

Private Sector Hydropower Development Project

**Manual for Preparing Scoping Document for
Environmental Impact Assessment (EIA) of
Hydropower Projects**



**Department of Electricity Development, HMG Nepal, in Collaboration with
United States Agency for International Development and International
Resources Group**



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with United States Agency for International Development and
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Manuals in this series:

Manual for Preparing Scoping Document for Environmental Impact Assessment (EIA) of Hydropower Projects.

Manual for Preparing Terms of Reference (TOR) for Environmental Impact Assessment (EIA) of Hydropower Projects, with Notes on EIA Report Preparation.

Manual for Preparing Environmental Management Plan (EMP) for Hydropower Projects.

Manual for Reviewing Scoping Document, Terms of Reference (TOR) and Environmental Impact Assessment (EIA) Reports for Hydropower Projects.

Manual for Preparing Initial Environmental Examination (IEE) Report for Hydropower Projects.

Manual for Public Involvement in the Environmental Impact Assessment (EIA) Process of Hydropower Projects.

Manual for Developing and Reviewing Water Quality Monitoring Plans and Results for Hydropower Projects.

Manual for Prediction, Rating, Ranking and Determination of Significant Impacts in Environmental Impact Assessment (EIA) of Hydropower Projects.

FOREWORD

Environmental Impact Assessment (EIA) is one of the proven tools of facilitation to achieve the goal of environmentally and socially sound and sustainable development. The incorporation of EIA in hydropower projects in Nepal was initiated in the early eighties. However, with the enforcement of the Environment Protection Act (EPA) and the Environment Protection Rules (EPR) in 1997, the integration of EIA in hydropower projects has now become compulsory. Large-scale hydropower projects were gaining attention for the integration of EIA prior to the enforcement of EPR. But, they were all initiatives from the donor agencies. At present, we have our own national system of EIA. A large number of proposed and on-going hydropower projects have already completed an EIA study. Some of them have been approved by the government agencies and are in the process of implementation. However, in the course of gaining experience about the processes and procedures of EIA implementation, we have become aware that the process needs to be improved.

In March 2000, the Department of Electricity Development (DOED), the National Environmental Impact Assessment Association of Nepal, International Resources Group (IRG), and the US Agency for International Development organized a one-day interagency workshop. The objective of this event was to carry out a SWOT analysis of the EIA process for hydropower projects in Nepal. A major conclusion of the participants was that the EIA process could be improved and streamlined by producing a series of manuals that would clarify the requirements at each stage in the process. Thus, the DOED, in collaboration with IRG, has developed sectoral manuals for improving the EIA process for hydropower projects. The draft manuals produced under this program are then being refined through a series of interagency workshops.

A workshop to finalize the *Manual for Preparing Scoping Document for Environmental Impact Assessment (EIA) Study of Hydropower Projects* and the *Manual for Preparing Terms of Reference (TOR) for Environmental Impact Assessment (EIA) Study of Hydropower Projects, with Notes on EIA Report Preparation* was conducted at Godavari from 25 to 26 May 2000. A total of 29 participants consisted of senior representatives from the DOED, The Ministry of Water Resources (MOWR), the Water and Energy Commission Secretariat, the Department of Soil Conservation and Watershed Management, the Department of Forests, the Department of Water Induced Disaster Prevention, Nepal Electricity Authority, the National Environmental Impact Assessment Association of Nepal (NEIAAN), Butwal Power Company, Himal Power Limited, Lamjung Electricity Development Company, IRG, METCON Consultants, and the US Agency for International Development. This publication is the result of the dedicated effort of the participants.

I sincerely hope that these manuals will be useful to streamline the present practice of EIA relevant to hydropower projects in Nepal. I am confident that these manuals will considerably improve the current practices of EIA in Nepal, making the system more beneficial, meaningful, and efficient for achieving environmentally and socially sound and sustainable hydropower development in Nepal.

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Director-General

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ABBREVIATIONS

CBO	Community based Organization
DDC	District Development Committee
DOED	Department of Electricity Development
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Act
EPR	Environmental Protection Regulation
FGD	Focus Group Discussion
HMG	His Majesty's Government
IEE	Initial Environmental Assessment
IRG	International Resources Group Ltd.
MOPE	Ministry of Population and Environment
MOWR	Ministry of Water Resources
NGO	Non-governmental Organization
PIC	Project Information Center
PRA	Participatory Rapid Appraisal
TOR	Terms of Reference
VDC	Village Development Committee

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1. INTRODUCTION

The purpose of this manual is to facilitate the work of developers in the Scoping process, as part of *Environmental Impact Assessment* (EIA) of hydropower projects. Up to the present time, the Scoping documents produced in Nepal have varied greatly in both size and content. At one extreme, it appears that the requirement for Scoping is merely a legal hurdle to overcome while, at the other extreme, some developers attempt to use Scoping to produce mini-EIAs. A Scoping document and an EIA have fundamentally different functions. The purpose of an EIA is to identify and quantify impacts while proposing mitigation strategies, whereas the purpose of Scoping is to identify all of the issues that should be considered by the EIA.

The fact that a Scoping document is approved does not confer, nor imply, any exemptions from the existing environmental legislation of the Kingdom of Nepal. It is therefore of utmost importance that Scoping be as accurate as possible. Thus, the principle objective of this manual is to help the developer, whether public or private, to save time and money. It will also be helpful for the reviewers.

1.1 Environmental Problems in Nepal

Environmental problems in Nepal fall into two basic categories:

- i) Natural events such as earthquakes, storms, etc, that are not possible to prevent; and,
- ii) Environmental problems caused by human activities that can be prevented and avoided by integrating an environmental consideration at an early stage of development project planning.

Most of Nepal's environmental problems have been the consequence of excessive pressure on natural resources, the development of projects without environmental considerations, and unplanned growth of human settlements and industries. Too often, development and growth have been implemented through uncoordinated processes, in which environmental considerations were not properly addressed.

Nepal is continuously putting immense effort in implementing major economic development projects for poverty alleviation by providing a better economic future for its people to fulfill the basic needs of a growing population. However, the major development initiatives that took place in the past were not considered adequately from an environmental perspective. As a result, development projects implemented to overcome poverty, illiteracy and malnutrition in the country have sometimes created environmental problems such as flooding, erosion, landslides, deforestation, desertification, pollution and disease. In many cases such adverse effects have negated the very objectives of the development projects.

1.2 Environmental Policies and Legislation in Nepal

Consideration for the environment in Nepal's development policies is somewhat new. Only recently has Nepal adopted environmental and administrative instructions addressing the environmental effects and impacts of development. The Seventh Five-Year Plan (1987-1992) was the first to address environmental considerations in the planning process. However, lack of coordination between sector-specific programs, inadequately trained human resources, and lack of adequate budgetary provisions have resulted in an inability to fully implement Seventh Five-Year Plan.

Four major achievements were made during Eighth Five-Year Plan (1992-1997):

- i) endorsement and implementation of the National Conservation Strategy;
- ii) formulation of a national environmental policy;
- iii) establishment of the Ministry of Population and Environment, and
- iv) enactment of national environmental protection legislation.

In addition, the government's subsequent endorsement of national and sectoral EIA guidelines was another milestone achievement of the Eighth and the ongoing Ninth Five-Year Plan (1997-2002) periods.

The integration of EIA in development projects was made legally binding through enforcement of the *Environmental Protection Act, 2053* (EPA53) and the *Environmental Protection Regulation, 2054* (EPR54).

1.3 Environmental Impact Assessment in Nepal

Since the enforcement of EPR54 in Nepal (with the first amendment in 2055), all major projects are now being considered for the application of EIA. Each project under consideration is screened, and it is determined whether it should undergo an *Initial Environmental Examination* (IEE) or the full EIA process. The rules that guide the choice of IEE or EIA are provided in Schedule-1 and Schedule-2 of EPR54, as amended (Annexes 1 and 2).

The IEE is a relatively simple procedure that does not need to undergo a Scoping process. The format for an IEE is given in EPR54. If the project has to undergo an EIA there is a series of steps to be taken at different stages of the project cycle.

The EIA process after Screening includes Scoping, public participation and involvement, impact identification and prediction, analysis of alternatives, development of a mitigation plan and preparation of an Environmental Management Plan (EMP) that includes environmental monitoring and auditing. Annex 3 provides a logic diagram of the EIA process in Nepal.

There are three major decision steps during the entire period of EIA preparation and implementation. They are as follows:

- i. The Scoping study should be made during the feasibility period. Based on the output of the Scoping exercise a Terms of Reference (TOR) is prepared. The proponent should prepare the Scoping and TOR documents. According to EPR54 (amended 2055) both of these documents should be submitted to the Ministry of Population and Environment (MOPE) through the Department of Electricity Development (DOED) and Ministry of Water Resources (MOWR) for approval. This is the first decision step.
- ii. Based on the approved TOR, the developer should complete an EIA study and submit it to MOPE through DOED and MOWR. Approval of the EIA report invariably provides some conditions to comply with during project construction. This is the second decision step; its successful completion allows developer to go ahead with project construction.
- iii. Implementation of Environmental Management Plan (EMP) takes place during the project construction phase. Environmental monitoring is a part of the EMP and continues for the entire project cycle. Environmental auditing is carried out after the project has been in operation for some time, in order to examine whether everything has gone as predicted. This is a one-time activity and provides the final decision step. Based on this step, the decision is made if the project will continue or be discontinued.

1.4 Environmental Impact Assessment in Hydropower Development Sector

Nepal has tremendous potential for hydropower generation. To date, however, only a small fraction of this power potential has been utilized. Most of the hydropower projects currently being constructed or on line are of the run-of-river type, with or without daily pondage. Of the existing power projects in Nepal only Kulekhani has a reservoir for seasonal storage. Run-of-river hydropower projects will continue to dominate future hydropower development in Nepal, but the construction of high dams for generating larger amounts of power are also being considered, and in some cases preliminary investigations have begun.

Hydropower development schemes are the most highly prioritized development programs in Nepal. According to EPR54, a hydropower project generating up to 5 mw requires the IEE process, whereas more than 5 mw requires an EIA. Similarly, a transmission project up to 66 kV capacity requires an IEE and more than 66 kV requires an EIA. Besides these conditions, other projects requiring an EIA are mentioned in Schedule-2 of EPR54 (Annex 2).

The processes required to conduct an IEE and EIA in hydropower projects are the same as described in §1.3, above. However, the impacts arising from different types of hydropower projects (as for example, high dam or run-of-river type) differ greatly.

For example, a transmission line is a linear project with different magnitudes and intensities of effects compared with generation projects. For projects involving both generation and transmission it is sometimes convenient to carry out Scoping as if for two sub-projects with two separate EIAs.

2 MANUAL FOR PREPARING SCOPING DOCUMENT FOR HYDROPOWER PROJECTS

2.1 Definition of EIA Scoping

A legal definition of Scoping is provided by EPR54. Under Rule 4 of EPR54, Scoping is defined as a procedure for determining the extent of and the approach to an EIA. It involves the following tasks:

- a) the involvement of relevant authorities, interested parties and affected groups;
- b) the identification of relevant or significant issues to be examined;
- c) the identification and selection of alternatives; and
- d) the determination of the TOR for further study.

2.2 The Objectives of Scoping

The main objectives of Scoping are:

- a) to provide an opportunity for the proponents, consultants, relevant authorities and interested and affected parties to exchange information and express their views and concerns regarding a proposal before an EIA is undertaken; and
- b) to focus the study on reasonable alternatives and relevant issues, to ensure that the resulting EIA is useful to the decision-maker and addresses the concerns of interested and affected parties, as well as to facilitate an efficient EIA process that saves time and resources while reducing the risk of costly delays.

