environmental and social impacts
(6) Providing information and data in a form useful to road agencies, donor agencies, planners, engineers and decision makers.

The main parameters and recommendations for the multistage ESIA process of road projects are presented in figure 6.1.

Practical guidelines for the multistage ESIA process are required for procedural issues, such as institutional infrastructure, legislation and legal frameworks, extent and scope of the ESIA requirements, information and data, and public participation. Figure 6.2 provides the necessary guidelines for each of the procedural issues.

It is equally important to develop practical ESIA guidelines for various road-development-related substantive parameters not only environmental, such as soil, water, air, ecosystem and landscape, but also social, such as community activities, displacement and resettlement, cultural heritage, noise, air and water pollution, human health and safety. Practical guidelines for these substantive parameters at different stages of the ESIA process are systematically presented in Chapter 9 under standardized formats, such as objectives and main tasks, evaluation of potential environmental and social impacts and their prediction, national environmental laws and regulations regarding environmentally and socially sensitive elements and issues, overall national development planning and individual projects with environmental and social significance, public consultation and public participation, technical standards and benchmarks, consultation with experts, responsibilities of respective agencies and coordination between them.

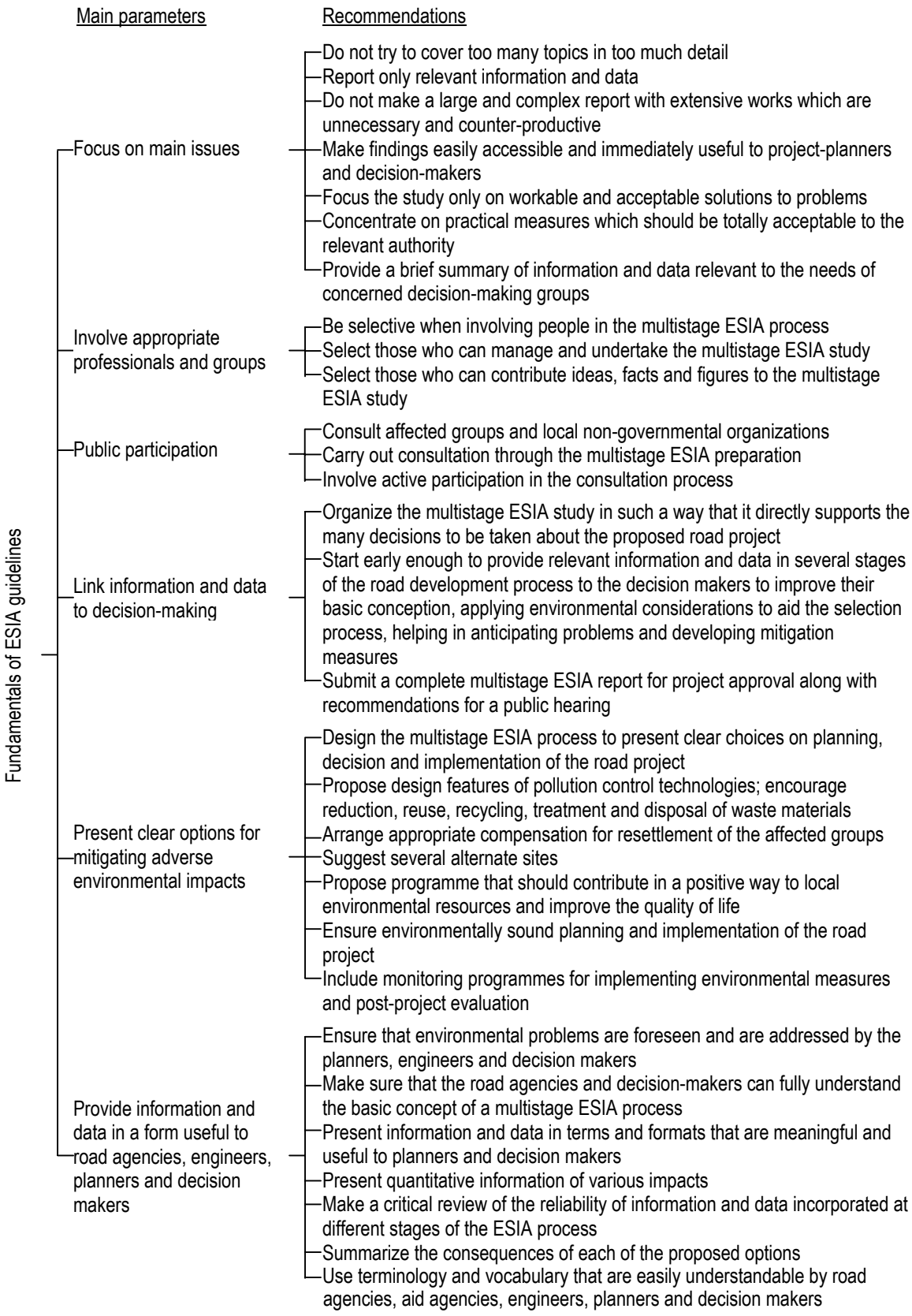


Figure 6.1 Main parameters and recommendations for a multistage ESIA process for road projects

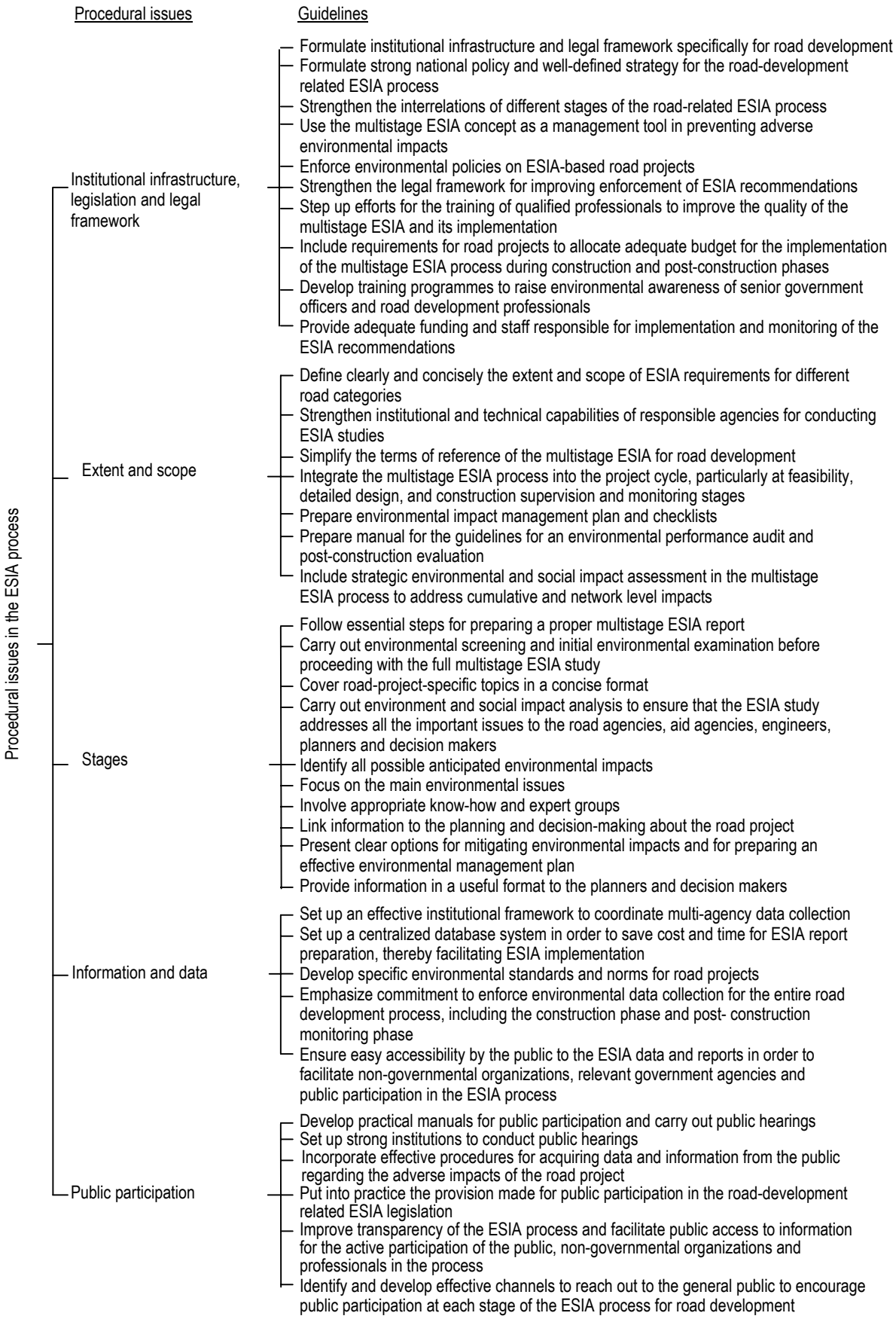


Figure 6.2 Practical guidelines for various procedural issues of the multistage ESIA process for road development

7. STAGE ONE: ENVIRONMENTAL AND SOCIAL SCREENING (ESS)

7.1 Objectives

The main objective of environmental and social screening is the early determination of the potential magnitude of environmental and social impacts of a road development project. Environmental and social screening will (a) provide information regarding the scale and type of project; (b) identify a list of valued ecosystem components; (c) establish the general nature and magnitude of the potential environmental and social impacts; and (d) suggest the most appropriate ESIA process for the road project.

Environmental and social screening is actually a process for ascertaining what can and what cannot be accomplished during a particular environmental and social impact study. This should (a) define the geographical boundary of the study area in relation to possible impacts; (b) identify time constraints and time horizons of the study; and (c) estimate the skills and human resources needed to undertake the project.

7.2 Main tasks

At the environmental and social screening stage, eight main tasks as shown in figure 7.1 need to be undertaken.

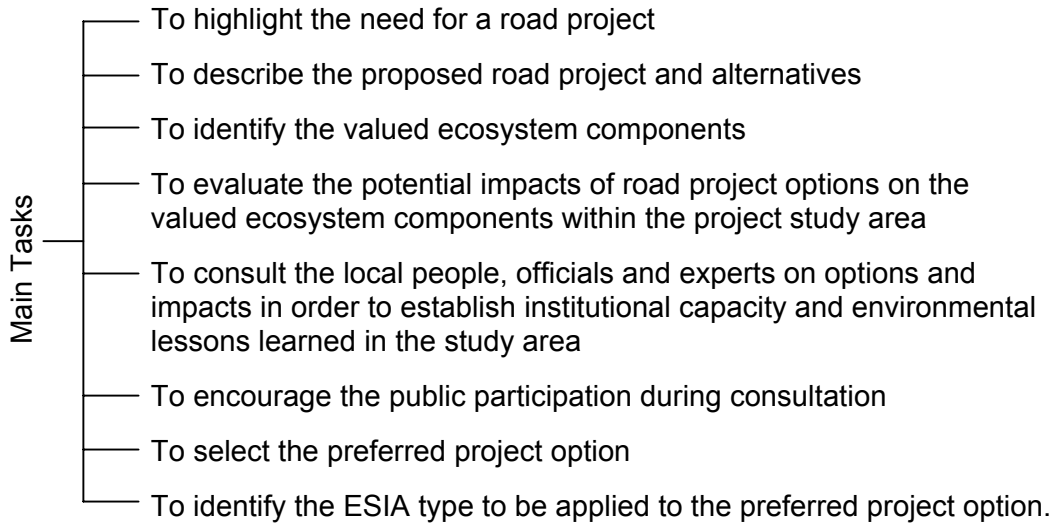


Figure 7.1 Important tasks of the environmental and social screening stage

Many enquiries should be made and many questions should be asked in the environmental screening stage in order to select the right road alignment. A list of typical questions that should be asked is outlined in figure 7.2. General information and data that are required are presented in figure 7.3. Figure 7.4 presents a typical example of an environmental and social screening procedure.

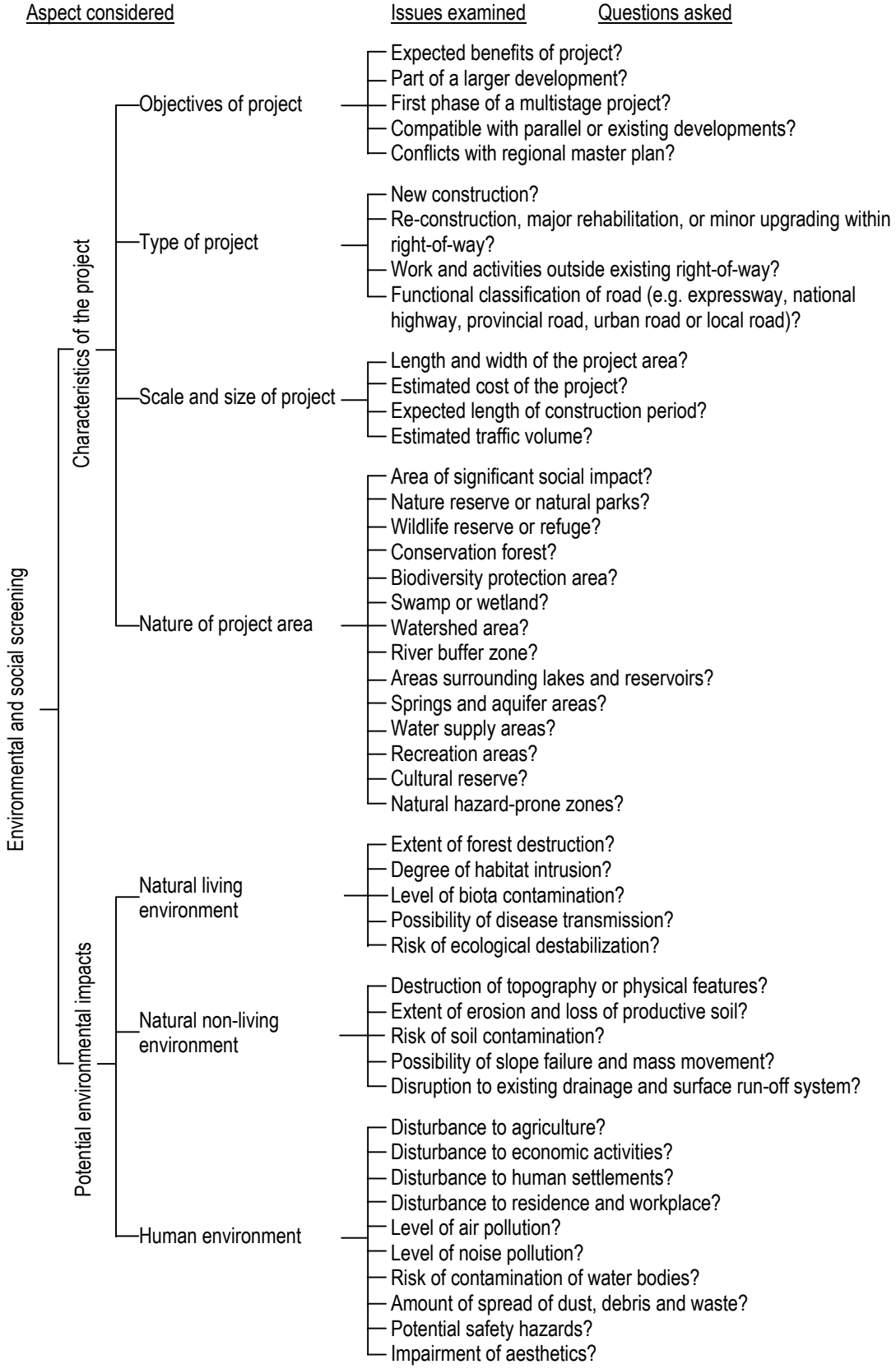


Figure 7.2 List of typical questions that should be asked at the environmental and social screening stage