2.3 Need for a Manual for Preparing Scoping Document

EPR54 provides for undertaking Scoping on a proposed project. A broad framework of Scoping techniques to be employed is necessary in order to generate a wide variety of issues and concerns from local communities. The prescribed methods for Scoping may not always be effective. Therefore, in this manual a series of alternative techniques and a combination of techniques are given, so that the proponents may have choices in employing the Scoping methods. The selection of these techniques will depend upon the availability of:

- a) adequate time,
- b) adequate financial resources, and
- c) appropriate human resources.

The output of Scoping is the backbone of the EIA study. The adoption of an appropriate and effective technique is always required to create the best and most comprehensive Scoping output. Therefore, this manual has been developed for the purpose of integrating them into the EIA studies of hydropower projects in Nepal.

2.4 Appropriate Time for Conducting Scoping

Scoping should be carried out at an early stage of project planning, following completion of the Screening process. The most appropriate time to conduct Scoping is during the feasibility stage of the project cycle. Following the completion of Scoping, a TOR for an EIA should be prepared on the basis of the Scoping results.

2.5 Responsibility for Scoping

As per EPR54, the proponent will have final responsibility for Scoping. The proponent should appoint a team of multidisciplinary experts for the Scoping period. The results of the Scoping exercise provide the basis for the rest of the EIA process.

3. METHODS OF SCOPING

Upon the completion of project Screening, Scoping is carried out as a fundamental activity of the EIA process. The process of Scoping is compulsory in Nepal under EPR54, and EPR54 deals explicitly with the process of Scoping to be undertaken by the project proponent. According to EPR54, the project proponent should publish a public notice in a national daily newspaper about the proposed project. In the public notice, the proponent should request concerned citizens, VDCs/municipalities, schools, health posts, hospitals and organizations to provide suggestions and comments in writing within 15 days of the date of first publication. After collecting information from the concerned people of the project area, the proponent should prepare a report on Scoping. As per EPR54, a majority of project proponents is currently employing only one method of notifying by publishing a notice in a newspaper.

The techniques used in Scoping are part of the decision-making process. Issues are identified, evaluated and organized for presentation to decision-makers. The basic components for Scoping exercise are as follows:

3.1 Background Materials on Proposal

Background information on the nature of the proposal is required to be disseminated in order to assist interested parties and affected groups to provide comments and concerns. This background information should include the following: the purpose and need for the project, the proposed actions, the location, timing and methods of operation, likely impacts and so on, as well as a brief description of the affected environment.

Screening has previously been completed for many potential medium-size hydropower projects in Nepal, and some of this information is available from the DOED for inclusion in the discussion of project history.

Background information should be developed in a clear and concise manner, without jargon; unnecessary technical and scientific terms should be avoided so that the information can easily understood by the general public. For major projects it may be appropriate to supplement this background information with additional documents dealing with technical or problematic aspects of a proposal. These documents should be made available to the public and adequate time should be given for the public to read them thoroughly. Such documents should be prepared in simple Nepali language.

A description of the existing environment is *not* the same as the baseline information needed for the EIA. Baseline information should be presented only at a level of detail that enables the proponent to accurately identify significant issues in the Scoping matrix (see §5.2). This information can usually be obtained from standard references on environmental and social statistics of Nepal, thematic maps and from an observation field trip to the project site. On-site participatory rapid appraisal (PRA) or focus group discussion (FGD) techniques are useful tools for collecting information during a visit to the project site. Annex 4 lists the basic information required for describing a project.

3.2 Involvement: Identification and Notification

It is imperative that whoever takes responsibility for Scoping should consult with decision-makers throughout the Scoping process. A Scoping plan should be prepared which includes:

- a) a list of authorities, interested parties and affected groups or communities that are likely to be involved in the Scoping process,
- b) methods of notifying them,
- c) methods to inform them about the proposal and solicit their comments and concerns, and
- d) a determination of the stages where their inputs are required.

This section considers how the authorities and interested parties and affected groups should be involved in EIA Scoping procedures. The following paragraphs examine *who* should be involved, *how* they should be informed about the proposed activity, and *what* methods may be employed to obtain the necessary information. Annex 5 provides a checklist of the legislation which, depending on the nature of an individual hydropower project, may be relevant to the EIA. The same Annex also provides a list of potential concerned authorities and stakeholders.

3.2.1 Concerned Authorities

The proponent's first task is to establish links with the responsible decision-making authority, or the authority with delegated responsibility (i.e., the 'lead authority'). The responsible decision-making authority, as well as other relevant authorities with responsibilities, interests or special expertise relevant to the proposal should be contacted directly for information and comments. Consultation with authorities usually takes place in the form of informal discussions or a small working group discussion.

This form of Scoping should be directed at identifying any policy, legal or administrative constraints that may exist, exchanging information on the proposal and its likely impacts, at the higher level of decision-making as well as determining the major concerns of the various authorities whose interests may be affected by the proposal.

3.2.2 Interested Parties and Affected Groups

The establishment of lists and the process of networking are probably the most effective methods of making direct contact with interested and affected communities. However, for certain proposals there may not be a clearly definable public, especially for projects or plans that may have regional or national implications. In such cases notifying the public through advertisements in the press or media may be the most appropriate approach. In particular, the method of notifying disadvantaged communities and/or illiterate persons about a proposal and providing an opportunity to participate in public involvement programs needs special consideration. (See the Manual for Public Involvement, developed separately from this manual, for examples.)

The following is a selection of effective approaches for the identification and notification of interested and affected communities.

a) Establishment of Lists

The use of established lists and directories is a useful way of identifying interested and affected communities. These include, but are not limited, to commercial lists, lists of taxpayers, lists of members belonging to specific interest groups of professional organizations non-governmental organizations (NGOs), community based organizations (CBOs), local authorities and affected persons. Random stratified sampling methods provide a reliable way of selecting samples from these.

b) Networking

Networking is the process of identifying interested and affected communities through a chain referral system. The first task is to establish a network with individuals who should be consulted. This may be done by examining maps and directories relevant to the area or by asking the known key players (for example local authorities) for the names of individuals, institutions and groups who may have an interest or would be affected by the proposal. These individuals are contacted and more names of potentially interested affected persons or communities are requested. This process is continued until the proponent is confident that all interested and affected parties (or at least representatives of such groups) have been invited to participate in the Scoping exercise.

c) Announcement in the media/public places

The public may be informed about the proposed activities and the plan to undertake an EIA through several means:

- print media,
- electronic media,
- pamphlets and informative brochures,
- exhibitions and project information center displays,
- newsletters,
- radio and television announcements,
- electronic mail/web sites, and
- public notices.

Announcements should briefly describe the proposal and indicate how interested and affected communities can participate in the planning, assessment and decision-making process. The kind of information required should provide background information on the proposal and an invitation to submit written comments, or contact the consultant, or attend a meeting.

4. PARTICIPATION IN SCOPING

Whatever techniques are employed for public involvement should be suitable and appropriate to local circumstances. The public involvement facilitation team should have the flexibility to choose and adapt various methods as time and local circumstances suggest. The importance of using a combination of participatory public involvement techniques must be emphasized. Different techniques will be appropriate in the three phases of project– planning, construction/implementation and operational. During Scoping, for example, a graphical exhibition to inform the public of a proposal may be followed by public meetings. Thereafter, it may be appropriate to conduct semi-structured interviews, focus group discussions and/or a series of local workshops, to gain more in-depth information. The mandatory method of public involvement is a public notice. This and other methods to supplement and enhance these activities are described below.

4.1 Public Notices

This method of public involvement is mandatory in Nepal as per EPR55 (as amended). A notice in the newspaper can be used to provide information to the general public on a proposal and, at the same time, solicit comments from them. A newspaper notice can also be used to inform about public meetings and plans for supplementary surveys, workshops, interviews and site observation field visits by the study team.

It is important to place a notice in a prominent place in the national daily newspaper. The information provided should be accurate, clear and concise, and the language should be simple and

without technical jargon. The notice should indicate how further information about the proposal and other public involvement programs can be obtained (e.g., the telephone 'hot line', or brochure, as described below). Because of the size limitations on notices in newspapers, this form of public participation is limited. Hence, other methods of informing the public are important to supplement and strengthen it.

Because newspapers may not be available in remote areas where the construction of hydropower projects generally take place, the proponent should also post public notices in the concerned Village Development Committee (VDC) and District Development Committee (DDC) offices, at other district offices, at schools and at service centers, such as health posts. They should be posted prominently on public notice boards.

4.2 Public Meetings

A 'public meeting' is a gathering of interested and affected communities to present and exchange information and views on a proposal.

In rural areas, many people may be interested but unable to reply to public notices due to illiteracy or lack of ready access to newspapers. In a public meeting, however, they can voice their opinions, concerns and suggestions (and in further group discussions, workshops or interviews they can elaborate on them). This method supplements public notices and is very effective for ensuring local public involvement.

Public meetings should be held in a place convenient to the public. It should begin with a description of the proposal and its anticipated effects, presented by the proponent (i.e., by public involvement facilitation team members). Displays of posters and other illustrative material are also useful to give the public a good understanding of all aspects of the proposal, proposed actions and their potential negative and positive impacts.

Concerned people should then be invited to identify the issues and alternatives that they believe should be addressed in the EIA. To run such a meeting successfully, a facilitator must first explain certain 'ground rules', like these:

- speakers should be asked to identify themselves by name and other identifying roles or characteristics (e.g., local farmer or shop keeper, school teacher, village leader or elected official, NGO or CBO representative, etc.), in order to establish their authority and the position or angle from which they are commenting;
- speakers should be given a brief but adequate time in which to comment; and
- speakers should restrict their comments to the identification of major issues and possible alternatives to the proposed action.

All the concerns expressed by the people should be recorded. The facilitator should interpret how each suggestion might guide the assessment process and how the respondents can make further contributions, such as providing comments on a draft environmental report. Public meetings and other group discussions should be held periodically, at each stage of the development cycle, to keep the public well informed and involved.

While a public meeting may appear to be the simplest and most direct way of gaining contact with the people, it can also be one of the most complex, unpredictable and demanding methods of public involvement. The number of public meetings will depend upon the complexities of the project. More than one public meeting held in different locations may be required when there is a large impact area.

Public Hearings help explain the project and the public involvement process, as well as how the concerns raised by potential displaced or resettled persons or communities and other affected populations are addressed. Where resettlement is necessary, they help describe and discuss the type and expected value of compensation, and elicit public response in the decision-making process.

4.3 Telephone 'Hot Lines'

A telephone 'hot-line' is a telephone number which is publicized through repeated announcements on television and radio programs, in newspaper notices and in project brochures, reports, et c., so that citizens can call to ask questions or make comments about proposals or issues. A system should be in place to record all comments. The same conditions should apply to callers as for people who comment in public meetings (identifying themselves, allowing sufficient time, and staying to the topic) and, if possible, the respondent should be asked to provide a contact phone number or address, in case the proponent wants to get back later for clarification of a point or for further information. (However, respondents also have the right to remain anonymous if they wish.)

It is important that the persons answering the hotline phones should be knowledgeable about the project, as well as of relevant government rules and regulations. They should respond to callers in a polite, friendly, non-threatening, and informative (but non-technical) manner.

The telephone 'hot line' is helpful to the public and to the proponent in several important ways:

- it is a convenient method for receiving public comments;
- it helps the public to locate those people (the proponent or other authorities) who have the information they need, or to whom they should speak regarding specific issues, concerns or suggestions regarding the project proposal; and
- it can also be a useful mechanism for the coordination of public involvement activities, since it provides a single source of information about the time, date and place of various other public involvement activities.

Furthermore the telephone is not threatening for those who find it difficult to participate or speak out in public. Most importantly, it provides a convenient means for citizen involvement.

4.4 Project Information Center (PIC)

A Project Information Center (PIC) should be established at the central and field offices of the project proponent. The number of centers depends upon size of the project. Displays and exhibitions set up in an attractive and graphic form enable information to be accessed by a large number of people at their own pace. Information centers of this sort usually take one of two forms:

- booths staffed by public involvement specialists who give information, hand out brochures or pamphlets, answer questions and solicit comments, and
- fixed displays that give general information (in the form of pictures, models, maps, and in writing). Outdoor displays overlooking construction sites are often helpful, for the interested public wishing to see the project site in various stages of development.