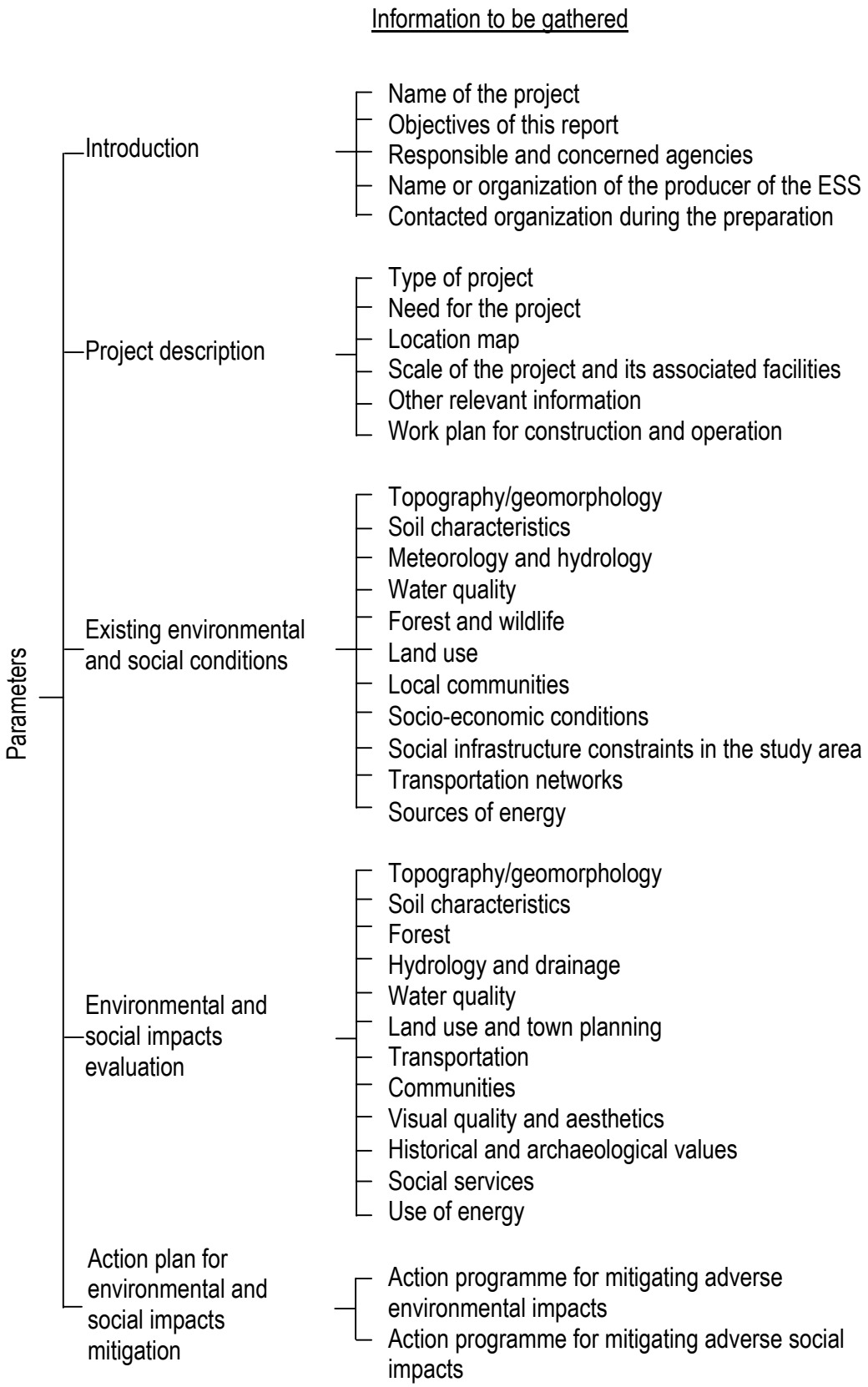


Figure 7.3 General information and data to be gathered at the environmental and social screening stage

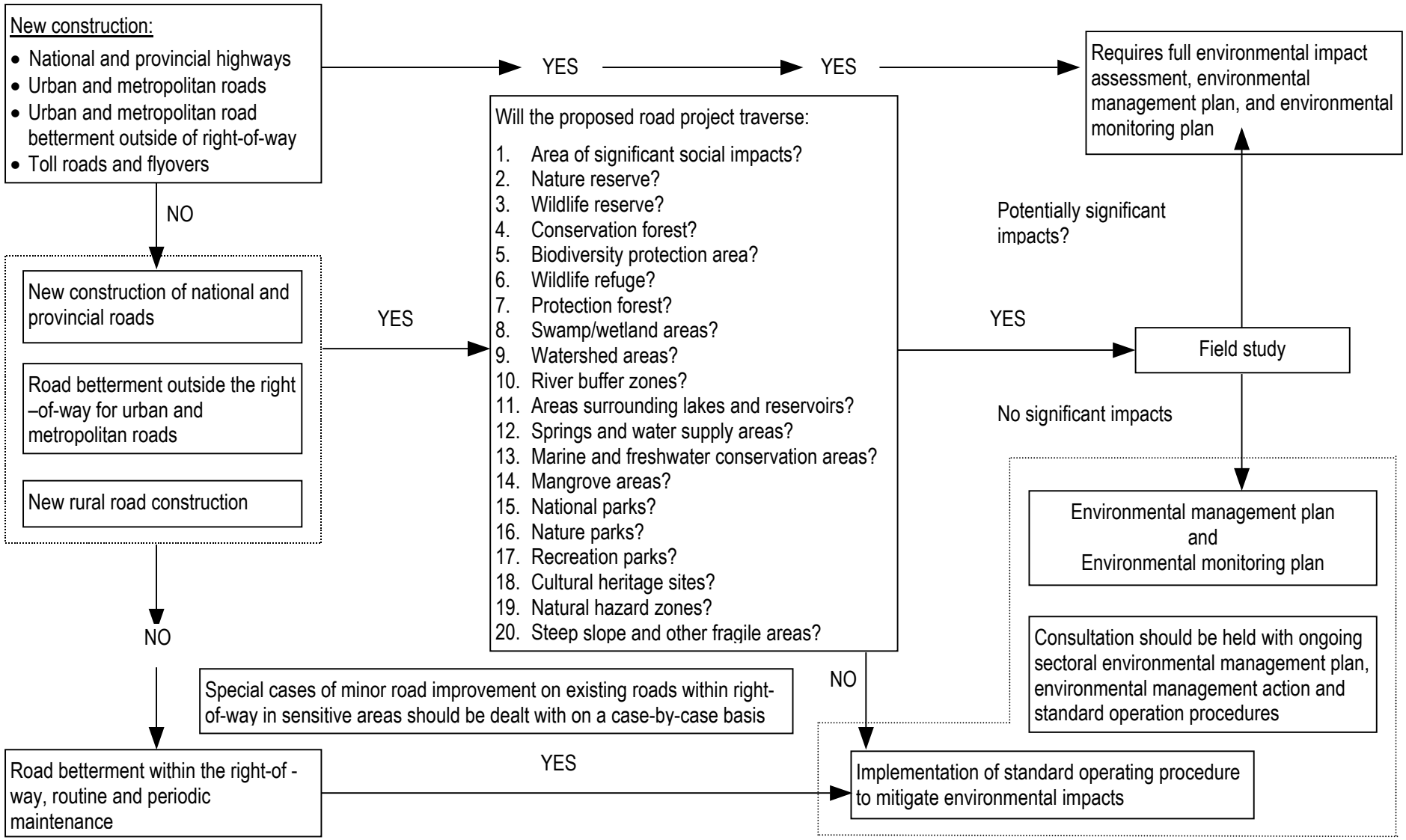


Figure 7.4 Typical example of an environmental and social screening procedure

7.3 Evaluation of potential environmental and social impacts and prediction of impacts

Using the results of the screening tasks proposed in section 7.2, a preliminary matrix screening should be conducted to quickly identify the project which should be the most ecologically harmonious and environmentally sound and socially acceptable to provide the best option. The environmental screening takes place on a macro-scale, comparing the management decisions and potential environmental and social consequences of building a road with other conceptual solutions, such as restricting private vehicle use, supporting public transportation, encouraging non-motorized transport modes, and so forth. The environmental screening should be carried out most efficiently by a team of experts who are capable of undertaking the work, and who should be fully aware of the general costs and benefits of each alternative. The application of indicators, such as economic losses and gains, number of people to be displaced and to be resettled, and loss of value ecosystem components helps to evaluate the magnitude of the potential impacts.

7.4 National environmental laws and regulations regarding environmentally and socially sensitive elements and areas

While carrying out environmental and social screening activities, due consideration should be given to national environmental laws and regulations regarding environmentally and socially sensitive elements and areas. This will help the environmental screening process to be carried out smoothly to select the right road alignment which will create the minimum possible environmental and social impacts.

7.5 Overall national planning and individual projects with environmental and social significance

At the environmental and social screening stage, studies should be made of the overall national planning and individual projects with environmental and social significance similar to those anticipated in the proposed road project. This will help to develop a well-planned and integrated road infrastructure in close harmony along with other development projects.

7.6 Recommendations

At the environmental and social screening stage, recommendations for the ESIA process should be made and directed to the concerned planning and policy-making specialists, technical experts, environmental specialists, project managers and site supervisors. Recommendations should also be made about the probable contents of the ESIA study. These recommendations are needed for the planning, design and construction of a sound road infrastructure development project.

7.7 Public consultation and public participation

Prior to selecting a preferred alternative alignment, a preliminary public consultation should be held with all other stakeholders. The focus should be on introducing the project, outlining possible environmental and social impacts, indicating the planning timetable, and specifying the guidelines for stakeholders inputs (including specifications on when the inputs

are most desirable). The consultation session should bring together the public and all other stakeholders. Active public participation should be encouraged during the environmental and social screening stage. Proper public consultation and active public participation will form a critical basis for deciding what level of ESIA needs to be undertaken.

7.8 Technical standards and benchmarks

Technical standards and benchmarks are required to be established for the proposed road development project at the environmental and social screening stage to provide the basis of evaluation for a wide range of environmental and social impacts and their probable mitigation measures. These should include air and water quality standards along with permissible noise standards, and public health and safety standards.

7.9 Consultation with experts

At the environmental and social screening stage of road projects, consultation with different experts pertaining to planning, decision-making, design, construction, operation and maintenance, environmental monitoring and evaluation is essential. Consultation with the experts will help to assess the magnitude of the potential environmental and social impacts of the proposed road project at the environmental screening stage.

7.10 Responsibilities of respective agencies and coordination between them

The responsibilities of respective agencies for the proposed road development project should be clearly defined at the environmental and social screening stage so that at the subsequent stages no conflict arises among the responsibilities of the respective agencies. There should be good channels for active cooperation and coordination among the respective agencies involved in a road development project.

8. STAGE TWO: INITIAL ENVIRONMENTAL AND SOCIAL EXAMINATION (IESE)

8.1 Objectives

The main objective of the initial environmental and social examination is to review the potential impacts which a proposed road project will have on the natural, human and social environments. It is a brief statement of key environmental issues based upon readily available information and data, and is intended for use in the early phases of project planning.

8.2 Main tasks

The main task of the initial environmental and social examination are given in figure 8.1. The terms of reference of the initial environmental and social examination is outlined in figure 8.2. The necessary information and data required for the initial environmental and social examination are shown in figure 8.3.

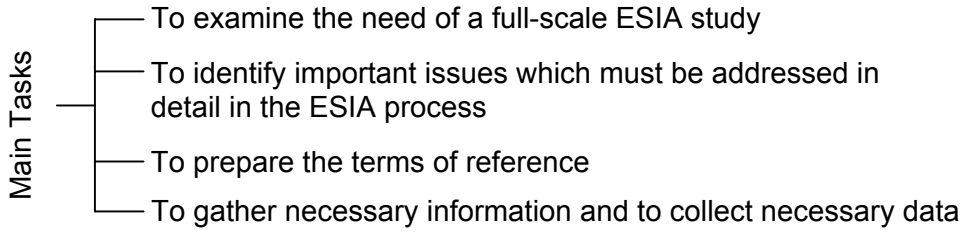


Figure 8.1 Main tasks of the initial environmental and social examination

8.3 Evaluation of potential environmental and social impacts and prediction of the impacts

From the information and data collected at the initial environmental and social examination stage, potential environmental and social impacts need to be evaluated and future predictions made. This will assist in the development of practical ESIA guidelines to mitigate the adverse impacts caused by road infrastructure development.

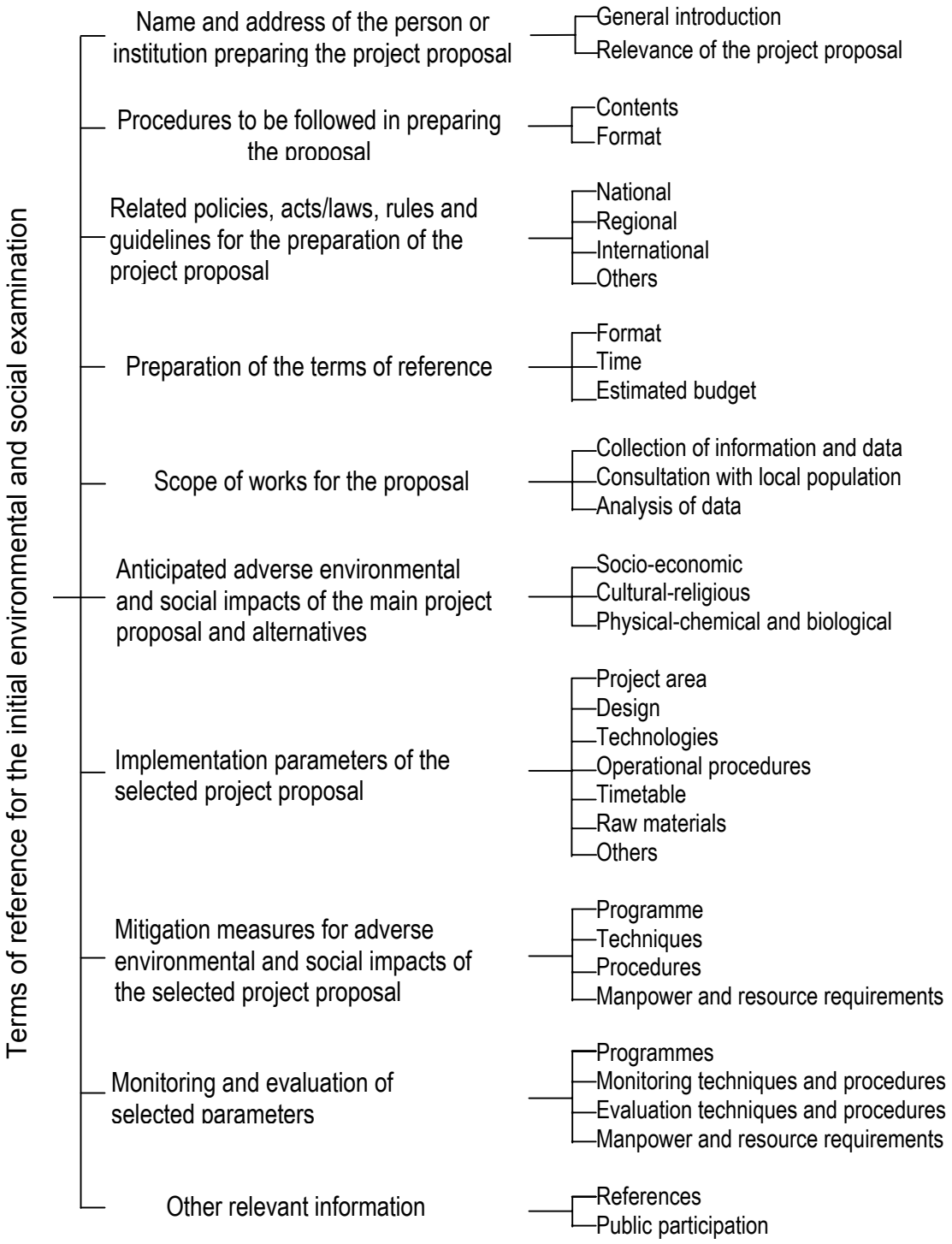


Figure 8.2 Terms of reference for the initial environmental and social examination stage of an ESIA study for road development

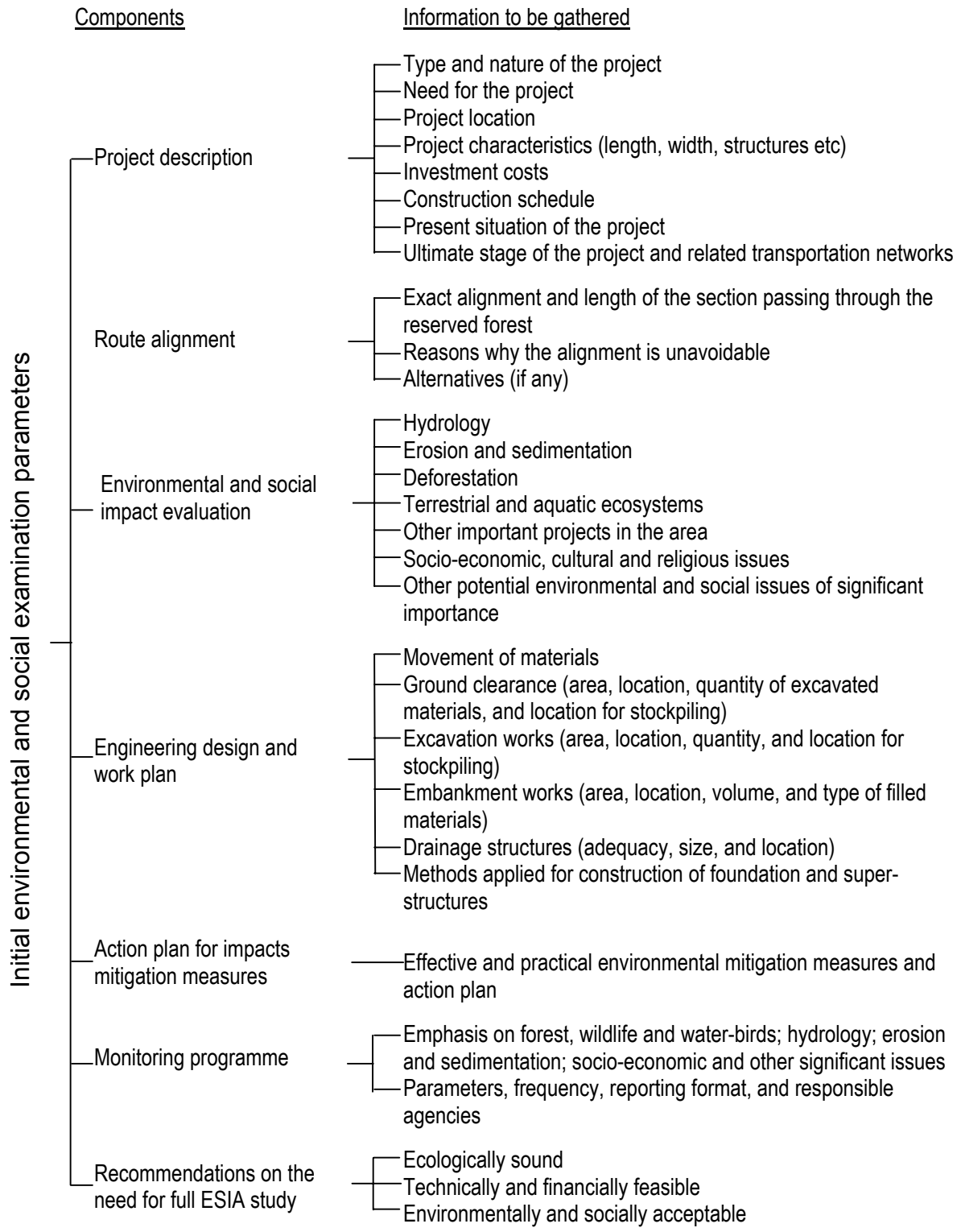


Figure 8.3 Necessary information and data to be gathered for the initial environmental and social examination stage of an ESIA study for road development

8.4 Public consultation and public participation

Public consultation is required at the initial environmental and social examination stage in order to gain input on the potential environmental and social impacts of the proposed road development project. Public participation needs to be encouraged to create public awareness of the environmental and social implications of the proposed road development project and to complement the efforts of governments and other agencies.

8.5 Consideration of other relevant issues

At the initial environmental and social examination stage, due consideration should be given to the existing environmental laws and regulations regarding sensitive elements and issues, overall national development planning and individual infrastructure development projects with enormous environmental and social significance; technical standards and benchmarks of environmental quality of parameters such as air, water and noise; and consultation with the local experts. Most important of all is the responsibilities of various agencies involved and their coordination in carrying out an effective initial environmental and social examination of various positive and negative environmental and social impacts. Recommendations should be made for the ESIA process and should be directed to planning and policy-making specialists, technical specialists, environmental and social specialists, project managers, contractors and site supervisors. Specific recommendations should also be made in the development of practical ESIA guidelines.

8.6 Review of the contents of the initial environmental and social examination report

The contents of the initial environmental and social examination report should be reviewed by relevant agencies in order to ascertain whether the findings of the initial environmental and social examination are sufficient or whether a full-scale ESIA study, recommended at the environmental and social screening stage, is required. If a full-scale ESIA study is recommended, then the typical components of the ESIA report should be as per the details given in figure 8.4.

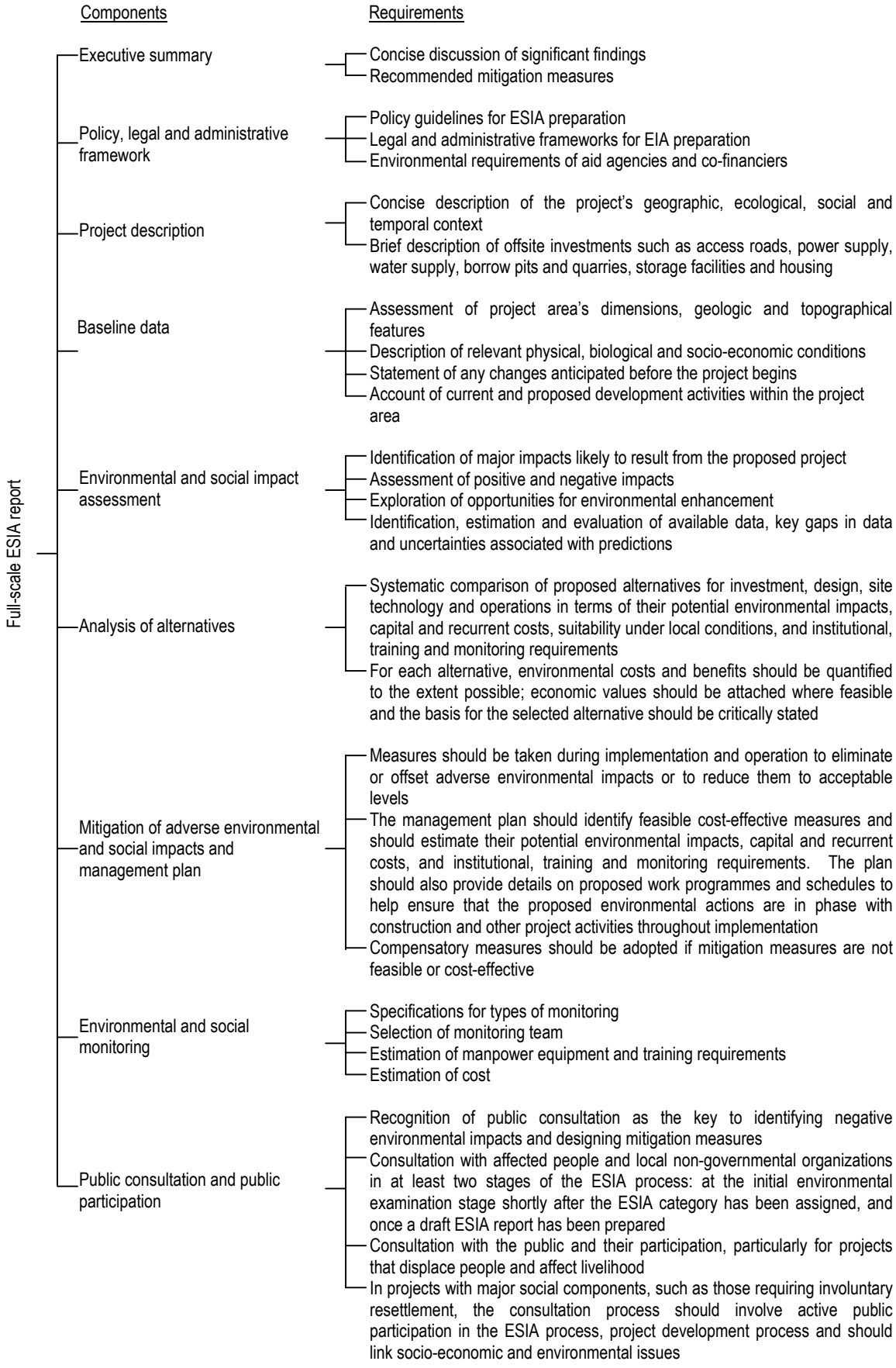


Figure 8.4 Main components of a full-scale ESIA study for the road development projects

9. STAGE THREE: ENVIRONMENTAL AND SOCIAL IMPACT ANALYSIS (ESIAn)

9.1 Objectives

The main objective of the environmental and social impact analysis is to make a detailed quantitative evaluation of the probable adverse environmental and social impacts caused by road projects (figures 9.1 and 9.2, see following pages). It should include a comparison of the impacts of the preferred road project with the impacts of any possible alternative transport project. The analysis should focus on determining the significance of direct and where applicable, indirect environmental and social impacts of the proposed road project.

9.2 Main tasks

The main tasks to be performed at the environmental and social impact analysis stage are shown in figure 9.3.

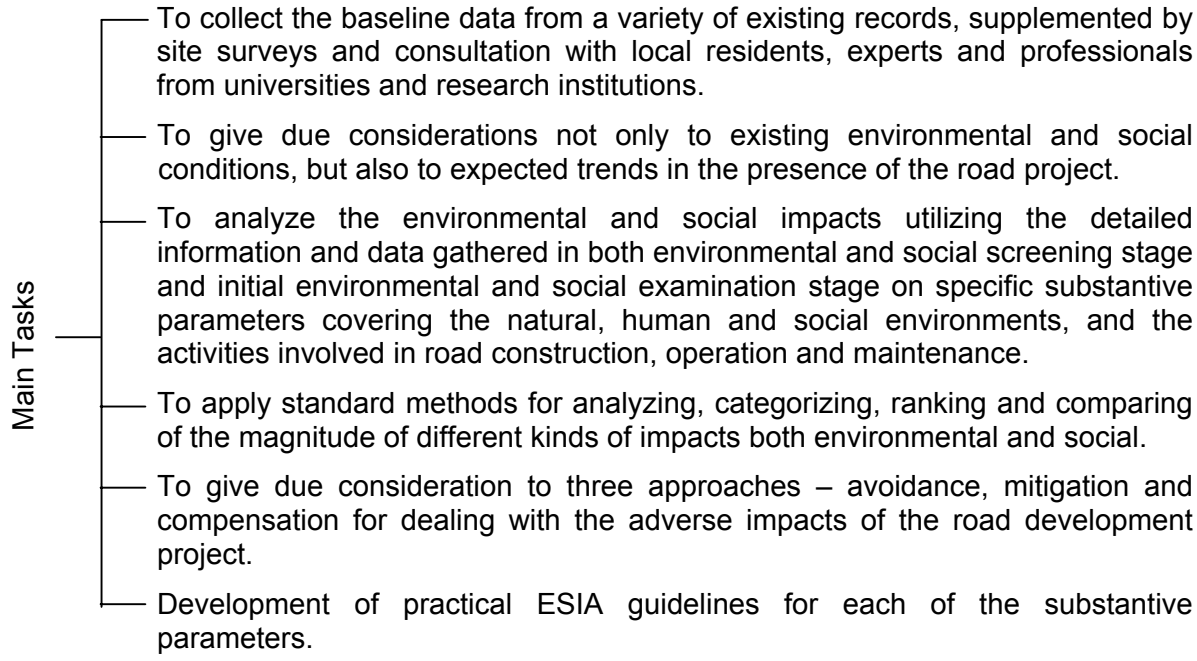


Figure 9.3 Main tasks to be performed at the environmental and social impact analysis stage

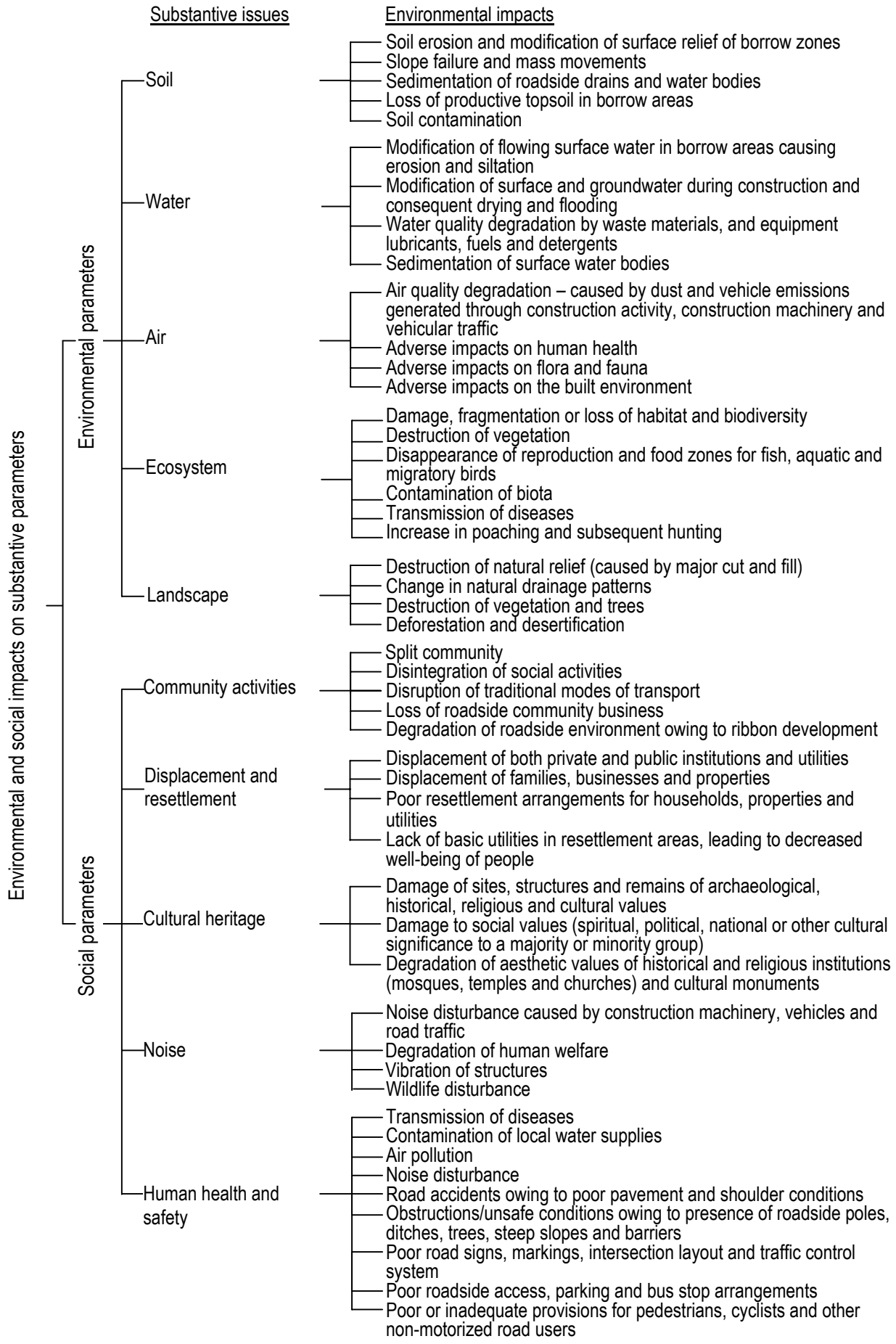


Figure 9.1 Various adverse environmental and social impacts that may be caused by road development projects on major substantive parameters

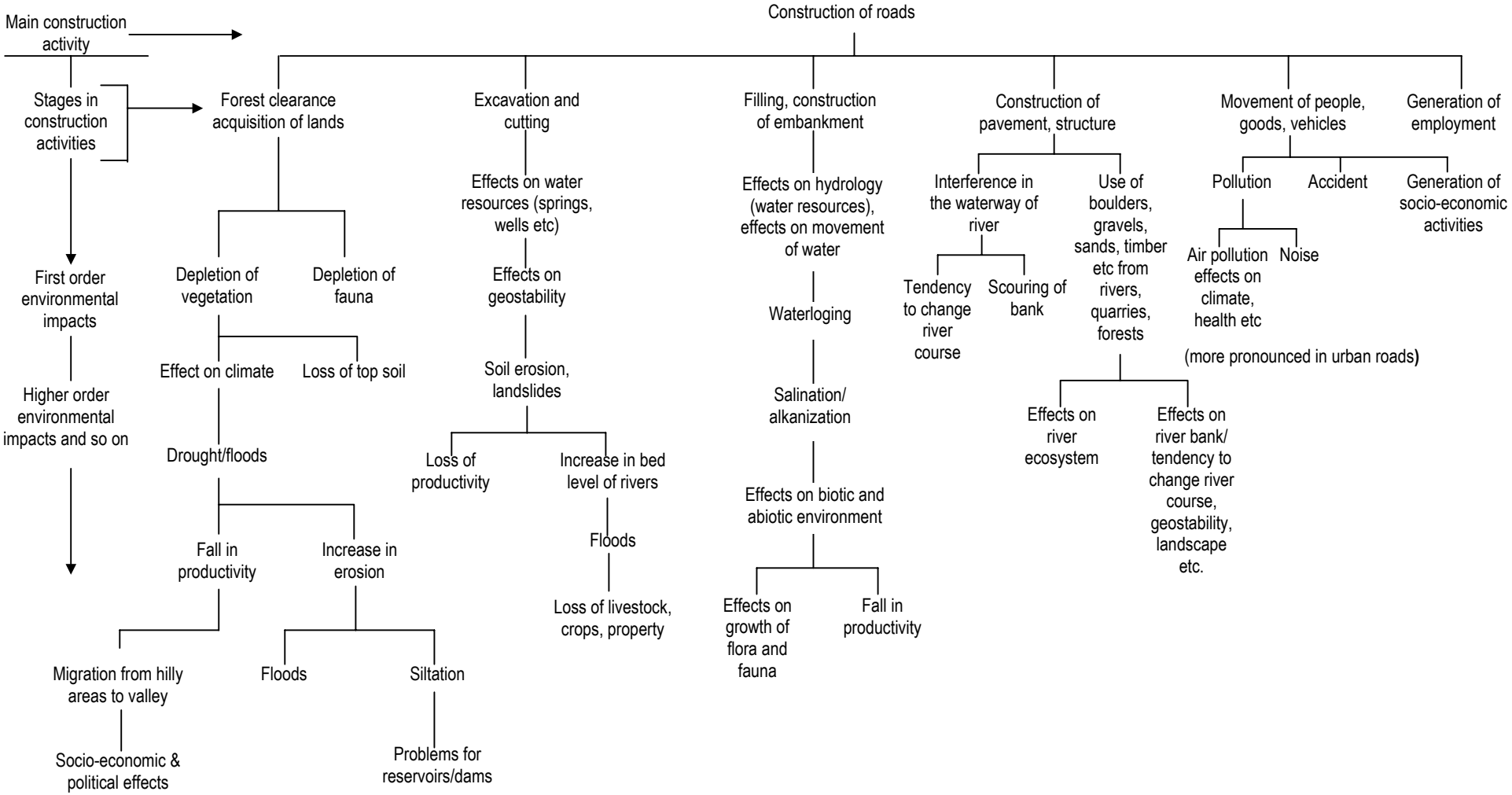


Figure 9.2 Comprehensive flow chart showing various environmental and social impacts caused by road construction

9.3 Consultation with the public and experts

During the environmental and social impact analysis stage, consultation with the public and experts is required to gain the necessary input in order to analyse properly the potential environmental and social impacts of the proposed road project. The consultation will also assist in developing practical ESIA guidelines to mitigate adverse environmental and social impacts that are anticipated.