Exhibits and displays can be extremely effective in helping people visualize the proposed project or plan. Demonstration aids such as physical models and drawings should be meticulously prepared to scale, otherwise they could give a distorted view. The use of videos and narrated slide-shows can also be very useful, especially with an illiterate public.

4.5 Surveys

Socio-economic survey questionnaires are quantitative methods that can be used to determine public attitudes, values and perceptions on a variety of issues. Some or all of the following survey methods may be used: household surveys, community surveys, resource surveys and ethnographic surveys. They may be relatively formal (structured) or informal (semi-structured). They may be combined with, or further informed by, secondary and historical data analysis, as well as by focus group discussions, interviews, workshops and field site visits (as discussed below).

The first step in conducting any survey is to establish a comfortable rapport with the respondents. The interviewer should introduce himself or herself and clearly state the purpose of the questionnaire to the respondents. Those selected for a survey questionnaire should be informed how the information will be used, who or what kinds of people are being interviewed, how long the survey will take to complete, and how individual confidentiality will be kept if appropriate. It is essential that interviewers are friendly, neutral and non-threatening so that their presence itself does not produce biased results. The persons taking the survey and conducting interviews should also be reasonably well informed about the proposal.

Interviewers must also be carefully trained and familiar with the questionnaire. They must follow the questions wording and order exactly, and record responses exactly as they are given. The interviewer should never assume he or she knows the answer, and should never fill parts of the questionnaire without establishing the answer with the respondents. Leading questions should be avoided, although they are commonplace on many survey questionnaires. Recognized sampling methods should be followed to ensure that all representative groups have been included.

Because questionnaire data can be affected by non-sampling errors and simple biases, it is recommended that qualitative (anthropological) methods be incorporated within quantitative surveys both to improve data validity and as a means to control for non-sampling error.

4.6 Participatory Rapid Appraisals and Other Forms of Rapid Assessment

Participatory Rural Appraisal is a systematic sequence of interdisciplinary activities for producing accurate information and analyses of rural life and resource conditions, in an step-by-step and efficient manner. It can incorporate both qualitative and quantitative applications, and it involves the public in important and pro-active ways.

There are many forms of Rapid Appraisal. They include RRA–Rapid Rural Appraisal, PRA–Participatory Rural Appraisal, PAR – Participatory Action Research, PLA –Participatory Learning and Action, and AI – Appreciative Inquiry or APA – Appreciative Planning and Action. The study team members may be more familiar and experienced with some over others.

Most rapid and participatory appraisals are conducted or facilitated by small interdisciplinary teams (two or more individuals) applying multiple techniques to ensure public involvement, for useful data acquisition and analysis. On hydropower projects, for example, an appraisal team might include an engineer, a social scientist, an economist, and a water, land or forest resource specialist. All members of the team should speak the language of the community where the appraisal is carried out, and each should be familiar and comfortable with field conditions. The advantage of rapid and participatory appraisals over questionnaire surveys has been hotly debated – the best solution is to use a combination of *both*.

The advantage of rapid appraisals are that that they among the best ways to obtain information in a timely, cost effective, accurate and insightful manner, providing a useful basis for development planning and action. And, given the step-by-step nature of the team/community interactions, they avoid some of the biases of singular questionnaire surveys. They are often used to back up and 'ground truth' uncertain or unclear survey data.

All methods of public involvement, whether quantitative or qualitative, rely on good listening combined with social learning – understanding the *hows* and *whys*, as well as the *values* and *rationale*, of particular situations or issues. In every instance, special attention is focused on reaching the most vulnerable publics, the most poor and the typically voiceless, especially women's voices.

The key tenets of PRA are these:

- *Participation* – assuring local people's inputs.
- *Teamwork* – involving a well-balanced range of specialist viewpoints.
- *Flexibility* – combining methods and techniques as they fit the situation.
- *Optimal ignorance* – gathering just enough information to make necessary decisions and recommendations.
- *Triangulation* – taking the most important or sensitive information from at least three sources.

Once a rapid or participatory appraisal has begun, the specialists on the team may bring a variety of useful field methods for interviewing, discussions, measurements and observations into the process.

The difference between an RRA and a PRA is the level of participation. In a typical RRA, the team members lead the discussion, raising issues and suggesting topics for the public to respond or react

to. In PRA and similar participatory methods the responsibility for leading the discussion is in the hands of the community, and appraisal team members merely facilitate their involvement.

4.7 Workshops

The term 'workshop' is used for a wide variety of small meetings in which a limited number of participants can be briefed on a proposal, or be engaged in the review of information and plans, or in defining the issues and problem-solving. Workshops are expected to produce results as well to serve as a forum for exchanging information. They are useful additions to the public discussion and participatory appraisal methods, discussed above.

Workshops are useful for dealing with complex topics where the public needs briefing on technical matters, as well as time for detailed consideration. The advantage of a workshop is that it can be used at a number of different stages in the public involvement process. It allows for in-depth involvement, and for participants to have the opportunity to work out value priorities and evaluate the alternatives.

Workshops are meant to operate around small groups of 5 to 10 people. The need to have all interest groups of the public represented, however, usually means that the small group may be as large as 20 or more participants. Despite this constraint, a number of small group processes may be used in the workshop setting to improve its effectiveness. Although workshops are not mandatory, conducting them as a part of Scoping and at other phases of project development is very useful and desirable for large and multipurpose projects.

Some common workshop techniques include:

- **Brainstorming** is a 'free-thinking' group technique for coming up with many ideas around a specific topic. It is best used in group problem-solving situations. On hydropower EIAs, for example, it can be used to solicit issues, concerns and suggestions about potential impacts and their mitigation from a wide range of stakeholder groups. It is a fast-moving process and can be used to make a list of ideas at different stages of the research.

Brainstorming relies on the creativity of group members. Each member is encouraged to come up with as many ideas focussed on the topic as possible. Participants are encouraged to speak up in turn stating their ideas, which are recorded as a list (on a flip chart or whiteboard). Everyone takes a turn and offers an idea, though anyone can skip a turn. The topic goes round and round the group until it appears exhausted. In addition to contributing ideas of their own, participants should also suggest how the ideas of others can be expanded and improved upon, or how two or more ideas can be combined into a new idea. Nobody's ideas are criticized, and nobody is faulted for being 'wrong' or holding a contrary opinion, though care must be taken to avoid wild or exaggerated ideas.

- **Force Field Analysis** is a method used to get a whole view of all the forces for or against a plan so that decisions can be made which take all interests into account. It is a specialized method of weighing the pros and cons of an issue. Where a plan has been decided on, force field analysis allows proponents and participants to look at all the forces for or against it. It helps in planning to reduce the impact of opposing forces, and to strengthen and reinforce supporting forces.

There are several steps to carrying out a Force Field Analysis:

- first, list all forces for change in one column, and all forces against change in another column;
- then assign a score to each force, from 1 (weak) to 5 (strong);
- then draw a diagram showing the forces for or against, and the size of the forces;
- then, discuss the pros and cons, trying to reduce the negative forces and increase the positive, by group consensus.

The facilitator should avoid compelling or annoying the group into accepting a change in the plan. This only creates animosities and resistance. Sometimes group

members can be convinced to change or reduce opposing forces by being shown the alternatives, or through training, or by introducing other practical information.

Force Field Analysis is an effective method of getting a picture of all forces for and against a plan. It helps planners to weigh the importance of these factors and assess whether the plan is worth pursuing, or to identify changes that might be made to improve it and achieve better support.

- **Focus Group Discussion** is a group workshop technique used in qualitative research. A focus group is a loosely-structured roundtable discussion conducted by a facilitator among a small number of participants, usually 8 to 12 people. Participants for the groups are selected on the basis of having shared a common experience (e.g., for hydropower project development, useful local focus groups might be fishermen, wood cutters, laborers, educators, health workers, government civil servants, ward leaders, shop-keepers, farmers, herders, or natural resource user group members). A check list or topical guide is developed to facilitate the discussion, which covers the key areas of inquiry or concern. As discussion points come up, and opinions are shared, they are listed on a flip-chart or white board (or, a tape recorder).

The objective of this method is to encourage participants to talk openly and freely about a topic relevant to a specified topic, issue, concern, resource, product or service. Thus, it is important that both the facilitator and the setting of the meeting encourage free expression of opinions and feelings.

During a Focus Group Discussion, some of the other group methods already noted may be used, to improve the overall result.

Note that there are many other useful workshop and group discussion techniques (*Nominal Group Technique, Delphi Technique, Decision Trees, etc.*). The public involvement facilitation team may apply them as needed. This is part of the flexibility of group discussion and of participatory appraisal and discussion techniques in general.

5. THE SIGNIFICANCE OF SCOPING

Determining the scope of EIA involves input from interested and affected parties on:

- the identification and selection of alternatives,
- the identification of significant issues to be addressed, and
- the identification of appropriate mitigation measures.

Once the scope of the EIA has been determined, it is important to maintain the scope throughout the assessment process. Therefore, it must be ensured that the investigation remains focused on reasonable alternatives, and on those issues identified as significant by interested and affected parties. Scoping is not an isolated exercise. It may continue well into the project planning and design phase, depending upon the new issues that may arise for consideration.

5.1 Identification and Selection of Alternatives

Identification and examination of alternatives to meet the stated needs and objectives of a proposal is a fundamental component of EIA. It provides a basis for choice among options available to the decision-makers. In all assessments of alternatives the decision-makers should be provided with information that enables them to choose the most acceptable alternative by making trade-offs between physical, biological and socio-economic and cultural factors.

The following questions must be addressed when considering the identification and selection of alternatives:

- How should alternatives be identified?
- What is the reasonable range of alternatives that should be considered?
- What level of investigation should be applied to each alternative?

The following general categories of alternatives may be considered at the Scoping stage of EIA process:

- design alternatives,
- activity alternatives,
- location alternatives,
- process alternatives,
- construction alternatives,
- temporal alternatives, and
- cost alternatives.

5.2 Identification of Pertinent Issues

The major task of Scoping is to identify the pertinent issues that are of concern to the authorities and to interested and affected communities, groups and individuals, and to gain some indication about the importance of these issues. The issues may either be definable impacts (e.g., creation of a reservoir), the cause of an impact (e.g., river diversion), or a generally expressed concern (e.g., social disruption of communities) which need to be translated into specific impacts and indicators to be investigated.

In some cases the issues identified by participants in Scoping may not be accurate or significant. Bearing in mind that the purpose of Scoping is to help focus the EIA on relevant issues, it is important to eliminate insignificant issues from the investigation at the outset. Once a broad range of issues have been identified in Scoping it is necessary to evaluate them and highlight the most pertinent for investigation and assessment.

Once the sufficient information has been compiled, and the views of stakeholders have been documented, a Scoping matrix can be prepared. Annex 6 lists the principal project components for the Scoping matrix, and Annex 7 lists the major environmental and social components. Depending on the project design, some components can often be 'lumped' together. For example, it might be possible to treat the dam, the spillway and the desander as a single unit. A sample matrix is given in Annex 8. The Scoping team checks off the boxes that are relevant and warrant coverage by the EIA. When made as a spreadsheet, the matrix can be used during the EIA as a wall chart where data and/or information are summarized in the relevant boxes. A glossary of terms used for Scoping and EIA of hydropower is given in Annex 9.

5.3 Determination of Specific Guidelines for the EIA

Specific guidelines for undertaking and preparing the EIA should also be determined during the Scoping process. Methods and procedures for the preparation of the particular EIA, as well as the standards that reviewers and the public are likely to use in assessing the adequacy of the EIA documentation, may also be identified during Scoping. Authorities and interested and affected parties should indicate what particular requirements should be met. The outputs of the Scoping exercise should provide the basis for development of TORs for EIA study.