9.4 Standards and benchmarks

Appropriate standards and benchmarks need to be established to provide the basis for environmental and social impact analysis. These include the benchmarks and standards for air and water quality and allowable noise levels. Other standards should include design and construction standards, monitoring and regulatory standards, human health and safety standards.

9.5 Development of practical guidelines

Despite the efforts by international, regional and national agencies, the implementation of EIA guidelines in road projects has been rather unsatisfactory. A major reason is the lack of commitment by the relevant authorities to develop appropriate EIA operational guidelines tailored to local applications. Many countries of the ESCAP region directly adopted EIA guidelines from developed countries without making any changes to accommodate the local environmental and social conditions and needs. Most existing EIA guidelines are too general in nature and are not very specific for implementation in road development projects. There is, therefore, an urgent need to develop practical ESIA guidelines for ecologically harmonious, environmentally sound and socially acceptable road development.

While developing practical ESIA guidelines, due consideration should be given to public consultation and public participation, national environmental and social laws and regulations, technical standards and benchmarks, consultation with technical, professional and environmental experts, and the responsibilities of respective agencies and the coordination between them.

Recommended activities for environmental and social impact analysis of various substantive parameters in each stage of the ESIA process are shown in figure 9.4.

Practical ESIA guidelines and recommendations for mitigating the adverse environmental and social impacts caused by road development on various substantive parameters are outlined in the following subsections 9.5.1 to 9.5.10.

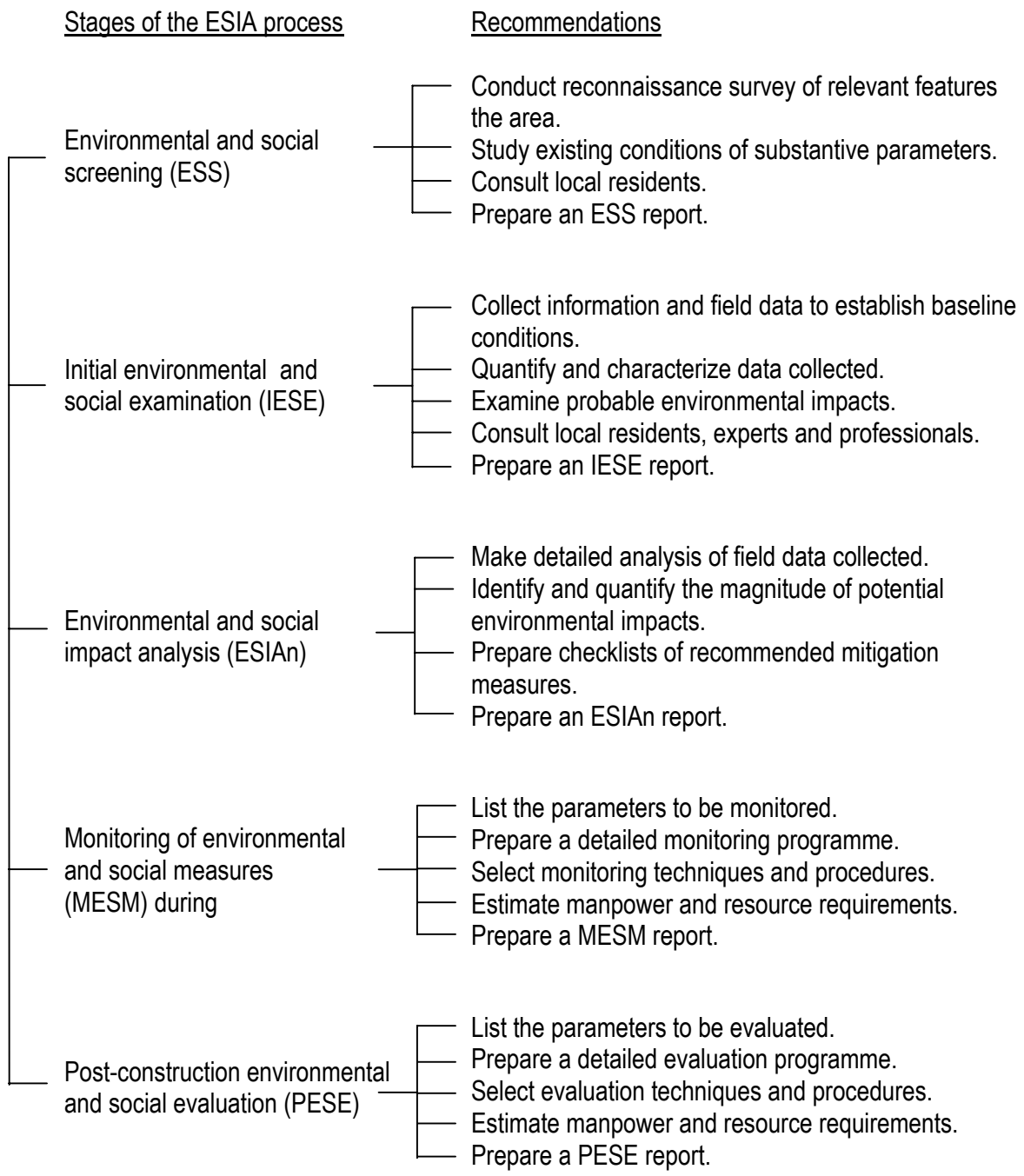


Figure 9.4 Recommended activities for environmental and social impacts analysis of substantive parameters in each stage of the ESIA process

9.5.1 Soil-related ESIA guidelines

Major soil-related adverse impacts are soil erosion and modification of surface relief of borrow zones, slope failure and mass movements, sedimentation of roadside drains and water bodies, loss of productive top soils in borrow areas and soil contamination (figure 9.1). Soil-related losses include farmers losing crops and land, fishers losing income because of sedimentation and pollution of water bodies (rivers, lakes and reservoirs) and roadside dwellers losing their households, properties and businesses when roadside slopes collapse and mass movements occur resulting in the damage of the road structure itself and roadside amenities.

Recommended guidelines for the mitigation of soil-related adverse impacts caused by road development projects are given in figure 9.5.

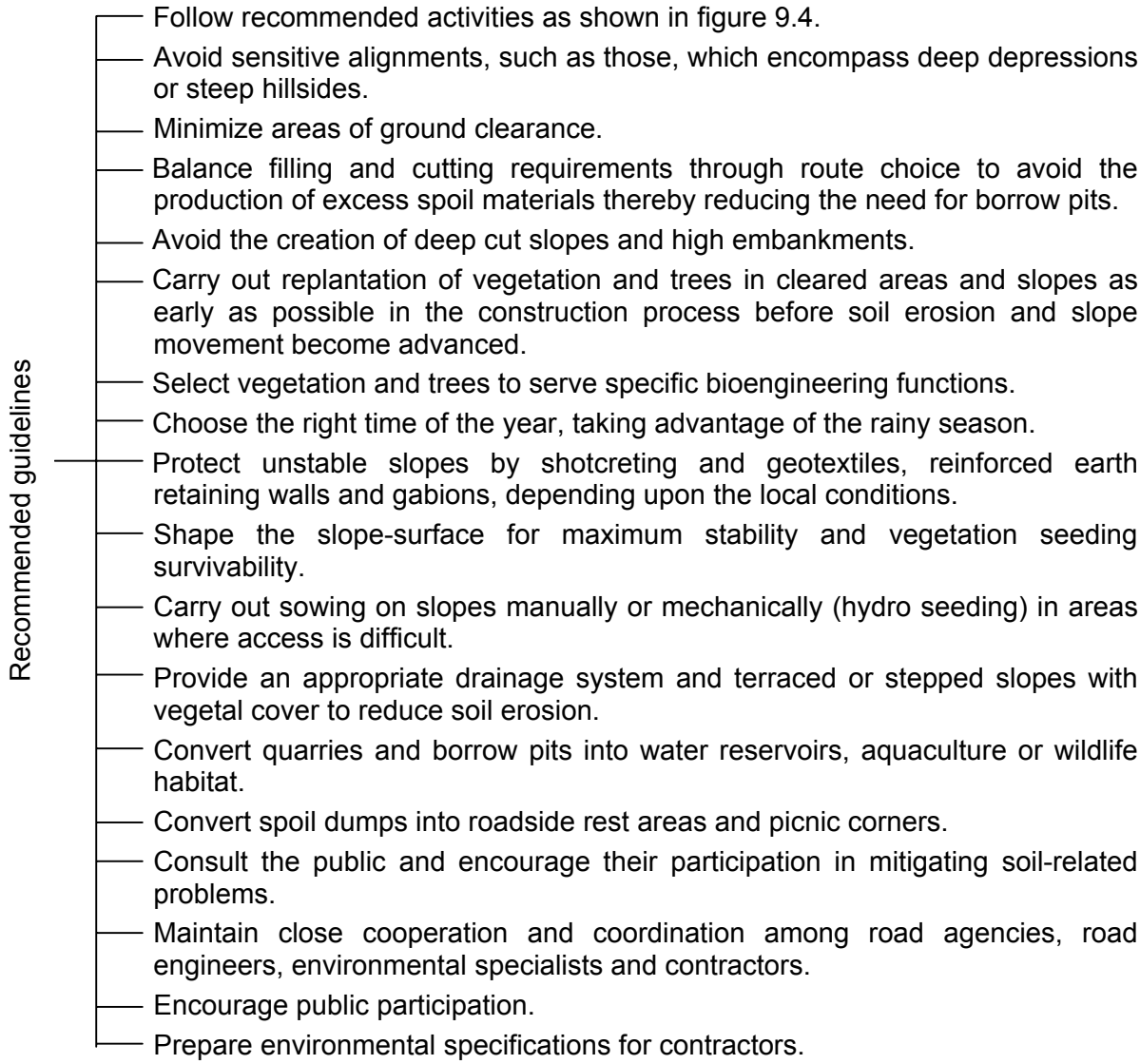


Figure 9.5 Recommended guidelines for mitigating soil-related adverse impacts caused by road development projects

9.5.2 Water-related ESIA guidelines

Road development projects usually intersect drainage basins and subsequently alter or modify the local hydrology. Road development can lead to both alterations and modifications to the surface water and groundwater flows, water table fluctuations, and water quality degradation (figure 9.1).

Recommended guidelines for mitigating water-resources-related adverse impacts caused by road projects are given in figure 9.6.

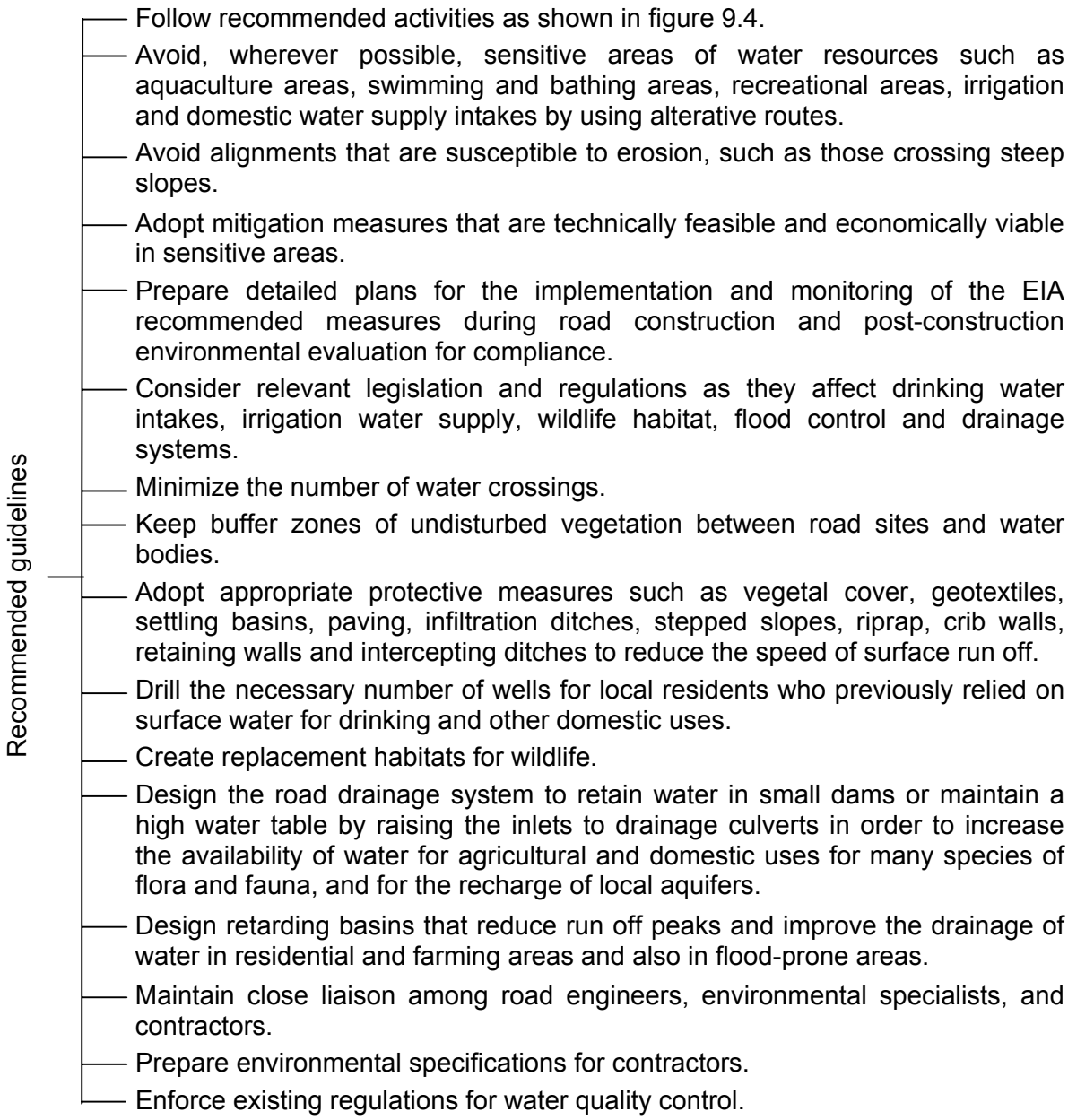


Figure 9.6 Recommended guidelines for mitigating water-related adverse impacts caused by road development projects

9.5.3 Air-related ESIA guidelines

Road development has tremendous potential for degrading the air quality of nearby air sheds if proper planning is not implemented. The major sources of air pollutants are the emissions from construction machinery and vehicles. Major air pollutants (dust, gaseous emissions and particulate matter) produce air pollution and impart adverse impacts on human health, flora and fauna and on the built environment (figure 9.1).

Recommended guidelines for controlling air quality-related adverse impacts caused by road development projects are given in figure 9.7.

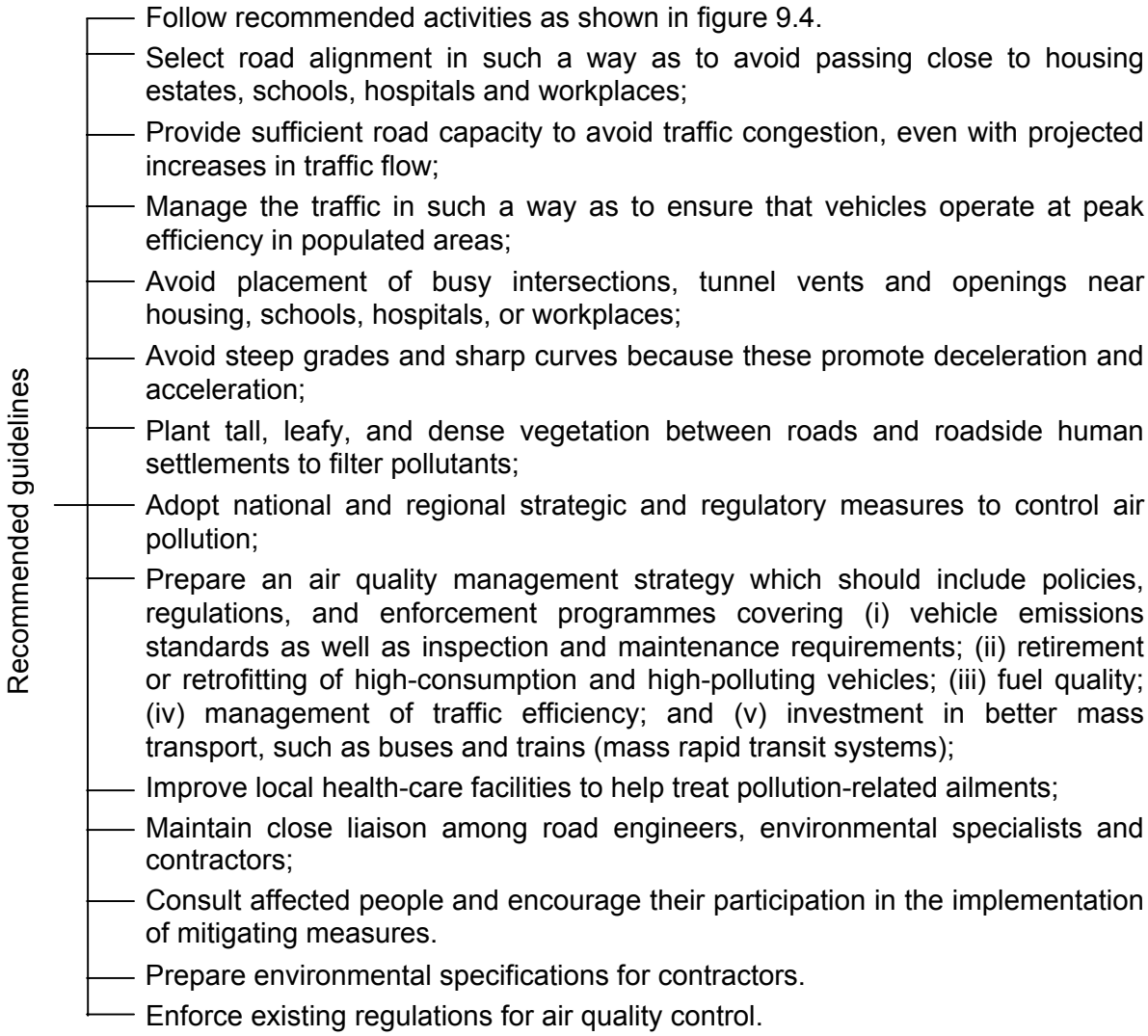


Figure 9.7 Recommended guidelines for mitigating air quality related adverse impacts caused by road development projects

9.5.4 Ecosystem-related ESIA guidelines

Road development if undertaken without proper understanding of the relationships of various components of the natural biophysical environment can be accompanied by serious disruption to the ecosystem. Major environmental impacts caused by road development on the ecosystem include damage to terrestrial and aquatic habitats, habitat fragmentation or loss, deforestation, loss of biodiversity, disappearance of reproduction and food zones for fish, aquatic and migrating birds, corridor restrictions, ecological disequilibrium, contamination of biota transmission of diseases and increases in poaching and subsequent hunting (figure 9.1).

Recommended guidelines for mitigating adverse impacts to the ecosystem caused by road development projects are given in figure 9.8.

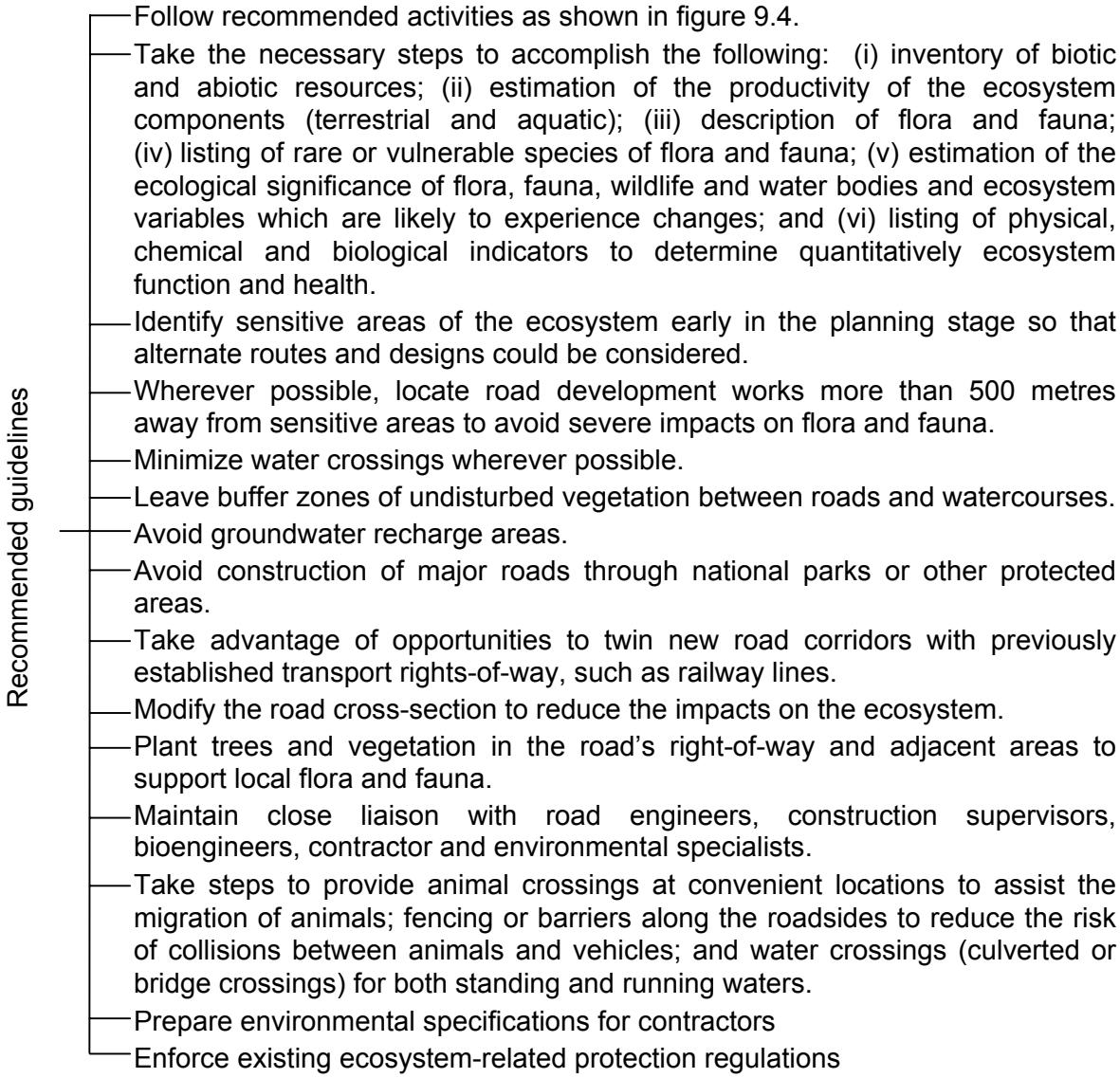


Figure 9.8 Recommended guidelines for mitigating adverse impacts to ecosystem caused by road development projects

9.5.5. Landscape-related ESIA guidelines

Any road development project can affect the surrounding landscape, which encompasses natural relief, vegetation, watercourses, structures, and other objects of aesthetic value. A road development project may destroy natural relief (caused by major cut and fill), change natural drainage patterns, destroy vegetation and trees, and also cause deforestation and desertification (figure 9.1).

A well-designed road should fit in well with its surrounding landscape if its design reflects the principles of roadside landscape design. These principles can and should be applied whether or not the area being considered is one of special physical beauty. The roadside landscaping will serve to minimize not just the visual disturbance to the landscape but also the disturbance to the physical functioning of the natural and human ecosystems. In fact, if applied well, they can contribute to the enhancement of environmental benefits. To the extent that a road's design is successful in reflecting these principles, it should prove to be aesthetically more appealing. Recommended guidelines for mitigating the adverse impacts of road development projects on the landscape are shown in figure 9.9.

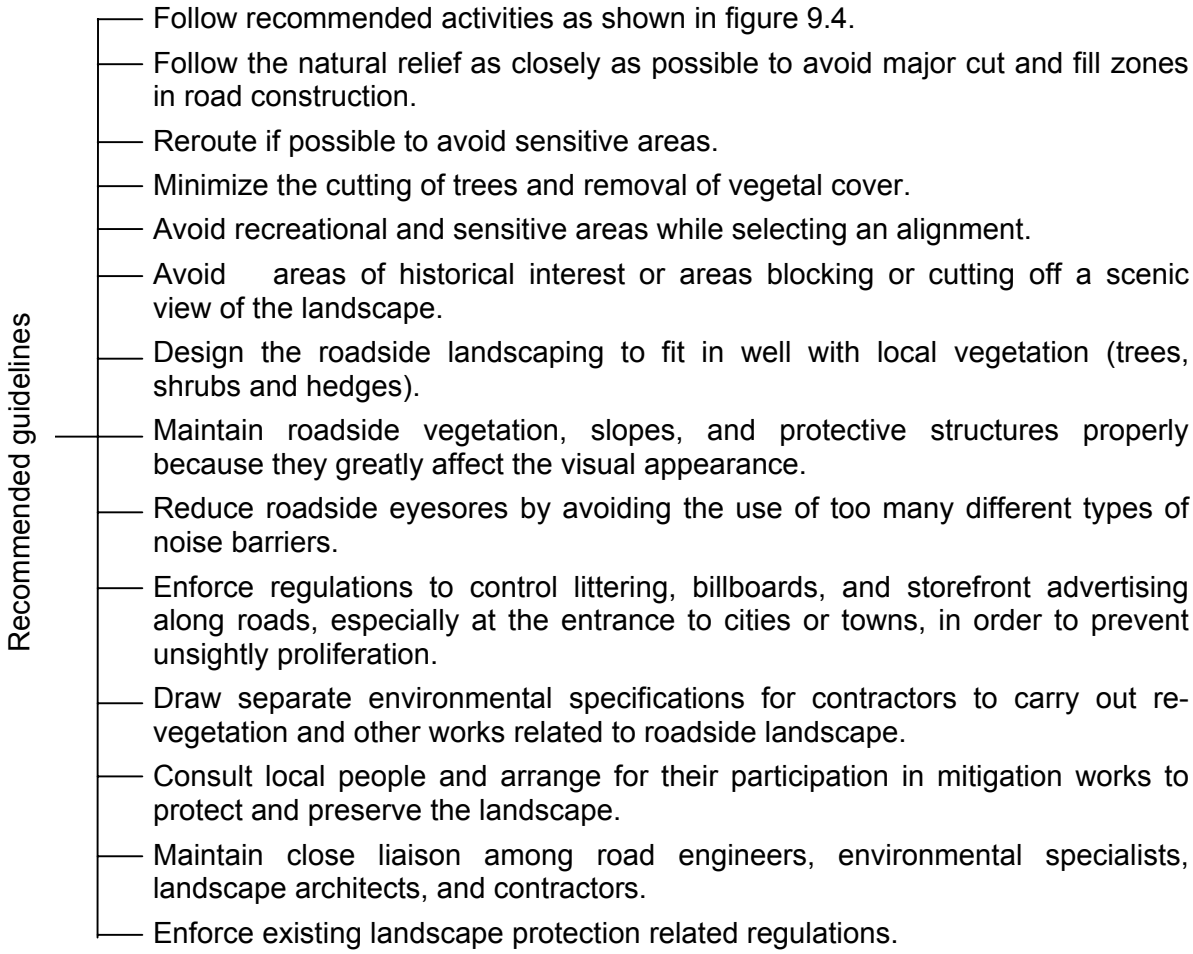


Figure 9.9 Recommended guidelines for mitigating adverse impacts to landscape caused by road development projects

9.5.6 Community activities-related ESIA guidelines

The construction of a new road, or the widening and improvement of an existing road, can cause split communities, disintegration of social activities, disruption of traditional modes of transport, loss of roadside community business and degradation of the roadside environment (figure 9.1).

Recommended guidelines for avoiding/minimizing/mitigating adverse impacts of road development projects community activities are given in figure 9.10.

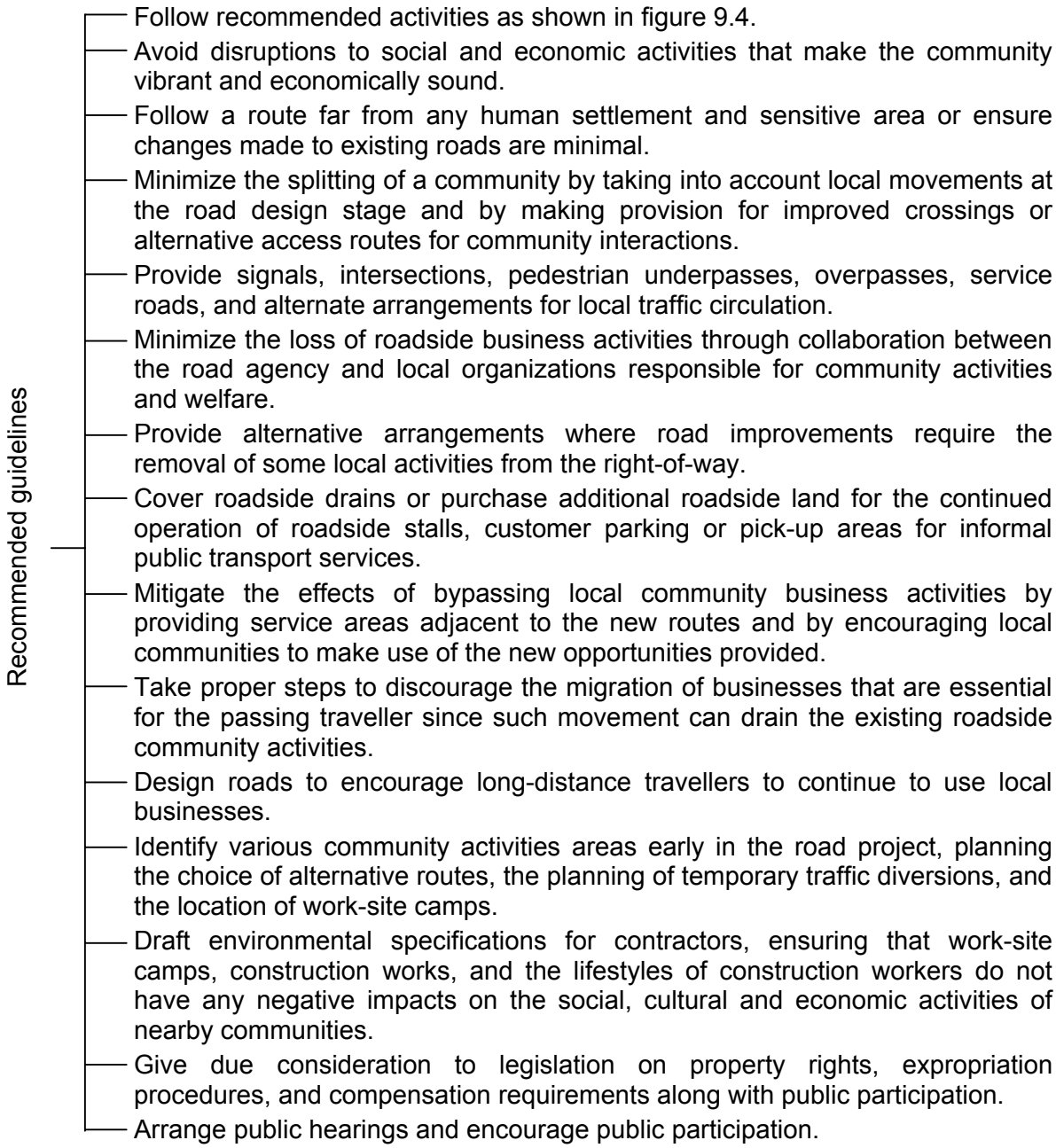


Figure 9.10 Recommended guidelines for avoiding/minimizing/mitigating adverse impacts on community activities caused by road development projects

9.5.7 Displacement and resettlement-related ESIA guidelines

Road development often requires the procurement of privately owned land. This procurement or acquisition of private land causes the displacement of families and households, resulting in economic loss and social psychological disruption for the affected individuals and their families (figure 9.1). Naturally, the greater the number of people involved, the greater the disruption and loss. The actual valuation of these losses often proves to be a difficult task. The social and psychological impacts of displacement and associated costs are more complex and more devastating than anticipated. Social interactions among neighbourhoods can be disrupted and, in worst instances, can be destroyed completely by road projects. Typically, road projects cut across communities and thereby displace them; run through many government jurisdictions displacing many properties such as post offices, police stations and utilities; and tend to displace a disproportionately large number of squatters who occupied government-owned land.