6. SCOPING REPORT

A written report on the results of the Scoping exercise should be prepared by the proponent for the further EIA study. The format for the Scoping report is given in Annex 10. The length of the main text of Scoping report should be concise; additional relevant information can be appended as annexes to the report. As much as possible, use the terms mentioned in the glossary.

7. CONCLUSION

Scoping is a critical stage in the EIA procedure. The success of a proposal will largely be determined by the adequacy of the Scoping exercise. The procedure above provides guidance on how Scoping should be undertaken within the framework of EPR54.

Scoping is an ongoing and interactive process that should allow for flexibility through the introduction of additional alternatives and issues that might be identified as significant during the course of the EIA study. Further involvement of interested and affected communities, groups and individuals may be desirable as additional issues or ideas unfold during the EIA investigation. This should be at the discretion of the individual/team responsible for Scoping. By adhering to the Scoping procedures and guidelines described in this document, it is likely that the final report submitted for review will be adequate to address the concerns of both the public and the concerned authorities.

ANNEX 1

Official translation

Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board

(Note: It is recognized that there are some spelling errors in this official translation)

Schedule - 1

(Pertaining to Rule 3)

Proposals Requiring Initial Environmental Examination

A. Forest Sector

- 1) Plantation of indigenous plants of a single species on a single block of 50 to 100 hectares in the Tarai and 25 to 50 hectares in the hills.
- 2) Plantation of such imported species of plants as are deemed suitable for that purpose following their test in the concerned place, on a single block of 10 to 50 hectares in the Tarai and 5 to 25 hectares in the hills.
- 3) Handover of forests with an area ranging between 25 to 100 hectares in the Tarai and 5 to 25 hectares in the hills as leasehold forests.
- 4) Clear felling or rehabilitation of national forests with an area of not more than 5 hectares.
- 5) Establishment of saw -mills processing 5,000 to 50,000 cubic feet of timber per year.
- 6) Collection of 5 to 50 tons of forest products other than timber per year.
- 7) Establishment or expansion of national parks, wildlife sanctuaries and conservation areas, or environmental conservation zones.
- 8) Extraction of the roots of trees which have been felled, removal of leaves (in such a manner as to turn trees into stumps), extraction of seeds of lichens or orchids from trees, and collection of Sal (*Shorea robusta*) seeds.
- 9) Formulation of watershed management plans.
- 10) Construction of new botanical gardens or zoos outside forest areas in the public or private sector.
- 11) Resettlement of imported wild animals of different species.
- 12) Preparation of management plans of national parks, wild life sanctuaries, conservation areas, and their buffer zones, or launching of development and construction activities specified in such plans.
- 13) Establishment of medicinal herbs centers for the commercial production of medicinal herbs and aromatic plants in public scrublands.
- 14) Commercial collection or industrial processing of non-polluting medicinal herbs and aromatic plants.
- 15) Construction of forest paths up to 5 kilometer long, and of fire protection lines up to 10 kilometer long.
- 16) Collection of boulders, gravel and sand and extraction of coal and other minerals from forest areas.

B. Industrial Sector:

(a)

- 1) Production of alcohol by the process of blending and establishment of distilleries equipped with boiling and fermentation facilities, with a production capacity of 5,00,000/- liters per day.
- 2) Establishment of breweries and wineries equipped with fermentation facilities with a production capacity of 500,000/- liters per day.
- 3) Establishment of acid, alkali, and primary chemical industries with a production capacity of 100 metric ton per day.
- 4) Processing of hides not more than 5000 sq. ft. per day.
- 5) Establishment of Electroplating and Galvanizing industries.
- 6) Establishment of cooking, natural gas refilling, filling, production and distribution industries.
- 7) Establishment of boulder crushing industries.
- 8) Establishment of paints industries.
- 9) Establishment of dairy processing industries.
- 10) Establishment of industries producing lubricant by the process of blending reprocessing or reclamation.
- 11) Establishment of industries manufacturing foam.
- 12) Establishment of industries manufacturing dry or wet cell (battery).

- 13) Establishment of crude sugar or sugar industries with a production capacity of 3000 metric tons per day.
 - 14) Establishment of thread and cloths dyeing, printing and laundry industries (including carpets) except traditional cottage industries.
 - 15) Establishment of pulp and paper industries, except traditional cottage industries, with a production capacity of 100 metric tons per day.
 - 16) Establishment of bricks and tiles industries with a production capacity of 10 million units per year.
 - 17) Establishment of cement industries with a production capacity of 30 metric tons per hour based on lime-stone and with a production capacity of 50 metric tons per hour based on clinker.
 - 18) Establishment of quick/ slaked lime industry producing 50 metric tons per day.
 - 19) Establishment of pharmaceutical industries.
 - 20) Establishment of industries manufacturing chemical fertilizers (blending) and pesticides (blending).
 - 21) Establishment of plastic industries (bases on waste plastic as raw materials).
 - 22) Establishment of matches industries.
 - 23) Establishment of industries relating to auto workshop (except 2 wheelers).
 - 24) Establishment of industries producing and processing coke and briquette from coal."
- (b) Establishment of the following industries having investment of total fixed capital exceeding Rs. 1 million.
- 1) Plastic processing (except processing waste materials).
 - 2) Processing and production of tyres, tubes and rubber.
 - 3) Soap (including detergents and clearing shampoos).
 - 4) Photo processing.
 - 5) Foundry.
 - 6) Production of cigarettes, bidi (tobacco rolled in leaf) tobacco, betel rults.
 - 7) Slaughter house.
 - 8) Glass (plane glass)
 - 9) Food processing.
 - 10) Relating to metal (including remelting, rerolling, and fabrication).
 - 11) Bitumen and bitumen emulsion.
 - 12) Cold storage.
 - 13) Threading.
 - 14) Vegetable ghee, oil.
 - 15) Herbal processing.
 - 16) Production of different items from bone, horn and foot root
 - 17) Rosin turpentine, veneer and catechu.
 - 18) Fish and meat processing.
 - 19) Production of packaging materials
 - 20) Poultry feeds.
 - 21) Machine shop.

C. Mining Sector:

- (a) Excavation of mines through relocation and resettlement of permanent residence of not more than 100 people.
- (b) Relating to Open Mine and Under Ground Mine:
 - 1) Excavation of metallic minerals in small scale.
 - 2) Excavation of the other industrial minerals in small scale except precious stones semiprecious stones and abressive minerals from among the classified industrial minerals for the industrial purpose.
 - 3) Excavation of non-metallic minerals in small scale.
 - 4) Excavation of industrial precious and semiprecious stones and abressive minerals with a production capacity of 50 to 100 grams per day.
 - 5) Establishment of coal mines in small scale.
 - 6) Excavation of constrution oriented minerals materials in small scale.
 - 7) Excavation of highly precious, precious, valueable stone and semi-valuable stone minerals with a production capacity of 50 to 100 grams per day.
 - 8) Production of natural gases in very small and small scale.
- (c) Relating to other Mines:
 - 1) Extraction of 10 to 50 cubic meter of sand, gravel and soil from river beds per day.

- 2) Extraction of 50 to 100 grams of precious, valuable and semi-valuable stone minerals per day through placer or dredging techniques.

D. Road Sector

- 1) Construction of the following roads:
 - (a) District roads
 - (b) Urban roads
 - (c) Rural roads
 - (d) Small feeder roads
- 2) Construction of 1 to 5 kilometers long ropeways.
- 3) Construction of 1 to 5 kilometers long cable car routes.
- 4) Construction of major bridges.
- 5) Construction of tunnels.
- 6) Improvement of the standard, rehabilitation and reconstruction of national highways and feeder roads.

E. Water Resources and Energy Sector

- 1) Supply of electricity through the installation of transmission lines of not more than sfrom 33 kv to 66 kv capacity.
- 2) Operation of rural electrification projects of 1 to 6 mva.
- 3) Operation of electricity generation projects of 1 to 5 mw capacity.
- 4) Under the new systems of irrigation:
 - (a) Those irrigating 25 to 2000 hectares in the Tarai,
 - (b) Those irrigating 15 to 500 hectares in the hill valleys,
 - (c) Those irrigating 10 to 200 hectares in the hill and mountain areas with a steep gradient.
- 5) Under the rehabilitated systems of irrigation:
 - (a) Those irrigating more than 500 hectares in the Tarai.
 - (b) Those irrigating more than 200 hectares in the hill valleys.
 - (c) Those irrigating more than 100 hectares in the hill and mountain areas with a steep gradient.
- 6) Any water resources development activity which displaces not more than sfrom 25 persons to 100 persons with permanent residence.
- 7) Control of floods through dams in the Tarai.
- 8) Control of rivers over an area of more than one kilometer.

Note: Any rehabilitation project which includes additional irrigated areas, new sources of water, watershed management or changed channel lines shall be considered to be a new system.

F. Tourism Sector

- 1) Establishment and operation of hotels with 50 to 100 beds.
- 2) Extension of the areas of the existing airports.
- 3) Opening of new areas for the promotion of tourism.
- 4) Operation of rafting activities on any river having fish or other aquatic life.
- 5) Operation of new golf courses and organized water sports.
- 6) Promotion of tourism in a number exceeding 10,000 per year at an altitude above 5000 meters.
- 7) Disposal and management of waste emitted from trekking points.

G. Drinking Water:

- 1) Collection of rain-water in an area of not more than 200 hectares, and use of water sources (springs and wet -lands) located within the same area.
- 2) Surface water sources with not more than 1 cubic ft. safe yield, and supply of not more than 50 percent of the water during the dry season.
- 3) Processing of water at the rate of 10 to 25 liters per second.
- 4) Recharging up to 50 percent of the total aquifer for the development of underground water sources.
- 5) Construction of not more than one kilometer long tunnels for carrying water.
- 6) Displacement of not more than 100 persons for operating a water supply scheme.
- 7) Settlement of not more than 500 persons on the upper reaches of water sources.
- 8) Supply of drinking water to a population ranging between 2,000 and 20,000.

- 9) Supply of drinking water to a population ranging between 10,000 and 100,000, and connection of new sources.
- 10) Installation of more than 20 kilometers long electricity transmission lines for pumping or processing water, and consumption of more than one mw of electricity.
- 11) River training and diversion activities over an area of more than one kilometer.

H. Waste Management:

- 1) Waste management activities to be undertaken with the objective of providing services to a population ranging between 2,000 and 10,000.
- 2) Following activities relating to waste emitted from houses and residential areas:
 - a) Filling of land with 100 to 1000 tons of waste a year.
 - b) Activities relating to transfer stations and resource recovery areas spread over not more than 3 hectares.
 - c) Selecting, picking, disposing, and recycling waste through chemical, mechanical or biological techniques in an area of not more than 2 hectares.
 - d) Activities relating to compost plants in an area ranging between 1 and 5 hectares.
 - e) Operation of sewerage schemes.

I. Agricultural Sector:

- 1) Clearing of national forests covering not more than 1 hectare in the hills and 5 hectares in the Tarai, and using them for agricultural purposes.
- 2) Following activities relating to construction:
 - a) !.....
 - b) Construction of 1 to 5 kilometers long agricultural roads.
 - c) Construction activities for farming 2000 to 5000 domestic fowls.
 - d) Construction activities for farming big cattle numbering between 100 and 500.
 - e) Construction activities for farming small cattle (sheep and goats) numbering between 1000 and 5000.
 - f) Establishment of agricultural wholesale markets in urban areas.
- 3) Following activities relating to toxic substances (only those which are listed):
 - a) Import of 1 to 10 tons of toxic substances.
 - b) Sale, supply, storage and disposal of 100 kg. to 1 ton of toxic substances.
 - c) Use of 100 kg. to 1 ton of toxic substances in a single area.
- 4) Establishment of the following agro-based industries which do not dispose of polluted substances mixed with dangerous toxins:
 - a) Milk-processing industries with a capacity of not more than 26,000 liters a day.
 - b) Such agro-based industries as those producing jam, jelly, squash and juice.
 - c) Cheese industries.
 - d) Baby food industries.
 - e) !.....
 - f) !.....
- 5) !.....
- 6) Commercial fish-farming in an area of more than 1 hectare.
- 7) Operation of any planning, project or programme of any development work, physical activities or change in land use except the proposals mentioned in Clause (A) to Clause (I) and those below the standards of such proposals as well as the proposals below the standards of those mentioned in Schedule-2 with a cost of Rs. 10 millions to hundred millions.

ANNEX 2

Official translation

Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board

(Note: It is recognized that there are some spelling errors in this official translation)

Schedule - 2

(Pertaining to Rule 3)

Proposals Requiring Environmental Impact Assessment

A. Forest Sector:

- 1) Plantation of indigenous plants of a single species on a single block covering an area of more than 100 hectares in the Tarai and 50 hectares in the hills.
- 2) Plantation of such imported species of plants as are deemed suitable for the purpose following their test in the concerned place, in an area of more than 50 hectares in the Tarai and 25 hectares in the hills.
- 3) Handover of forests with an area of more than 100 hectares in the Tarai and 25 hectares in the hills as leasehold forests.
- 4) Clear felling or rehabilitation of forests with an area of more than 5 hectares.
- 5) Establishment of saw -mills processing more than 50,000 cft. of timber per year.
- 6) Collection of more than 50 tons of forest products other than timber per year.
- 7) Formulation and implementation of forest management plans.
- 8) Clearing of public forests and establishment of new medicinal herbs centers for commercial production.
- 9) Rosin and turpentine, rubber, plywood and veneer, catechu, and timber-based matches, pulp and paper industries to be established within one kilometer inside the forest area which depend on forests for their raw materials and use processing techniques, and cardamom and medium and large tea industries which use large quantities of firewood.
- 10) Commercial and industrial processing of medicinal herbs and aromatic plants which emit garbage and pollution.
- 11) Establishment of saw-mills, bricks and tiles factories, and tobacco processing industries within 5 kilometers from the forest boundaries.
- 12) Establishment of resorts, hotels, safaris, educational institutions, hospitals and industries or other construction activities inside forest areas, national parks, sanctuaries, conservation areas, buffer zones, and environment conservation zones.

B. Industrial Sector:

- 1) Establishment of distilleries equipped with boiling and fermentation facilities with a production capacity of more than 500,000 liters per day.
- 2) Establishment of breweries and wineries equipped with fermentation facilities with a production capacity of more than 500,000 liters per day.
- 3) Production of primary chemicals such as corrosive acid and alkali etc. (except citric tartaric, acetic, acid etc.) with a production capacity of more than 100 metric tons per day.
- 4) Processing of hides more than 500 sq.ft. per day.
- 5) Production of chemical fertilizers and pesticides except produced through welding process.
- 6) Establishment of mineral based industries with a fixed investment of more than Rs. 50 millions.
- 7) Production of petro chemicals and processing (diesel, kerosene, lubricants, plastics, synthetics rubbers etc.).
- 8) Production of ferrous and non ferrous metals (except rerolling, remelting and fabrication) by the process of primary smelting.
- 9) Establishment of industry producing more than 3000 metric tons of crude sugar and sugar per day.
- 10) Establishment of cement industries with a production capacity of more than 30 metric tons per hour based on lime stone and with a production capacity of more than 50 metric tons per hour based on clinker.
- 11) Establishment of lime industries with a production capacity of more than 50 metric tons per day.
- 12) Production of asbestos.
- 13) Establishment of radio active emission (nuclear and atomic processing) industries.
- 14) Production of primary compound (Bulk drugs) for medicines.

- 15) Production of extremely hazardous substances such as Isocynite, mercury compound etc.
- 16) Production of ammunitions and explosives including gunpowder.
- 17) Establishment of industries of pulp or paper with a production capacity of more than 100 metric tons per day.
- 18) Establishment of brick and tiles industries with a production capacity of more than 10 million pieces per year.
- 19) Chemical processing of bones.

C. Mining Sector:

- (a) Relocation or resettlement of permanent residence of more than 100 people for the purpose of mine excavation.
- (b) Operation of all underground mining activities located at the main boundary thrust and central boundary thrust Zone.
- (c) Relating to Open Mines or Underground Mines:
 - 1) Excavation of metallic mineral substances in medium and large scale.
 - 2) Excavation of non metallic mineral substances in medium and large scale.
 - 3) Excavation of other medium and large scale industrial minerals except precious stone, semi-precious stone, abressive minerals from among the classified industrial minerals for industrial purposes.
 - 4) Excavation of medium and large scale coal mines.
 - 5) Excavation of construction-oriented minerals in medium and large scale.
 - 6) Excavation of highly precious, precious, valuable and semi-valuable minerals with a production capacity of more than 100 grams per day.
 - 7) Production of natural gas in medium and large scale.
 - 8) Excavation of radio active minerals in any scale.
 - 9) Excavation of asbestos minerals in any scale.
 - 10) Excavation of crude oil in any scale.
 - 11) Excavation of industrial, precious, semi-precious stones and abressive minerals with a production capacity of more than 100 grams per day.
- (d) Relating to Other Mines:
 - 1) Extraction of sand, gravel and soil at the rate of more than 50 cubic meters per day from the beds of river and revolutes.
 - 2) Extraction of highly precious and semi -precious minerals at the rate of more than 100 grams per day through placer and dredging technique.

D. Road Sector

- 1) Construction of the following roads:
 - (a) National highways.
 - (b) Main feeder roads.
- 2) Construction of more than 5 kilometers long ropeways.
- 3) Construction of more than 5 kilometers long cable car routes.

E. Water Resources and Energy Sector:

- 1) Supply of electricity through the installation of transmission lines of more than 66 kv. capacity.
- 2) Operation of more than 6 mva rural electrification projects.
- 3) Operation of electricity generation projects with a capacity of more than 5 mw.
- 4) Generation of more than 1 mw diesel or thermal electricity.
- 5) Under the new systems of irrigation:
 - (a) Those irrigating more than 2000 hectares in the Tarai.
 - (b) Those irrigating more than 500 hectares in the hill valleys.
 - (c) Those irrigation more the 200 hectares in the hill and mountain areas with a steep gradient.
- 6) Any water resources development activity which displaces more than 100 people with permanent residence.
- 7) Construction of multipurpose reservoirs.
- 8) Inter-basin wæer transfer and use.

F. Tourism Sector

- 1) Establishment and operation of hotels with more than 100 beds.
- 2) Establishment and development of new airports.
- 3) Rafting arrangements for more than 2000 persons per year on a single river.
- 4) Dispatch of more than 2000 tourists and their assistants per year for trekking in a single area.
- 5) Development and construction of any infrastructure for the promotion of adventure tourism in high mountainous areas.
- 6) Operation of house boats on lakes.

G. Drinking Water:

- 1) Collection of rain-water in an area of more than 200 hectares and use of water sources (springs/wetlands) located within the same area.
- 2) Surface water sources with more than 1 cft. safe yield, and the use of its entire part during the dry season.
- 3) Water processing at the rate of more than 25 liters per second.
- 4) Recharging of more than 50 percent of the total aquifer for the development of underground water sources.
- 5) Construction of more than 1 kilometer long water tunnels.
- 6) Displacement of more than 100 persons for the operation of water supply schemes.
- 7) Settlement of more than 500 persons on the upper reaches of water sources.
- 8) Supply of drinking water to a population of more than 20,000.
- 9) Supply of drinking water to a population of more than 100,000, and connection of new sources.
- 10) Over mining of biologically or chemically polluted point and non-point sources or underground water sources that may be affected by them.
- 11) Operation of multi-purpose projects relating to sources of drinking water using water sources at the rate of more than 25 liters per second.

H. Waste Management:

- 1) Waste management activities to be undertaken with the objective of providing services to a population of more than 10,000.
- 2) Following activities relating to waste emitted from houses and residential areas:
 - a) Filling of land with more than 1000 tons of waste per year.
 - b) Activities relating to transfer stations and resource recovery areas spread over an area of more than 3 hectares.
 - c) Selecting, picking, disposing and recycling waste through chemical, mechanical or biological techniques in an area spread over more than 2 hectares.
 - d) Activities relating to compost plants spread over an area of more than 5 hectares.
 - e) Burying of waste emitted from an urban area with a population of at least 10,000.
- 3) Following construction activities relating to hazardous waste of the following nature in any scale:
 - a) Construction of a waste plant.
 - b) Construction of a waste recovery plant.
 - c) Construction of a site for filling, accumulating or burying waste.
 - d) Construction of a site for storing waste.
 - e) Construction of a waste treatment facility.
- 4) Following activities relating to lethal waste:
 - a) Emission and management of any radio-active substance with a half life exceeding 25 years.
 - b) Emission and management of any lethal chemical with 30 lethal dose.
 - c) Final disposal management of biological lethal substances emitted from health centers, hospitals or nursing homes with at least 25 beds.
 - d) Any activity relating to one hectare or more of land and energy for the purpose of incinerating or recycling any lethal substance.

I. Agricultural Sector:

- 1) Clearing of forests covering more than 1 hectare in the hills and 5 hectares in the Tarai and using them for agricultural purposes.
- 2) Following activities relating to construction:
 - a) !.....

- b) Construction of more than 5 kilometers long agricultural roads.
 - c) Construction activities for farming more than 5000 domestic fowls.
 - d) Construction activities for farming more than 500 big cattle.
 - e) Construction activities for farming more than 5000 small cattle. (sheep and goats).
 - f) Urbanization plan in cultivable lands.
- 3) Following activities relating to toxic substances (only those which are listed):
- a) Import of more than 10 tons of a toxic substance.
 - b) Sale, supply, storage and disposal of more than 1 ton of a toxic substance.
 - c) Use of more than 1 ton of a toxic substance in a single area.
 - d) Activities relating to insecticide plants or toxic substances.