Monetary compensation poses a number of concerns in resettlement programmes. Most notable are the following: valuation of assets, property markets, timing of payments and manner in which compensation is paid.

Recommended guidelines for mitigating the adverse impacts of displacement and resettlement caused by road development projects are given in figure 9.11.

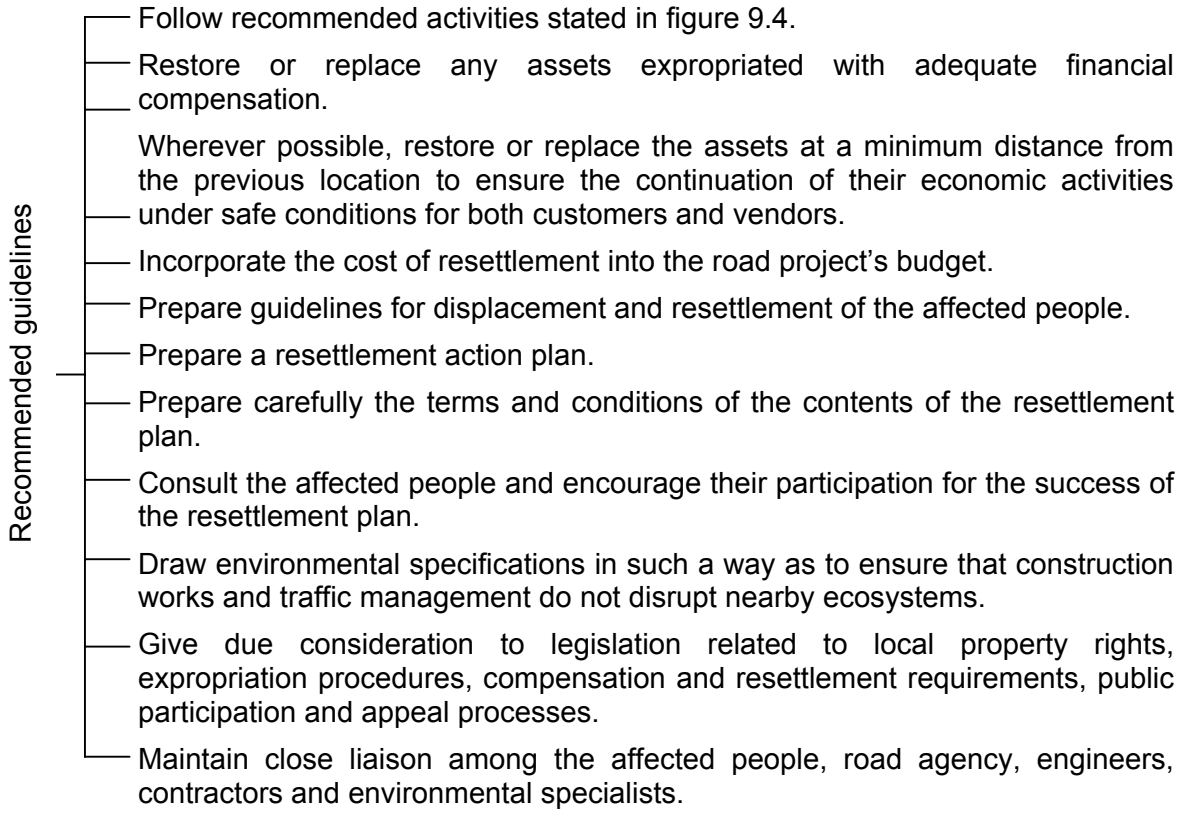


Figure 9.11 Recommended guidelines for mitigating adverse impacts of displacement and resettlement caused by road development projects

9.5.8 Cultural heritage-related ESIA guidelines

A road development project may have the following impacts on cultural heritage: damage of sites, structures and remains of archaeological, historical, religious and cultural value; damage to social value (spiritual, political, national or other cultural significance to a majority or minority group); degradation of the aesthetic value of cultural and religious institutions (mosques, temples and churches) and historical monuments (figure 9.1).

Recommended guidelines for mitigating the adverse impacts caused by road development projects on cultural heritage are given in figure 9.12.

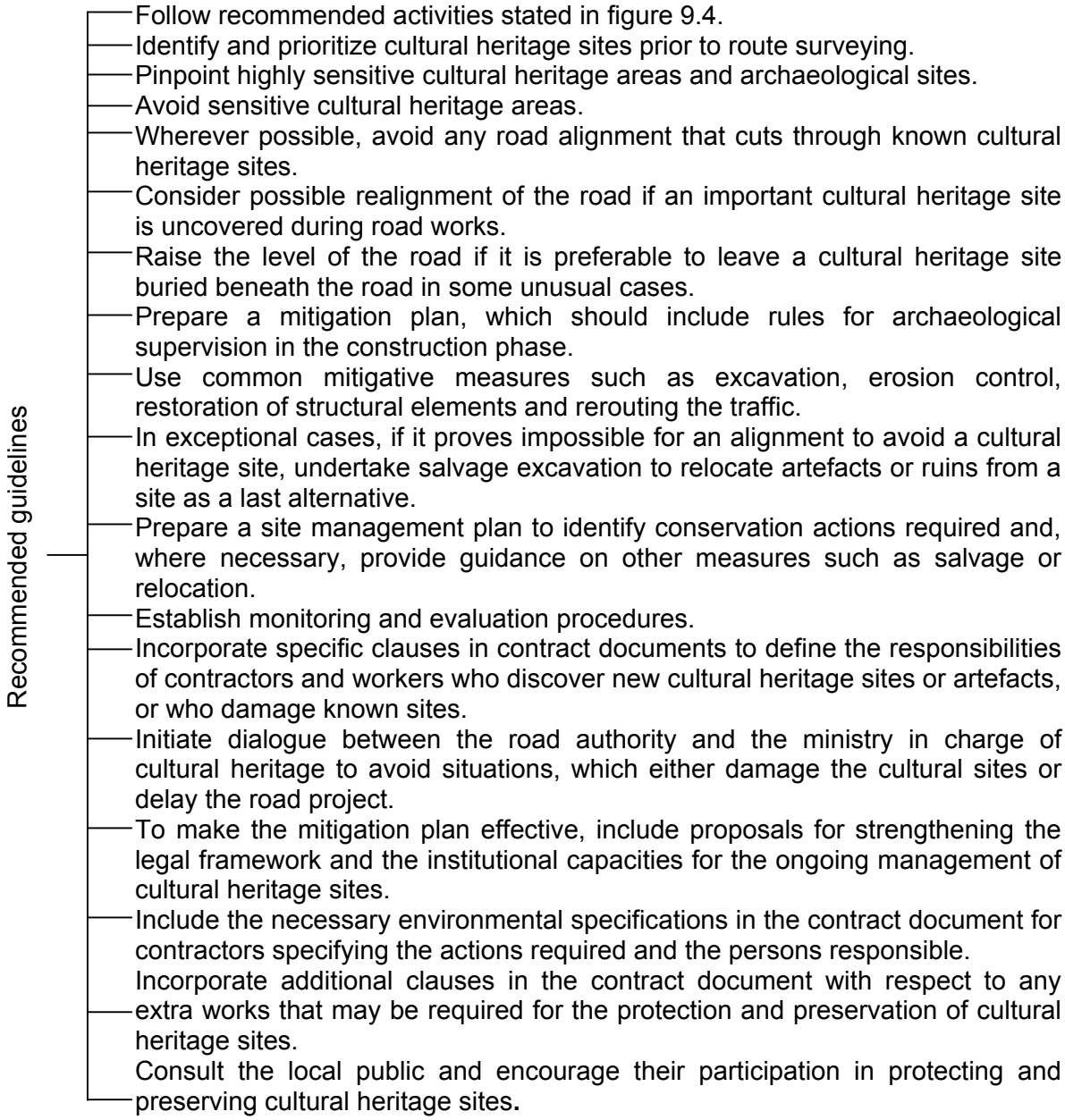


Figure 9.12 Recommended guidelines for mitigating adverse impacts caused by road development projects on cultural heritage

9.5.9 Noise disturbance-related ESIA guidelines

Road development has the potential to degrade the quality of life if noise disturbance is not properly dealt with. In road development activities and transport operations, noise is generated from (a) construction machinery, (b) vehicles, (c) friction between vehicles and the road surface, and (d) driver behaviour. Noise associated with road development and transport operation activities degrades human welfare, sonically vibrates structures, and disturbs wildlife (figure 9.1).

Assessment of the impact of potential road noise relies on an accurate evaluation of the baseline conditions, a thorough knowledge of the characteristics of the proposed road development and a good understanding of the composition of roadside dwellers (human beings and wildlife) and institutions and facilities (schools, hospitals, workplaces and recreational centres).

Recommended guidelines for reducing/eliminating adverse impacts of noise caused by road development projects and traffic operation are given in figure 9.13.

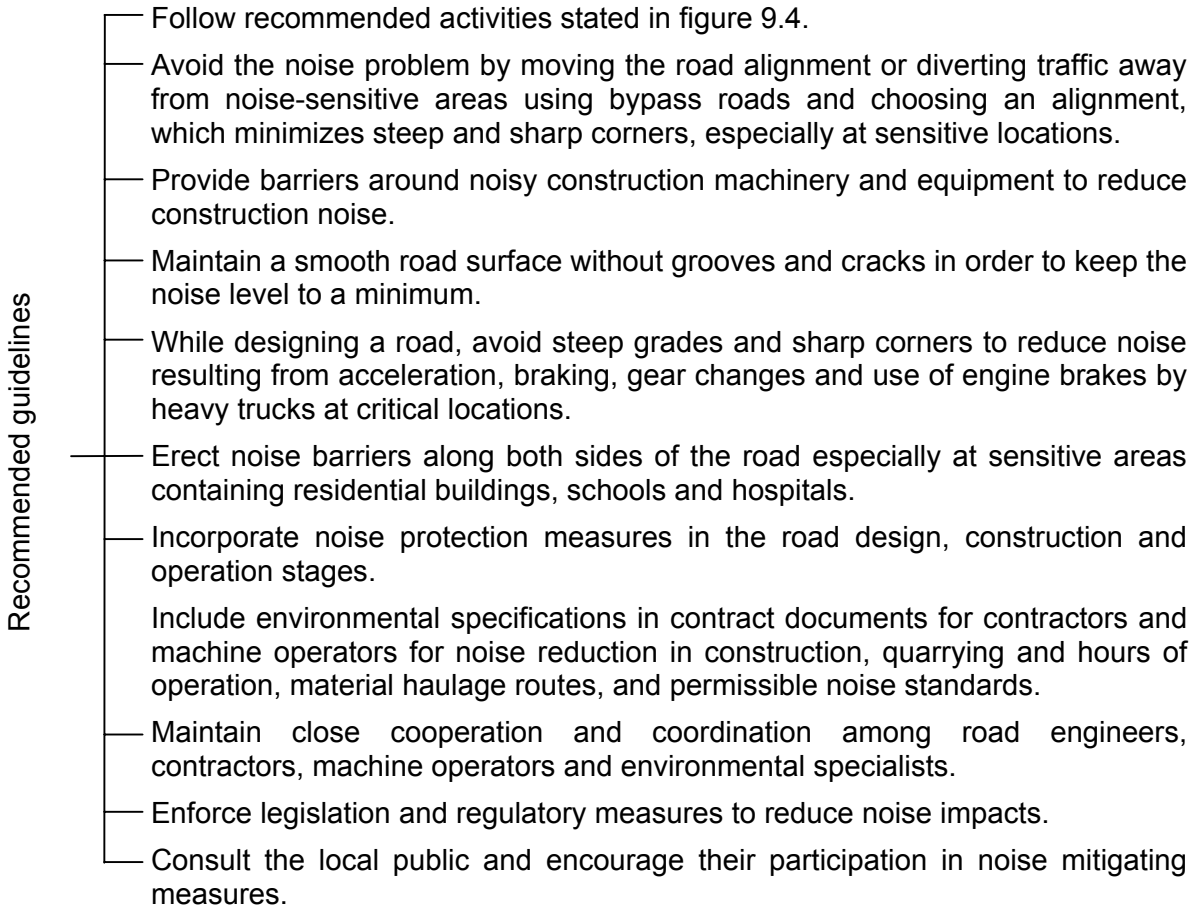


Figure 9.13 Recommended guidelines for reducing/eliminating adverse impacts of noise caused by road development projects and traffic operation

9.5.10 Human health and safety-related ESIA guidelines

Road development is often instrumental in the transmission of diseases; the contamination of local water supplies; air pollution, noise disturbance, road accidents caused by poor pavement and shoulder conditions; the creation of obstructions/unsafe conditions owing to the presence of roadside poles, ditches, trees, steep slopes and barriers; accidents caused by poor road signs, markings, intersection layouts and traffic control system; poor roadside access and improper parking; and unsafe conditions owing to poor or inadequate provisions for pedestrians, cyclists and other non-motorized road users (figure 9.1). Safety is an issue that must be addressed since road construction and operation-related accidents result in deaths, injuries, and damage to property which are major public health problems and a significant factor to the national economy.

Within the spectrum of road safety, unguarded construction machines, ill-planned construction activities, and the carelessness of the machine-operators may lead to fatal accidents. Landslides and collapse of unstable cuts above or below a road can prove fatal to road users who happen to be in the wrong place at the wrong time. In addition, there are many features of a road itself and its surroundings, which influence the risk of a road accident or the severity of accidents when they do occur. Examples of these features include poor pavement and shoulder conditions; presence of roadside poles, trees, ditches, steep slopes, and barriers; poor road signs, markings, intersection layouts and control; inadequate or poor roadside access, parking, and bus stop arrangements; and poor provisions for pedestrians, cyclists and other non-motorized road users.

In order to mitigate the various adverse impacts caused by road development projects and transport operations on human health and safety, practical guidelines are needed for the road sector ESIA process.

Recommended guidelines for the protection of human health and for ensuring safety from the negative impacts caused by road development projects and transport operations are outlined in figure 9.14.

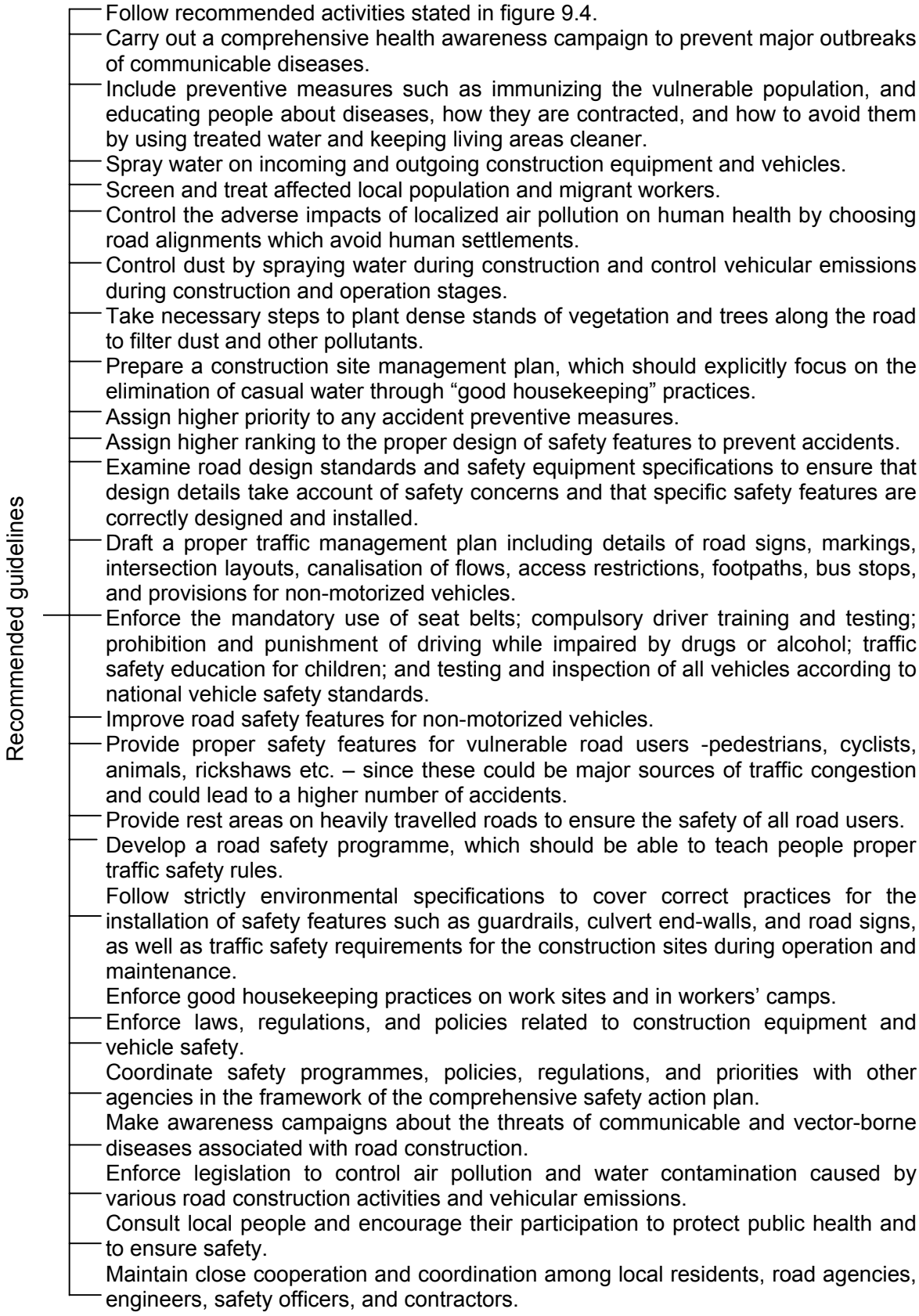


Figure 9.14 Recommended guidelines for the protection of human health and for ensuring safety from negative impacts caused by road development projects and transport operations

10. STAGE FOUR: MONITORING OF ENVIRONMENTAL AND SOCIAL MEASURES (MESM) DURING ROAD CONSTRUCTION

10.1 Objective

The main objective is to confirm the implementation of mitigation measures recommended in the ESIA study.