J. Health

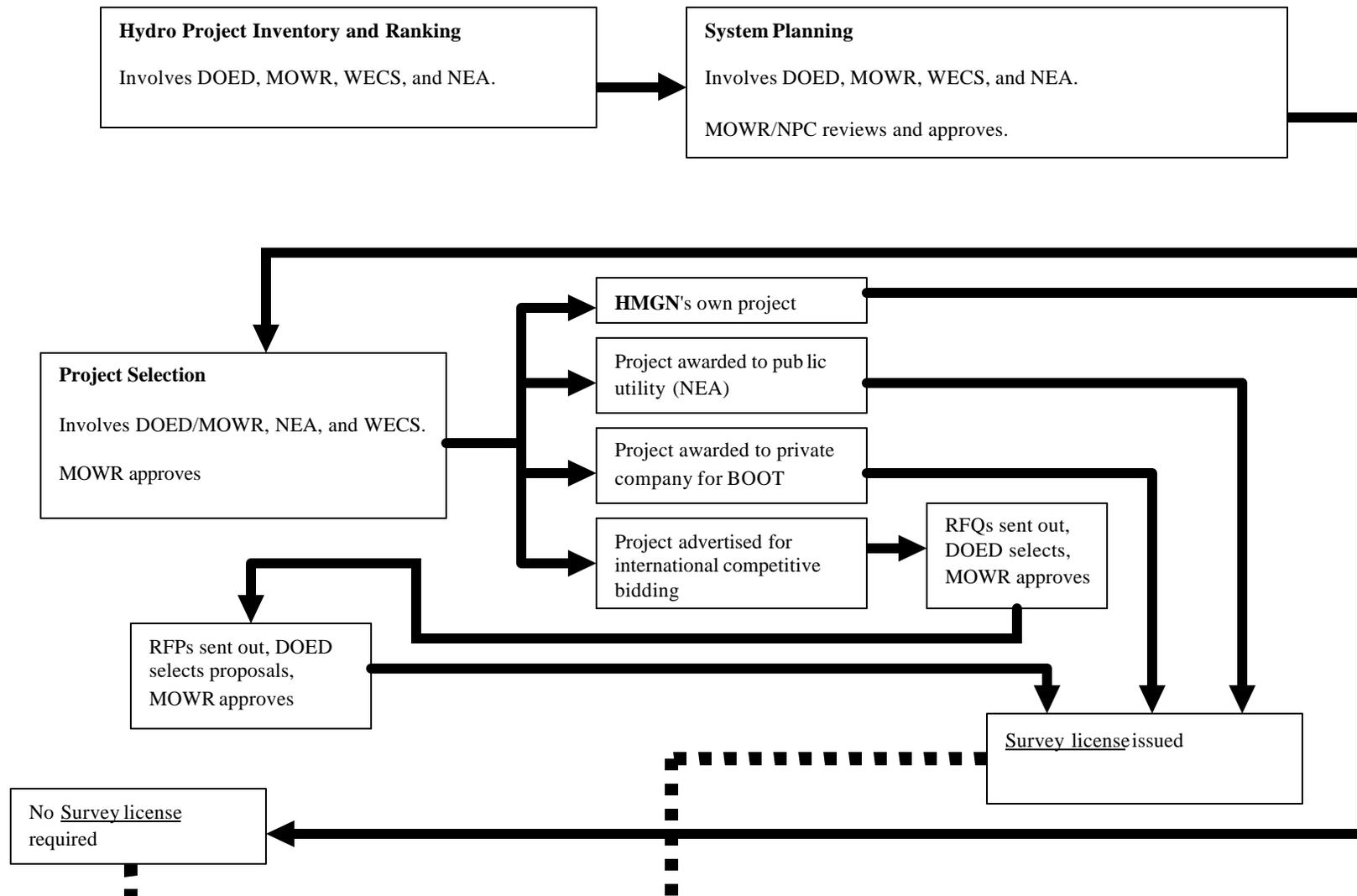
- 1) Operation of hospitals or nursing homes with more than 25 beds, or medical profession (study and teaching also).

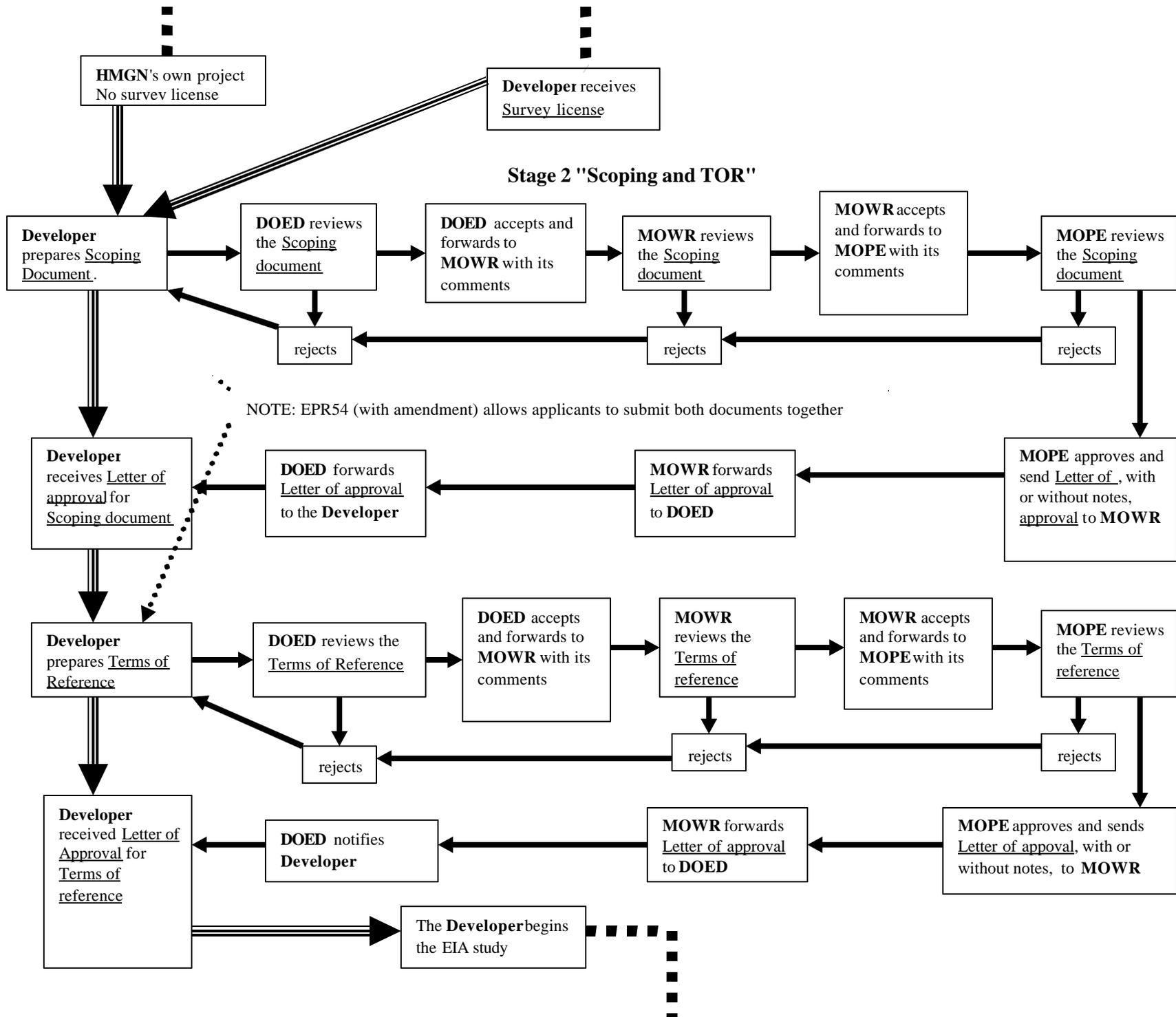
K. If any proposal is to be implemented in the following areas :

- 1) Historical, cultural and archeological sites.
- 2) Environmentally weak and wet areas.
- 3) National parks, wild life sanctuaries and conservation areas.
- 4) Semi-arid, mountainous and Himalayan regions.
- 5) Flood prone and other dangerous areas.
- 6) Residential, school and hospital areas.
- 7) Areas with main sources of public water supply.
- 8) !.....

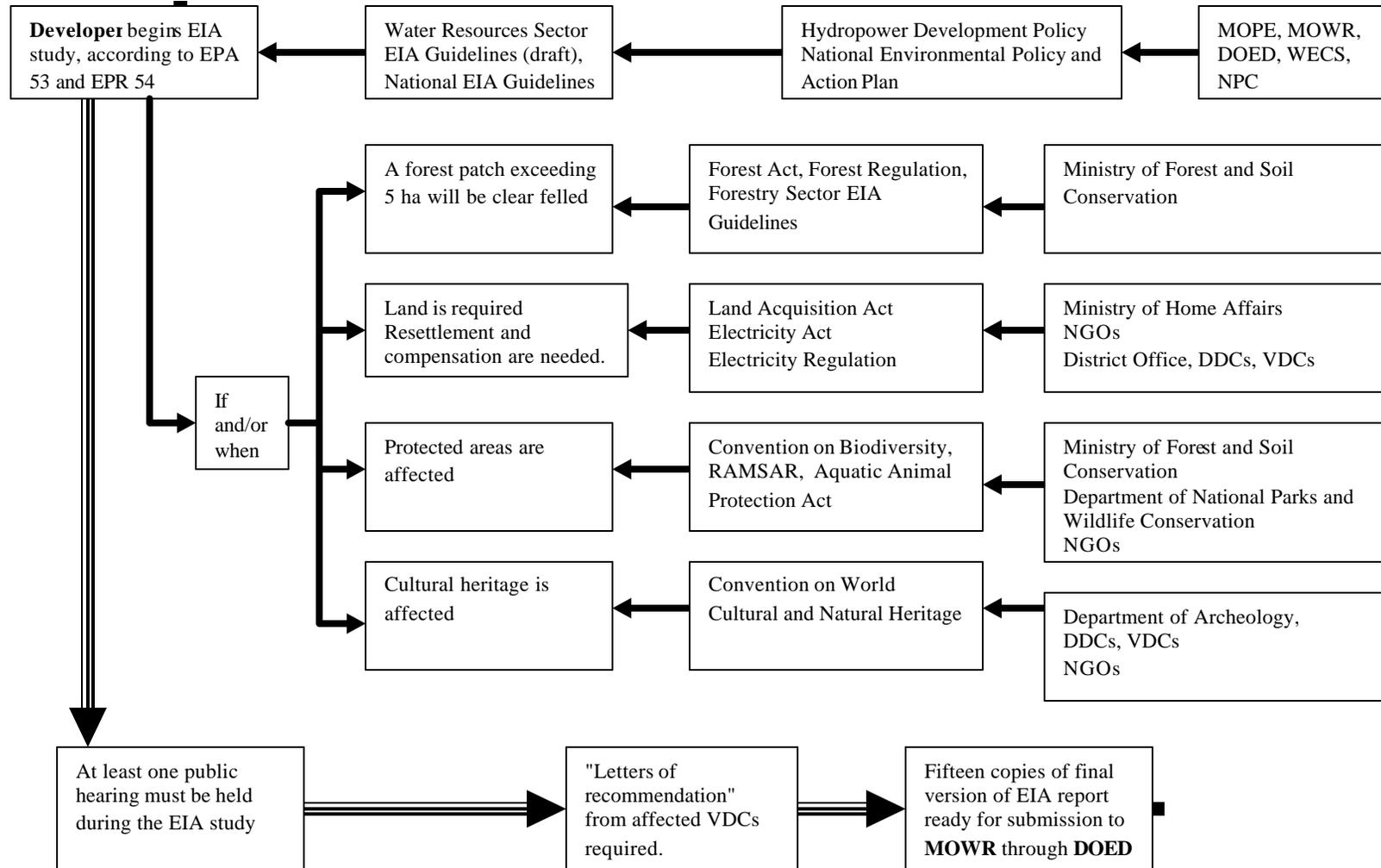
- L. Operation of any planning, project or programme relating to any developmental work, physical activities or change in land use except the proposals mentioned in Clause (A) to Clause (K) and those below the standards of such proposals as well as the proposals below the standards of those mentioned in Schedule-1 with a cost of more than 100 millions.

Annex 3: LOGIC DIAGRAM OF THE EIA PROCESS, Stage 1 "Process for Selection of Developer."