10.2 Main tasks

Main tasks that are required to be performed are given in figure 10.1.

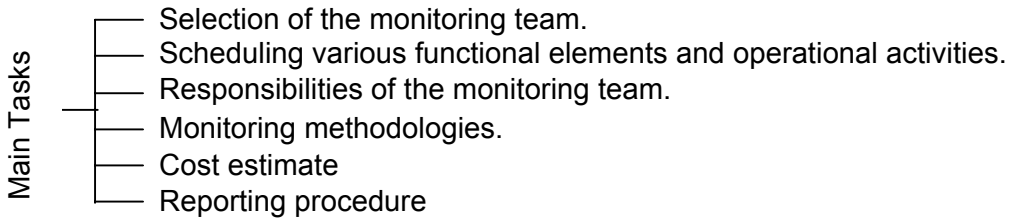


Figure 10.1 Main tasks of monitoring environmental and social measures during road construction

10.3 Recommended guidelines

Recommended guidelines for monitoring environmental and social measures during road construction are given in figure 10.2.

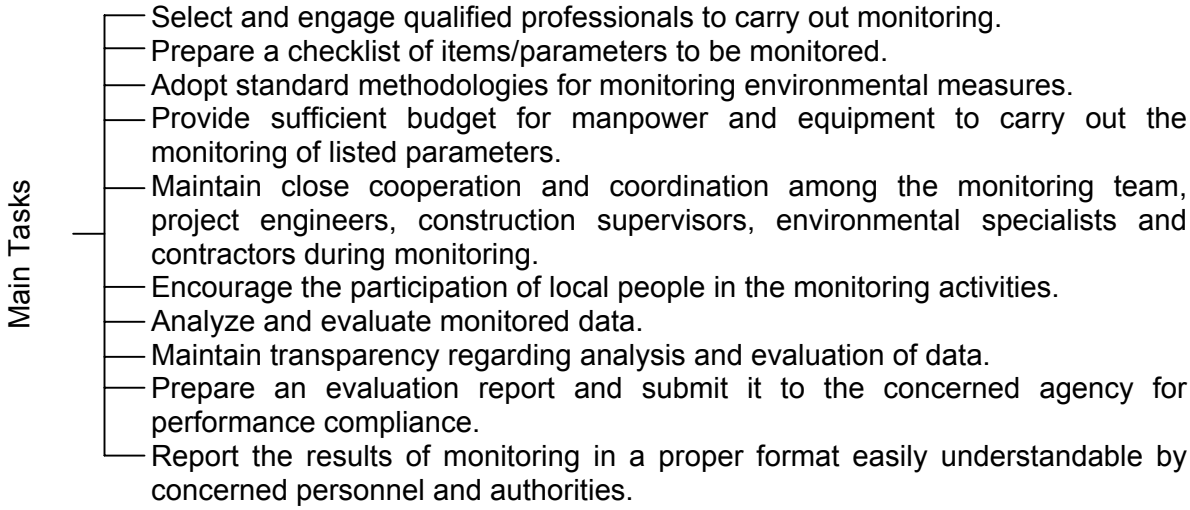


Figure 10.2 Recommended guidelines for monitoring environmental and social measures during road construction

In addition, recommended guidelines for the contractor to implement properly the mitigation measures stated in the ESIA study are given in figures 10.3 to 10.5.

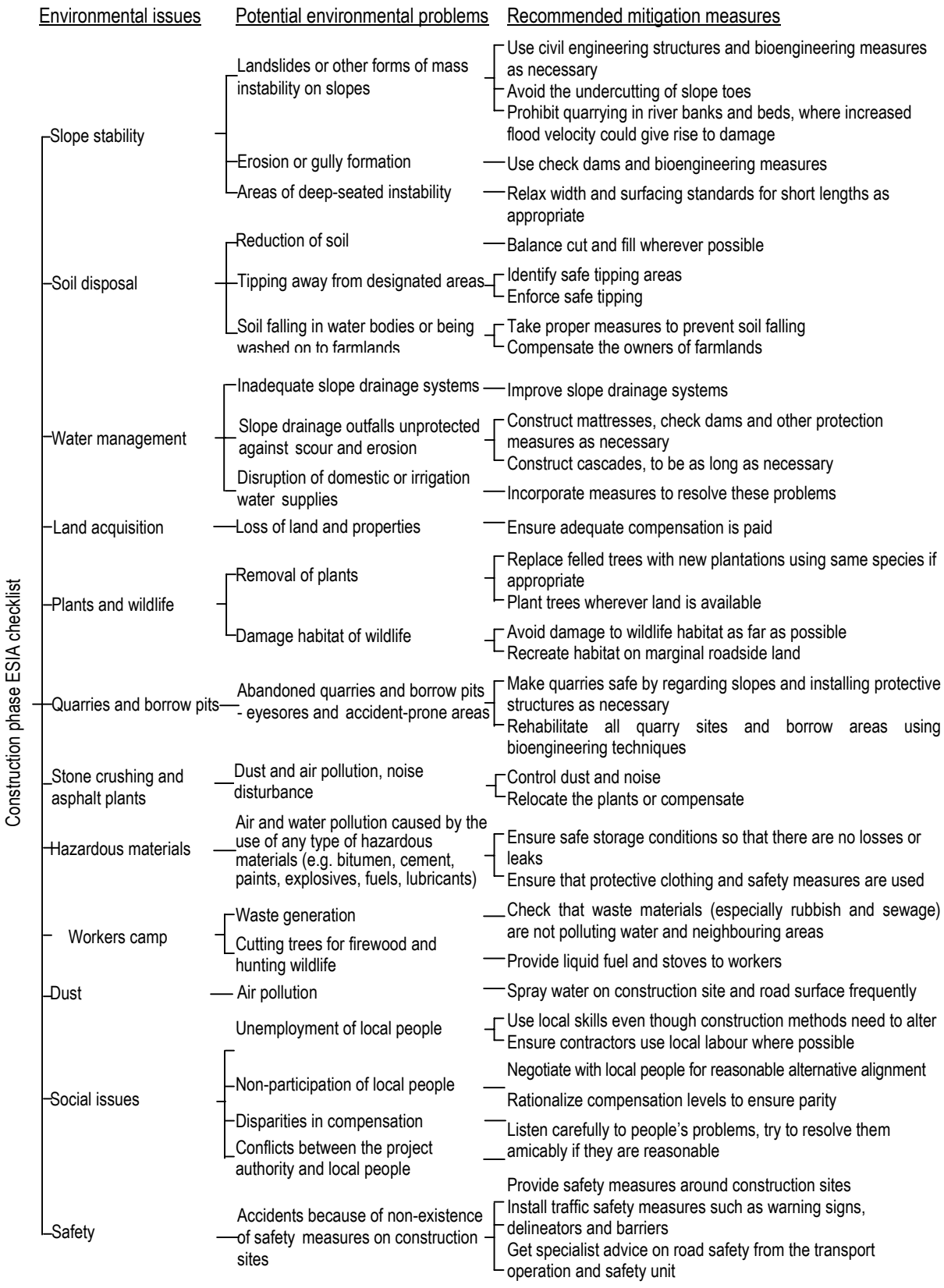


Figure 10.3 Guidelines for preparing a road construction checklist for mitigating potential environmental impacts

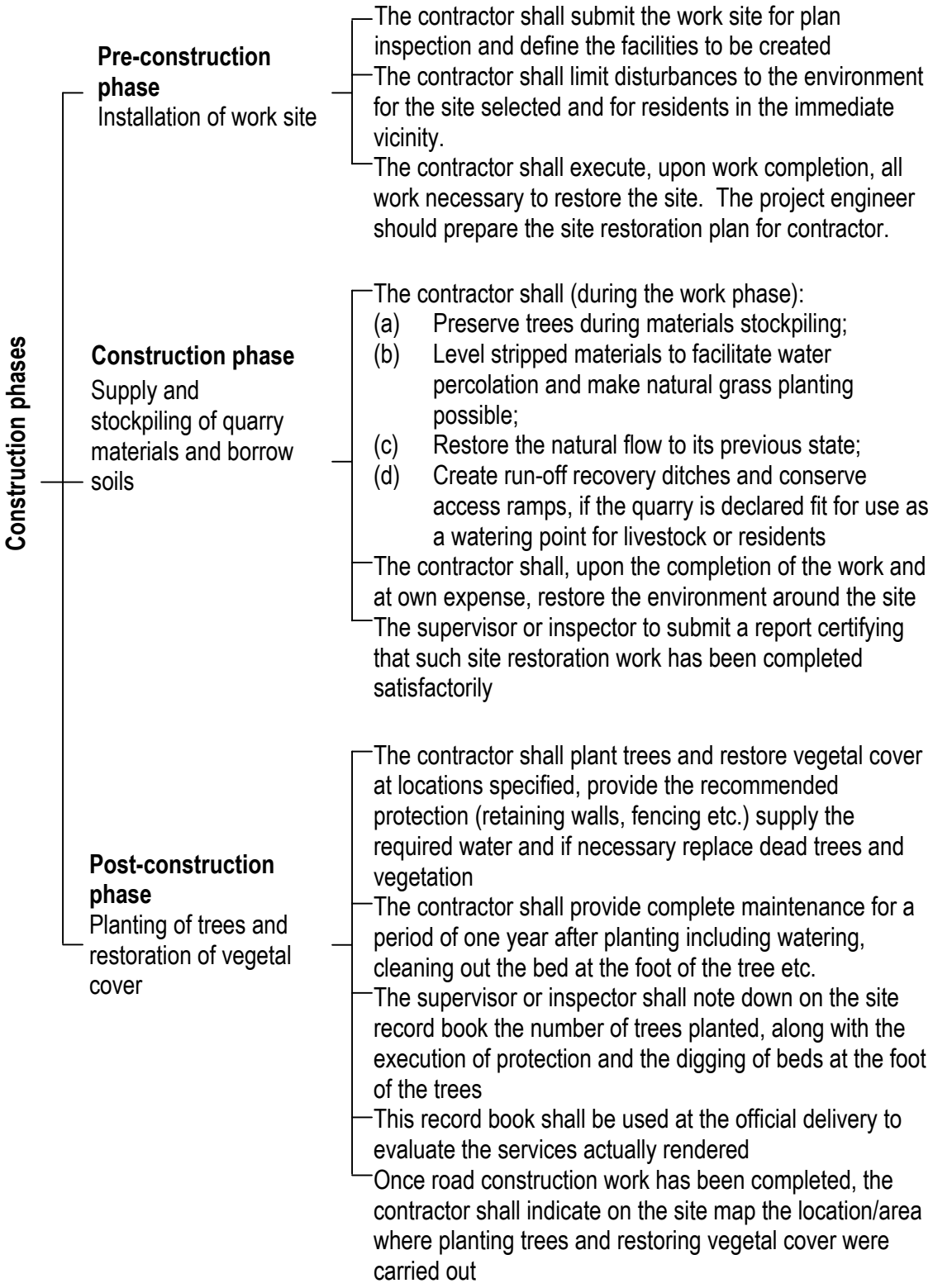


Figure 10.4 Recommended guidelines that need to be incorporated in the tender for contractors document during construction and post-construction phases

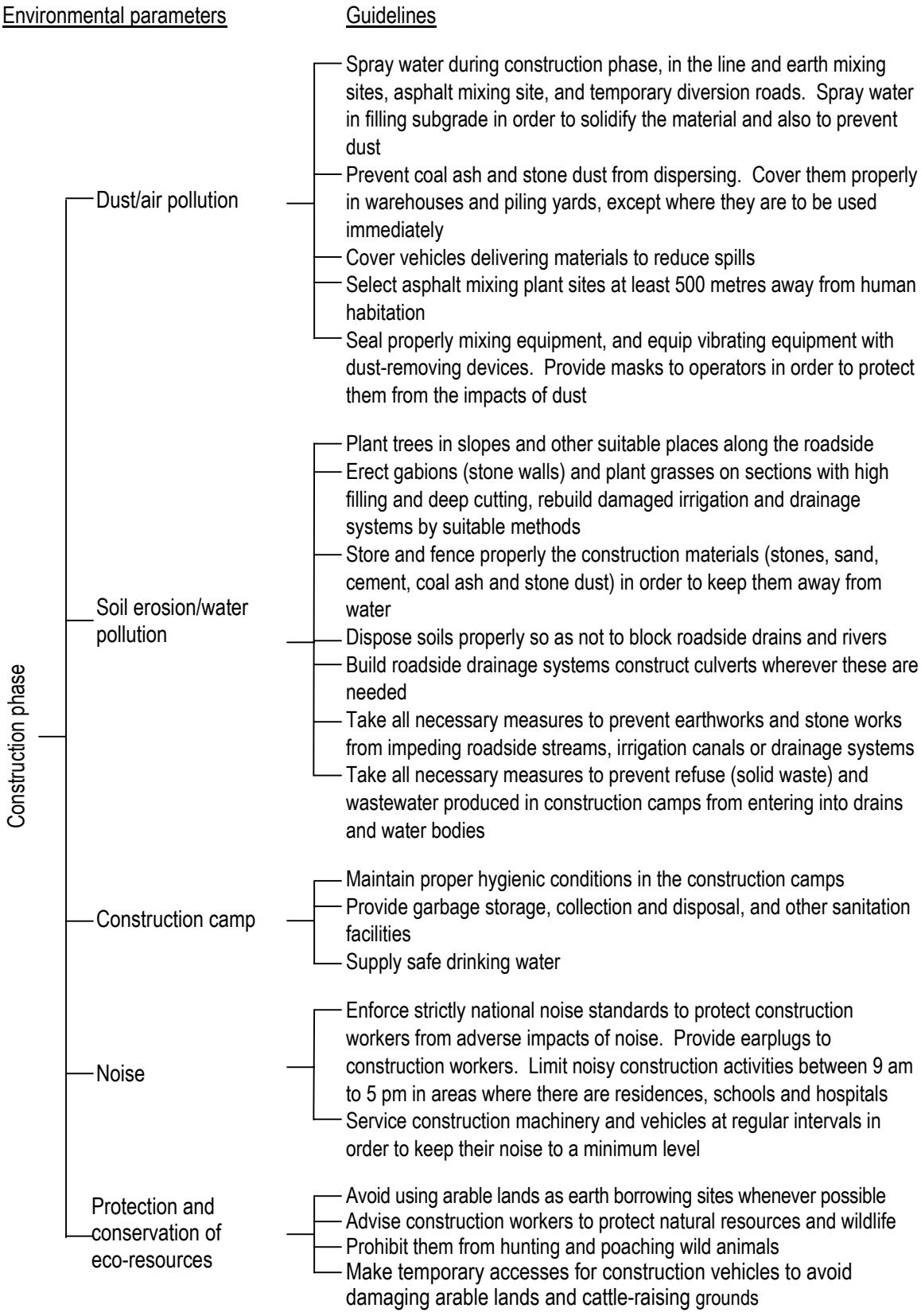


Figure 10.5 Recommended guidelines to mitigate adverse environmental impacts during road construction (Part 1)

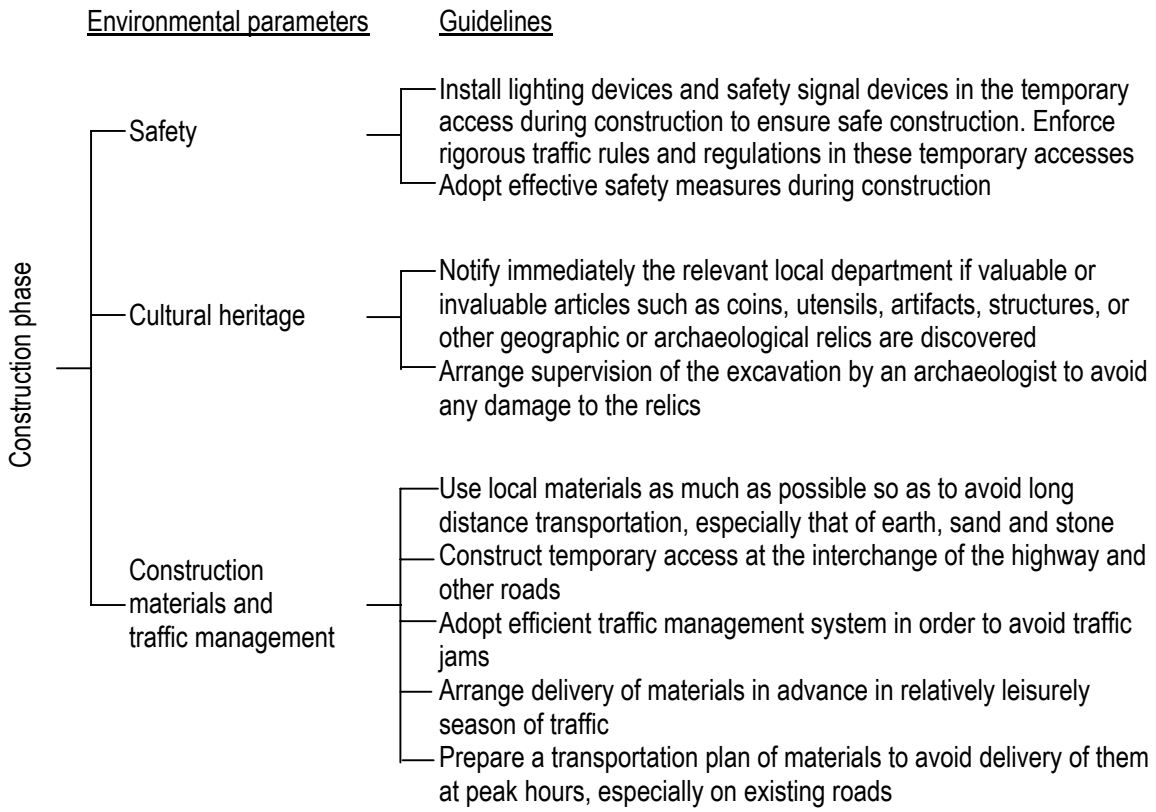


Figure 10.5 Recommended guidelines to mitigate adverse environmental impacts during road construction (Part 2)

11. STAGE FIVE: POST-CONSTRUCTION ENVIRONMENTAL AND SOCIAL EVALUATION (PESE)

11.1 Objectives

The main objectives are (a) to determine whether the proposed mitigative measures served their intended functions, and (b) to provide feedback to the project developer regarding the effectiveness of the ESIA recommended measures for mitigating adverse environmental and social impacts.

11.2 Main tasks

The main tasks to be performed during post-construction environmental and social evaluation are given in figure 10.1.

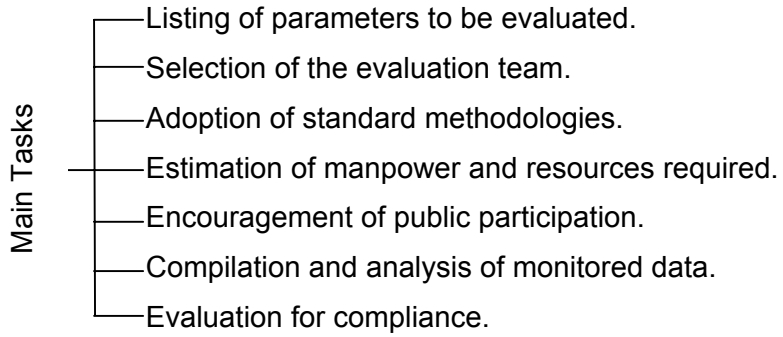


Figure 11.1 Main tasks of post-construction environmental and social evaluation

11.3 Benefits

The broader benefit of post-construction evaluation is that, in the long run, it will convert the ESIA into a more accurate and useful tool to achieve sound, rational and sustainable road development.

11.4 Methodologies and best-practice guidelines

There are currently no standard methodologies or best-practice guidelines available for carrying out post-construction evaluation. There are a number of obstacles to post-construction evaluation created by the general perception of, and attitude towards, ESIA by road developers, competent authorities and other players in the ESIA process. On the developer's side, the cost of in-construction monitoring and post-construction evaluation is frequently prohibitive. There is, therefore, a general lack of interest in the benefits that can be accrued following the decision from a properly implemented and audited ESIA for road development. The perception that post-construction evaluation merely highlights the inadequacies of ESIA and the frequently adversarial nature of the process make it difficult to enhance its profile. Furthermore, issues of confidentiality and access to data also cause difficulties.

On the competent authority's side, the current focus of most road-development-related ESIA processes on, and preoccupation with, the pre-decision stages and determination of the application invariably diverts attention away from the post-construction monitoring follow-up and evaluation, and also from long-term environmental management objectives. Many competent road authorities often see the post-construction evaluation as a threat to, and criticism of, the decision-making process. Furthermore, resources are often limited in many road development organizations, which again severely hamper post-construction follow-up activities.

11.5 Recommended guidelines

Recommended guidelines for successful post-construction environmental and social evaluation are given in figure 11.2.

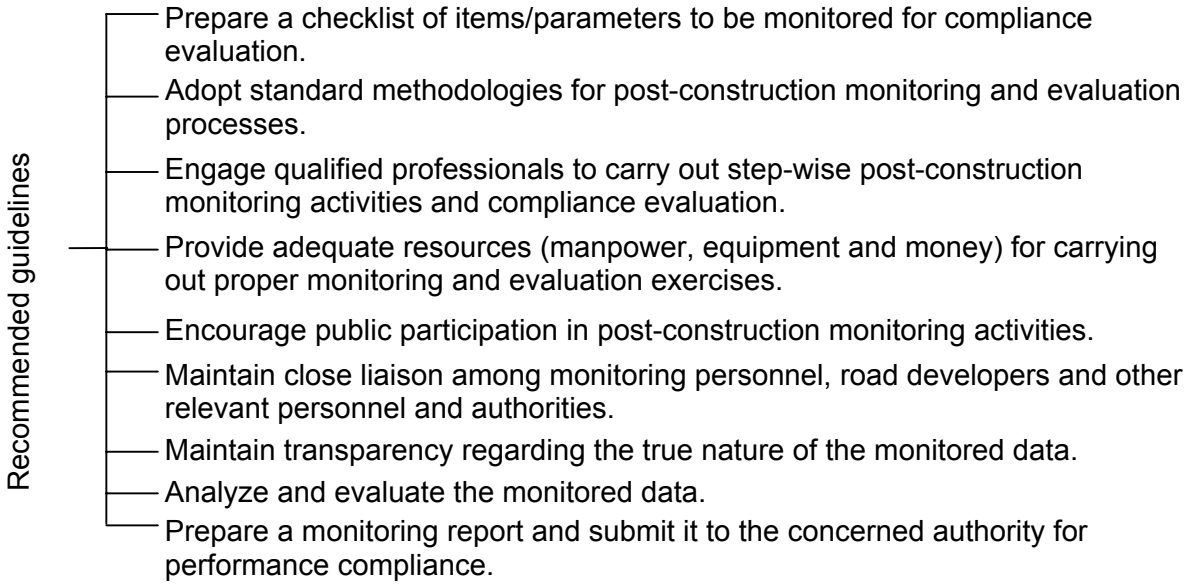


Figure 11.2 Recommended guidelines for post-construction environmental and social evaluation

12. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary, conclusions and recommendations of the report. It summarizes the rationale of the study and the approach adopted in the analysis. The conclusions describe the findings of the study. Recommendations are made for implementation procedure of the new concept of the multistage ESIA process.

12.1 Current state of environment and status of EIA implementation in the ESCAP region

This study reviews the available reports and surveys, including three recently conducted studies by ESCAP, and analyses the road-development-related impacts on the environment that have taken place in the ESCAP region. The following observations have been made:

- While there exist various forms of adverse impacts on the natural environment in the region, the negative effects of road development on the social environment are also highly significant. Undesirable social consequences in terms of health, safety, economic well being, security, community cohesiveness, social values, and cultural heritage have been observed. In the ESCAP region, the proportion of such adverse social consequences is no less than that of the impacts on the natural environment.

- Despite the laws and regulations enacted in various ESCAP member countries, the state of EIA implementation in road projects was unsatisfactory in the region as a whole. The roles of agencies responsible were not well defined, resulting in a severe lack of coordination and monitoring. EIA implementation tended to be cursory and ad hoc with no continuity and follow-up. Compared with developed countries, there was relatively little commitment from the governments and public agencies of the region.

- Of those road projects in the ESCAP region that some degree of EIA implementation was made, the emphasis has been concentrated on engineering details during the design and construction phases. EIA requirements were not considered in every stage of the road development cycle. The EIA process was often initiated only after the master plan had been finalized, and ended together with the construction phase of the road project. Late initiation of the EIA process has greatly limited its effectiveness and benefits, while not carrying out post-construction monitoring and evaluation was equivalent to ignoring the long-term environmental and social impacts which have proven to have significant consequences in the region.

- The degree of environmental awareness was low among the highway professionals, officials of highway authorities and related government agencies. EIA requirements were not considered to be of primary importance in road project planning, design and construction. Most government officials, consultants and contractors took EIA procedures and requirements as merely a formality to be executed for project approval and work endorsement.

- The quality of EIA reports for road projects in the ESCAP region was unsatisfactory. This could be attributed to the lack of qualified professionals and the general absence of relevant environmental and social data. There were simply not enough trained and qualified professionals and technical personnel to support the

implementation of EIA for road projects. Historical and planning data were incomplete, and records of completed projects were often not available.

- None of the countries in the ESCAP region has a comprehensive set of guidelines for highway and environmental agencies to effectively perform the EIA process. Most highway or environmental authorities have adopted directly rules and guidelines used in developed countries. This has resulted in difficulties in implementation because of differences in technology and practices, unique local conditions, as well as political and social environments.

- Public participation in the EIA process of road projects has been very low in the ESCAP region. Very few, if any, road projects in the region were known to have seriously incorporated public opinions and input into the planning and design of road projects. The direct reasons for the insignificant public involvement were (a) the lack of interest on the part of the authorities and the officials in charge, (b) the shortage of funds allocated, and (c) the mechanisms and formats of public participation were inappropriate and ineffective.

In general, the overall situation of EIA implementation in the ESCAP region is unsatisfactory. Most ESCAP member countries do not possess the required institutional framework and expertise to implement EIA fully and effectively. The relatively low level of environmental awareness and the lack of commitment of decision makers, planners and government officials provide further obstacles to the implementation of EIA for road development projects.

12.2 Orientation of the analysis

The main focus of the study is to address the EIA implementation issues encountered in the ESCAP member countries, analyze them and propose ways and means by which the problems could be overcome to achieve an effective EIA implementation in the ESCAP region. Having examined the major EIA implementation weaknesses and problems observed in various member countries of ESCAP, as has been summarized in section 12.1, it is apparent that many of the problems encountered in EIA implementation in the ESCAP region are rather different from those in industrialized nations. Procedures that work in industrialized nations have been shown to be ineffective in many ESCAP member countries. New concepts and procedures need to be introduced in order to address the weaknesses and problems identified.

The study proceeds to single out the critical areas in need of improvement, and proposes measures by which improvement in EIA implementation could be achieved. The following five main areas for improvement have been identified:

(1) There is a need for equal emphasis on the social and environmental impacts of road development projects. To correct the current tendency within the region to focus only on the engineering aspects of environmental impacts, it is proposed that the term EIA (environmental impact assessment) be replaced by ESIA (environmental and social impact assessment), so that the deserved emphasis on social impacts will not be ignored in the impact assessment of road development projects.

(2) There is a need for a multistage ESIA framework to ensure that appropriate environmental and social impact assessment is made at every phase of the entire road development cycle. It is important that ESIA is initiated early to be part of the

road project conception and planning stage. It is equally important that the ESIA process is continued beyond the end of road construction into the post-construction monitoring and evaluation phase.

(3) There is a need for practical guidelines tailored for local applications to be developed. The availability of appropriate guidelines helps to enhance the effectiveness of ESIA implementation locally. Well laid out guidelines ensure that proper procedures are followed and adequately applied to achieve the required results of acceptable quality.

(4) There is a need for an improved institutional framework and procedures. This is essential in tackling the various institutional problems highlighted in section 3. The legal framework must be properly set out to define the responsibility and accountability of various agencies and parties involved in the ESIA process. This will also pave the way for effective working procedures and coordination among different agencies.

(5) The level of public participation in the ESIA process in the ESCAP region is rather low and there is a need for a much higher level of public participation in order to achieve a sustainable road development programme. It is necessary to effectively address this issue from both the authority's and the public's perspective.

The analysis of the study is divided into two parts: Part one presents the concept of the multistage ESIA framework and Part two presents guidelines for the implementation of the multistage ESIA process. In Part one, the need to give equal emphasis to the natural and human environments is emphasized. The introduction of the ESIA concept ensures that this is achieved in a systematic fashion. The logical flow of the proposed ESIA process is presented in the context of the multistage framework. The following five stages of the ESIA process are defined:

- **Environmental and social screening**
- **Initial environmental and social examination**
- **Environmental and social impact analysis**
- **Monitoring of environmental and social measures**
- **Post-construction environmental and social evaluation**

Within the structure of the multistage ESIA framework, measures to overcome the various weaknesses and problems identified for the ESCAP region (see section 12.1) are proposed and elaborated. Special attention is devoted to the following aspects:

- Development of effective institutional infrastructure and legal framework
- Increase in the level of public participation
- Development and management of databases for ESIA
- Procedures in implementation and monitoring of ESIA

Part two of the report develops detailed guidelines, which provide additional details of the multistage ESIA concept. Guidelines are presented in line with the five-stage framework, providing guidance on the implementation of the ESIA process. For each stage of the ESIA process, the guidelines have been developed emphasizing the following aspects:

- Main tasks and activities to be undertaken
- Executing and approving authorities involved
- Roles and responsibilities of authorities, agencies and other parties involved

- Accountability and enforcement procedures
- Reporting and coordination arrangements
- Procedures for public involvement
- Data requirements
- Expected output

12.3 Conclusions and recommendations

This study has introduced two new concepts for the purpose of enhancing the effectiveness of EIA implementation in ESCAP member countries. The first is the adoption of the new term ESIA (environmental and social impact assessment) to replace the traditional term, EIA. It conveys the message that equal emphasis should be placed on the natural as well as the human environments in the ESIA process. The aim is to eliminate the misconception of many professionals and government officials in the region that the main concern of EIA is to mitigate the negative impacts of road projects on the natural environment. This report has provided sufficient evidence that ignoring the impacts on the human environment would lead to grave consequences that affect a large population base over an extended period.

The second concept introduced is the multistage framework for implementing the ESIA process. The analysis presented in this report has shown that a multistage ESIA framework would offer a workable mechanism to intimately incorporate the process of ESIA analysis into the road development cycle. By dividing the ESIA process into five stages, it is possible to logically link up the five ESIA stages with the different phases of the road development cycle. The scope of and activities in each of the five stages are clearly defined, and guidelines have also been established to offer guidance on how the activities in each stage should be conducted.

The multistage ESIA process offers a systematic approach to overcome most of the major problems currently encountered in many of the ESCAP member countries. It provides practical mechanisms to strengthen the legal framework, institutional coordination and professional accountability. Adhering to the multistage ESIA framework will ensure that the ESIA process will begin during the very early stage of the road-planning phase, thereby minimizing the chances of major planning “errors” in respect of the preservation of the natural and human environments. By following through the multistage ESIA process, one is also assured of continuity of ESIA implementation right to the post-construction evaluation and monitoring stage of road development.

An important feature of the multistage ESIA process is the emphasis on public participation in each stage of the process, right from the first stage at the beginning of the road development cycle. The lack of public participation is one of the most serious weaknesses of road development and EIA implementation in the ESCAP region. Application of the proposed multistage ESIA procedure will be an effective means to promote increased involvement of the general public, affected residents and businesses, consultants and professionals in the ESIA process in the ESCAP region.

Raising the general level of environmental and social awareness in the ESCAP region at large is another major issue of urgency. Implementation of the proposed multistage ESIA procedures in itself will be an enriching experience for the people involved in the process. It will go a long way in heightening the level of awareness of the need for ESIA. All the people involved, ranging from high level decision makers, government officials, professionals, to the general public will appreciate and benefit from exposure to the ESIA process.

As the concepts outlined in this report are new, some form of familiarization programme is required before even a trial implementation. A two-step familiarization programme is recommended. The first step of the programme should logically be one involving the decision makers and planners of the various ESCAP member countries. It would serve as a familiarization-cum-dialogue session to gather comments and feedback, and to seek endorsement on the proposed concepts. The second step involves country-level workshops targeting professionals and officers of prospective ESIA executing and authorizing agencies. Country-level workshops are necessary because the institutional structure, engineering practices, cultural and social values, as well as major ESIA issues vary from country to country. The emphasis of the ESIA process, including mitigation schemes and detailed implementation procedures, is likely to be different from one country to another. A country specific workshop tailored to the needs of the country concerned will serve well to develop a multistage ESIA framework to achieve the best results.

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