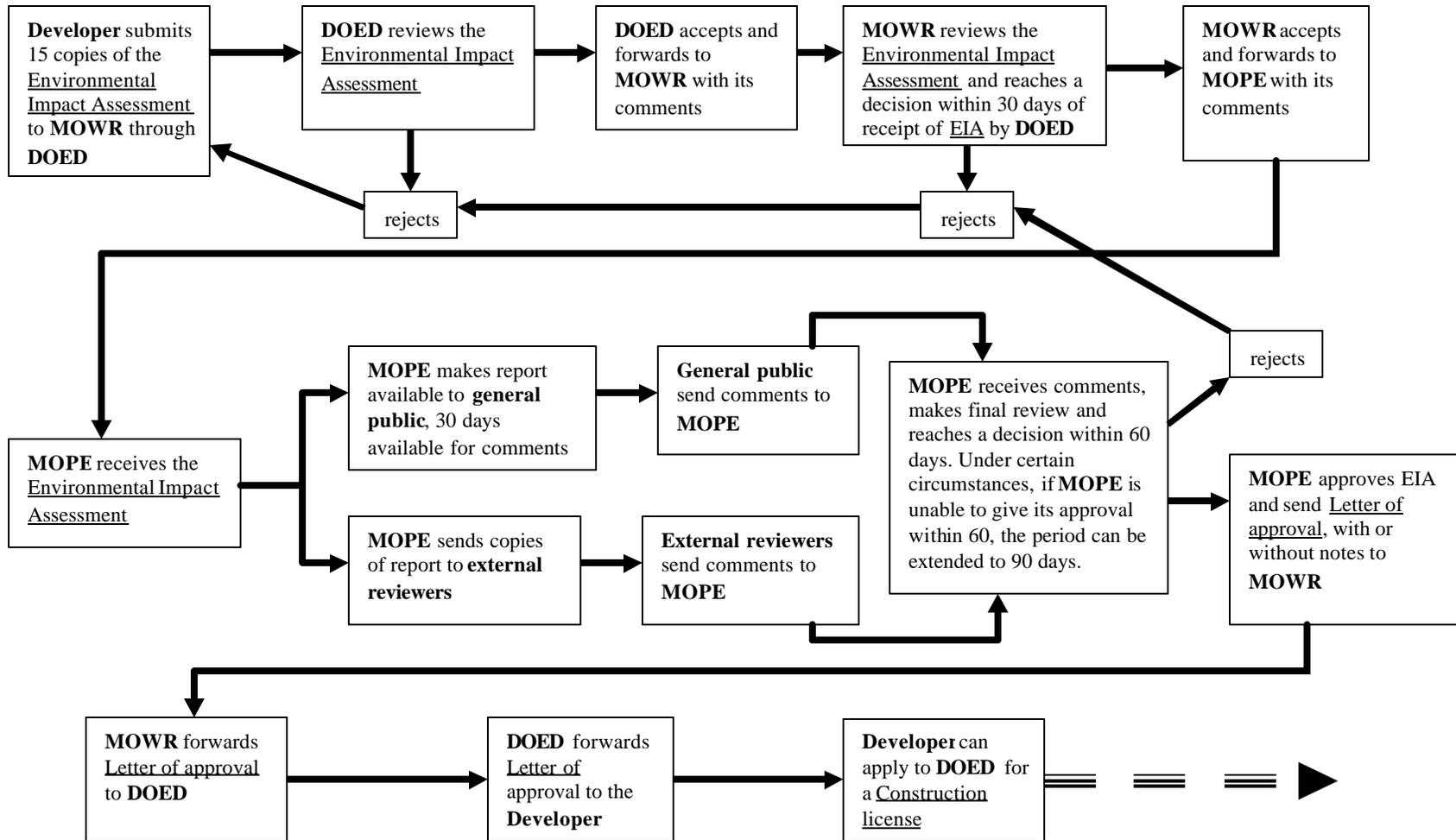




Stage 3 "EIA study"



Stage 4 "Submission of EIA"



ANNEX 4

Project Description: Essential Information for Scoping¹

1. NAME

- 1.1. Name of the project.
- 1.2. Name of the proponent
- 1.3. Nature of the project.

2. LOCATION OF PROJECT

- 2.1. Development Region and Zone.
- 2.2. District(s).
- 2.3. VDC(s).
- 2.4. Geographical coordinates for location of dam (to nearest minute).
- 2.5. Geographical coordinates for location of powerhouse (to nearest minute).
- 2.6. Altitude of proposed dam site in meters above sea level (to nearest 100 m).
- 2.7. General layout of the project components (preferably of 1:25,000 scale map).
- 2.8. Accessibility (indicated on a map).

3. CATCHMENT AREA CHARACTERISTICS

- 3.1. Name of river and majors tributaries.
- 3.2. Catchment area in km² at dam site.
- 3.3. Catchment area in km² at outlet site if outlet is in a different river.
- 3.4. River mean annual flow at project site in Mm³ (MCM).
- 3.5. Maximum mean monthly flow at project site in Mm³ (MCM).
- 3.6. Minimum mean monthly flow at project site in Mm³ (MCM).
- 3.7. Probable maximum flood in Mm³ (MCM).
- 3.8. Headworks/spillway design flood in Mm³ (MCM).
- 3.9. Quality of catchment area
- 3.10. Minimum flow of river in m³/sec.
- 3.11. Minimum dry season flow from side streams/rivers in the de-watered stretch.

4. TYPE OF PROJECT

- 4.1 Simple run-of-river.
- 4.2 Pondage run-of-river.
- 4.3 Seasonal storage.
- 4.4 Pumped storage.
- 4.5 With or without an inter-basin diversion.
- 4.6 Location of power house in relation to dam.
- 4.7 Installed capacity in megawatts.
- 4.8 Installed capacity in MW (firm).
- 4.9 Energy generation (firm and secondary).

¹ Essential information needed for the Scoping document is not limited to the above mentioned project descriptions.

4.10 Mode of operation.

5. ENGINEERING CHARACTERISTICS

- 5.1 Type of dam.
- 5.2 Dam height in meters.
- 5.3 Dam length in meters.
- 5.4 Power house type.
- 5.5 Type of turbine(s).
- 5.6 Flow through turbine(s).
- 5.7 Tunnel length in km.
- 5.8 Tunnel diameter in meters.
- 5.9 Total length of access roads in kilometers.

6. RESERVOIR CHARACTERISTICS

- 6.1 Reservoir area in hectares.
- 6.2 Reservoir length in km.
- 6.3 Reservoir volume in Mm^3 .
- 6.4 Reservoir live storage in Mm^3 .
- 6.5 Reservoir dead storage in Mm^3 .
- 6.6 Dead storage available for sediments above intake in Mm^3 .
- 6.7 Reservoir draw down height.

7. TRANSMISSION LINES (if applicable)

- 7.1 Voltage in kV.
- 7.2 Total length of transmission lines in kilometers.
- 7.3 Minimum height of conductor above ground.
- 7.4 Right-of-way in meters.
- 7.5 Destination.
- 7.6 Tower type and numbers.
- 7.7 Tower height.
- 7.8 Number of circuits.
- 7.9 Sub-station(s).

ANNEX 5

A Checklist of Relevant Legislation

These Milestone Events – policy, acts, regulations, and the founding of concerned agencies – relate to hydropower development and *Environmental Impact Assessment (EIA)* in Nepal from 2047 BS (1990 AD) to 2058 BS (2001). Before 1990, several acts provided a foundation for addressing related issues; e.g., the *Aquatic Animal Protection Act 1961* (giving some legislative protection to aquatic species habitat/river fisheries) and the *Land Acquisition Act 1977* (providing for acquisition of land for public or private corporations, organizations and private firms for public use and welfare, and establishes a mechanism to compensate private landowners). See also: *National Conservation Strategy 1988* which deals in part with terms of reference for conducting feasibility studies related to large scale projects, the requirements for preparing environmental and socio-economic impact statements and proposed measures to minimize possible detrimental impacts. Nepal is also signatory to the *Convention on World Cultural and Natural Heritage 1974*, *Convention on Wetlands 1968* ('Ramsar Convention'), and the *Convention to Combat Desertification 1997*.

ACRONYMS:

CBO - Community-Based Organization	EPC - Environmental Protection Council	MOPE - Ministry of Population & Environment
DDC - District Development Committee	HMG - His Majesty's Government	MOWR - Ministry of Water Resources
DOED - Department of Electricity Development/MOWR	IPP - Independent Power Producers	NEA - National Electricity Authority
DOF - Department of Forests/MFSC	MLD - Ministry of Local Development	NGO - Non-Governmental Organization
DOI - Department of Irrigation/MOWR	MOFSC - Ministry of Forest & Soil Conservation	NPCS - National Planning Commission Secretariat
DNPWC - Department of National Parks & Wildlife Conservation/MFSC	MOHPP - Ministry of Housing & Physical Planning	VDC - Village Development Committee
		WECS - Water & Energy Commission Secretariat/MOWR

S#	Date*	Name & Description of Key Developments: Legislation, Policy, Regulations, Guidelines, etc.	Concerned Authorities	Potential Stakeholders
1.	2030 B.S. (1973 A.D.)	<p><i>National Parks and Wildlife Conservation Act 2030</i></p> <ul style="list-style-type: none"> ▪ Prohibited actions without permission from authorized persons inside national parks and reserves, including: hunting or damaging any form of wildlife; building or occupying any form of shelter, hut or house; occupying, clearing or cultivating land; pasturing domesticated livestock; damaging, felling or removing any trees, shrubs or forest products; and, setting of forest fire, mining, removing stones, minerals, creating earthworks using explosive, using ammunition or poisons, block or diverting rivers or streams. 	MFSC	local people (incl. CBOs & user groups), NGOs, donors, researchers
2.	2037 (1979)	<p><i>Himalayan National Parks Regulation 2037</i></p> <ul style="list-style-type: none"> ▪ This regulation primarily deals with: provision for utilizing resources by those who are residing within national parks; provision for allowing grazing facilities for livestock kept by residential households; and, restriction on outsiders exploiting natural resources within national park boundaries. However, in case of national priority project, the protected area authority can provide permission if required. 	MFSC	local people (incl. CBOs & user groups), NGOs, donors, researchers

* Not all AD dates correlate precisely with Nepali BS (Bikram Sambat) dates. Dates AD begin in mid-Poush (January 1) while dates BS begin in mid-April (Baisakh 1).

3.	2047 (1990)	<p><i>The Constitution of the Kingdom of Nepal 2047</i></p> <ul style="list-style-type: none"> ▪ Article 26(4) requires that the "State shall give priority to the protection of environment and also to the prevention of its further damage due to physical development activities", and "the State shall also make arrangements for the protection of rare wildlife, the forests..." 	HMG (specifically MOPE & MFSC)	local people (incl. CBOs & user groups), NGOs, citizens, Parliament
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4.	2047 (1990)	WECS and the Environment a report of the Water and Energy Commission Secretariat <ul style="list-style-type: none"> The basis on which the <i>Hydropower Development Policy of 1992</i> was developed. 	MOWR (WECS & DOED)	Donors, IPPs, local people (incl. CBOs & user groups), NEA, NGOs
5.	2049 (1992)	Hydropower Development Policy 2049 (HDP49) <ul style="list-style-type: none"> Emphasizes the need to develop environmentally friendly hydropower to meet the country's energy needs and to encourage the private sector to invest in hydropower. Explains that excess electricity may be sold to NEA to connect to its main transmission and distribution system. (This policy focuses more on electricity generation. Other issues or impacts emerging from a hydropower project such as upstream/downstream benefits and issues like irrigation, navigation, erosion, flood control, siltation, watershed management and involuntary migration, displacement of people, indigenous people, etc., have not been clearly specified.) Reflects realization of the need for utilization of water resources for hydro power generation; enacted through the <i>Electricity Act of 1992</i>. 	MOWR, NPCS	CBOs, donors, IPPs, local people-user groups, NEA, NGOs, citizens
6.	2049 (1992)	Eighth Plan (2049-2054 (1992-1997)) <ul style="list-style-type: none"> Encourages integrating energy generation in the national productive sector. 	Cabinet, NPCS	All line agencies & citizens
7.	2049 (1992)	Water Resources Act 2049 (WRA49) <ul style="list-style-type: none"> Enacted to arrange for the rational utilization, conservation, management and development of water resources in Nepal. Provides for integration of EIA during hydropower project development. In Section 8, Sub-section 1, "a person of corporate body who desires to conduct survey or to utilize water resources, shall be required to submit an application to the prescribed officer or authority along with the economic, technical and environmental study report and with other prescribed particulars." Section 9 deals with the utilization of water resources for hydro electricity. Section 16 deals with utilization and acquisition of land and houses. Sections 18, 19 & 20 deal with water quality standards, water pollution & adverse effect on the environment. Followed in 2050 by <i>Water Resources Rules (WRR50)</i> [#8, below] 	MOWR	DDCs, IPPs, NEA, local people (incl. CBOs & user groups), Municipalities, NGOs, VDCs
8.	2049 (1992)	Electricity Act 2049 (EA49) <ul style="list-style-type: none"> Enacted to manage the survey, generation, transmission and distribution of electricity and to standardize and safeguard electricity services. Section 4, Sub-section states "...survey, generation, transmission or distribution of electricity over 1 MW, shall be required to submit an application to the prescribed officer along with the economic, technical and environmental study report." Section 24 states: "While carrying out electricity generation, transmission or distribution, it shall be carried out in such a manner that no substantial adverse effect be made on environment by the way of soil erosion, flood, landslide, air pollution etc." <p style="text-align: right;">– continued</p>	MOWR	DDCs, IPPs, NEA, local people (incl. CBOs & usergroups), Municipalities, NGOs, VDCs, citizens
		–continued <ul style="list-style-type: none"> Section 33 deals with the utilization and acquisition of land and houses. According to the <i>Electricity Regulation (ER50, below)</i>, there is a mandatory provision of publishing a public notice by DOED giving 35 days, stating the necessary particulars for information for general public. Any person may furnish his reaction to DOED if construction and operation of the proposed project is likely to cause adverse affect. <p>Followed in 2050 by <i>Electricity Regulations (ER50)</i> [#7, below]</p>		

9.	2049 (1992)	<p>Convention on Biological Diversity (CBD)</p> <ul style="list-style-type: none"> Nepal ratified CBD on 23 November 1993. This convention obligates Nepal to: introduce appropriate procedures for EIA; introduce appropriate arrangements to conduct EIAs; promote and exchange information with other nation states; notify immediately the potentially affected neighboring nation states about biodiversity impacts; arrange for protection and conservation of biodiversity; and, examine and enforce restoration and compensation of damage to biodiversity. 	MFSC & associated line agencies	Parliament, NGOs, CBOs & user groups, citizens, & neighboring nation states
10.	2050 (1993)	<p>Electricity Regulations 2050 (ER50)</p> <ul style="list-style-type: none"> The rules for enacting the <i>Electricity Act of 1992</i> [#6, above] 	MOWR (DOED)	DDCs, IPPs, NEA, local people (incl. CBOs & user groups), Municipalities, NGOs, VDCs, citizens
11.	2050 (1993)	<p>Water Resources Rules 2050 (WRR50)</p> <ul style="list-style-type: none"> The rules for enacting the <i>Water Resources Act (WRA49)</i> [#5, above] 	MOWR	DDCs, IPPs, NEA, local people (incl. CBOs & user groups), Municipalities, NGOs, VDCs, citizens
12.	2050 (1993)	<p>National Environmental Policy and Action Plan (NEPAP)</p> <ul style="list-style-type: none"> NEPAP is part of the government's endeavor to incorporate environmental concerns into Nepal's development process. Reviews current government policy on the environment, formulates new policies where needed and suggests an action agenda to address environmental problems. Identifies alternation of ecology from riverine to lake interventions and deals with destruction of forests and wildlife, threats to the survival of migratory aquatic species, climatic changes and the risk of dam failures due to seismic activities (earthquake), loss of agricultural land and displacement of local population as most significant environmental impacts of a hydropower project. The environmental policy describes EIA as a necessary tool in planning a hydroelectric project and emphasizes a greater participatory role of the local community's right from the feasibility study stage to plan execution, especially the adoption of mitigation measures. 	EPC, NPCS, MOPE	DDCs, local people (incl. CBOs & user groups), NGOs, Municipalities, VDCs, citizens

13.	2050 (1993)	<p>National Environmental Impact Assessment (EIA) Guidelines 2050 published by the National Planning Commission.</p> <ul style="list-style-type: none"> ▪ Makes EIA in Nepal legally mandatory. However, EIA guidelines themselves do not have legal recognition, as they have not yet been enshrined in the regulations. ▪ The <i>National EIA Guidelines</i> were endorsed by HMG in September 1992 and gazetted in June 1993. According to the guideline an EIA is mandatory for hydroelectric projects with generating capacity of 5 MW and above. ▪ The guidelines also provide clear directions on how EIAs are to be conducted in Nepal, and specify the responsible agencies. These guidelines were developed in the process of establishing a national system of EIA in Nepal. ▪ Contains objectives, methods for screening projects using IEE or EIA procedures, scoping, impact identification and prediction, report review, monitoring and evaluation, and impact auditing. ▪ Also contains methods for ensuring public participation during the preparation of the EIA report. ▪ Calls for the identification of socio-economic, biological, physico-chemical, and cultural impacts. ▪ Proposes mitigation measures to avoid, eliminate and/or minimize or mitigate each adverse impact and to augment beneficial impacts resulting from a project. ▪ Stresses the inclusion of monitoring and evaluation and a framework for environmental auditing in the EIA report. ▪ Revised by MoPE in 1997 [#18 below] 	NPCS, MOPE	DDCs, DOED, IPPs, local people (incl. CBOs & user groups), Municipalities, NEA, NGOs, VDCs, citizens
14.	2049 (1993)	<p>Forest Act 2049 (FA49)</p> <ul style="list-style-type: none"> ▪ Recognizes the importance of forests in maintaining a healthy environment. Requires decision-makers to take account of all forest values, including environment services and biodiversity. The basis of the Act's approach to forest and forest products is "resources oriented" rather than "use oriented". ▪ Section 23 empowers the government to delineate any part of a national forest as a protected forest. ▪ Section 49 prohibits reclaiming lands, setting fires, grazing, removing or damaging forest products, felling trees or plants, wildlife hunting and extracting boulders, sand and soil from the National forest without prior approval. ▪ The Act empowers government to permit use of any part of government-managed forest, leasehold forest or community forest, if there is no alternative for the implementation of a plan or project of national priority without significantly affecting the environment. ▪ Followed in 1995 by the <i>Forest Regulations (FR51)</i> 	MOFSC	DDCs, local people (incl. CBOs & user groups), Municipalities, VDCs, citizens
15.	2052 (1995)	<p>Forest Regulations 2052 (FR51)</p> <ul style="list-style-type: none"> ▪ Rule 65 stipulates that in case the execution of any project having national priority in any forest area causes loss or harm to any local individual or community the proponents of the project itself shall bear the amount of compensation to be paid. 	MOFSC (specifically DOF & DNPWC)	DDCs, DOED, IPPs, local people (incl. CBOs & user groups), Municipalities, NEA, NGOs, VDCs, citizens
16.	2052 (1995)	<p>Guidelines for Environmental Monitoring (WECS 1995).</p> <ul style="list-style-type: none"> ▪ Focus on types of monitoring (baseline, impact, compliance and surveillance) and methods and documentation of monitoring (environmental surveillance monitoring was new to Nepal's EIA process). 	MOWR (WECS)	IPPs, MOPE
17.	2052 (1995)	<p>Environmental Auditing of Water and Energy Projects (WECS 1995).</p> <ul style="list-style-type: none"> ▪ Details of the site inspection and formal notification processes. 	MOWR (WECS)	IPPs, MOPE

18.	2052 (1995)	Ministry of Population and Environment (MOPE) established.	MOPE	—
19.	2053 (1997)	<p><i>Environmental Protection Act 2053 (EPA53)</i></p> <ul style="list-style-type: none"> ▪ EPA53 says that no development activity shall take without conducting <i>Initial Environment Examination</i> (IEE) or <i>Environment Impact Assessment</i> (EIA) study as per schedules mentioned in the EPR54 (below). ▪ The project proponent must publish a public notice in the national daily newspaper about the project, seeking suggestions regarding impacts due to project, before submitting the Scoping document for approval. ▪ Terms of Reference (TOR) will be prepared based upon the approved Scoping and will be approved by MOPE. This TOR will form a basis for conducting EIA study and the proponent will conduct EIA study and make EIA report as per EPR 54 (below). MOPE will make the report public by publishing a notice in daily newspaper. Any person can read and give comments on it within 30 days of publication of notice. ▪ Scoping, TOR and EIA study must be approved by MOPE. ▪ EPR54 (below) has incorporated a bottom-up approach regarding local participation during various phases of project implementation. Public access to information and transparency of activities has also been looked at in EPA 53 and EPR54. However, IEE of any project can be approved by MOWR. ▪ EPA53 Amended 1998 (2055). 	MOPE, MOWR	DDCs, IPPs, local people (incl. CBOs & user groups), Municipalities, NEA, NGOs, VDCs, citizens
20.	2054 (1997)	<p><i>Environmental Protection Rules 2054 (EPR54)</i></p> <ul style="list-style-type: none"> ▪ The rules for enacting the <i>Environmental Protection Act (EPA53)</i>. ▪ Schedule-1 outlines minimum conditions for conducting IEE. ▪ Schedule-2 outlines minimum conditions for conducting EIA. ▪ Makes compulsory the integration of EIA in hydropower projects. ▪ Amended in 2055 (1997), and henceforth referred to as <i>EPR55</i>. 	MOPE, MOWR (DOED), MFSC	DDCs, IPPs, local people (incl. CBOs & user groups), Municipalities, NEA, NGOs, VDCs, citizens
21.	2054 (1997)	<p>Revised <i>Nafonal Environmental Impact Assessment (EIA) Guidelines</i> for Nepal (MoPE 1997).</p> <ul style="list-style-type: none"> ▪ Calls for ensuring public involvement, collecting relevant information, identifying major issues of public concern, evaluating the seriousness of the issues, and establishing priorities for EIA study. 	<i>Same authorities as #10, above</i>	DDCs, IPPs, local people (incl. CBOs & user groups), Municipalities, NEA, NGOs, VDCs, citizens

22.	2055 (1998)	<p>Ninth Plan (1998-2002)</p> <ul style="list-style-type: none"> ▪ A chapter on Environment and Resource Conservation includes the following statements: <ul style="list-style-type: none"> (a) information on natural and cultural assets, biodiversity and traditional conservation skills will be documented, scientifically analyzed and upgraded; (b) collection of information and documentation of genetic resources of important vegetation, endemic species and other living resources will be carried out on a regular basis; (c) provisions will be made for <i>in situ</i> and <i>ex situ</i> conservation in different national parks, reserves, botanical gardens and zoos; EIAs will be taken into consideration in the formulation and implementation of projects; and, (d) comprehensive legal provisions will be prepared and enforced to facilitate environmental management. ▪ In addition, integration of environmental consideration in development are considered in the plan. ▪ Exemption of income tax, import license fee and sales tax, amendment of various Acts, and the simplification of administrative procedures, to encourage the participation of private sector companies in electricity generation, transmission and distribution are a major emphasis the plan. ▪ Further encourages private sector and joint venture investment in hydropower development, including special attention to the mitigation of adverse environmental and social impacts, along with the integration of watershed management in all water resources development. 	Cabinet, NPCS	All line agencies & citizens
23.	2057 (1999)	<p>Local Self-Governance Act 2057 (LSGA57)</p> <ul style="list-style-type: none"> ▪ Repeals and supercedes the <i>Decentralization Act of 1982, VDC Act of 1991, Municipality Act of 1991</i> and <i>DDC Act of 1991</i>, but recognizes prior activities conducted by VDCs, Municipalities, municipalities and DDCs. ▪ Provides more power to local bodies for legislation formulation, revenue collection and development activities to help function as self-governing institutions. ▪ Empowers VDCs, Municipalities, Municipalities and DDCs to conserve, manage and use their natural resources and collect tax and revenue from the sale/use of such resources and its use for local development. ▪ The special feature under this Act is that the VDC and Municipality are authorized to generate and distribute electricity for VDCs (Part 2, Ch. 4, Section 28.E.3), and municipalities [Part 3, Ch. 4, Section 96.C.8)]. ▪ Similarly, the DDC is authorized to identify, plan, implement, operate, distribute and as maintenance of small rural hydroelectric projects as well as other energy related projects (Part 4, Section 189.C). Furthermore, VDCs are requested to select the development projects in a manner that such projects should contribute to conservation of environment. ▪ Followed within a year by <i>Local Self-Governance Regulations (LSGR57)</i>. 	MLD	DDCs, NGOs, local people (incl. CBOs & user groups), VDCs, citizens
24.	2053 (1997)	<p>Buffer Zone Management Guidelines 2053</p> <ul style="list-style-type: none"> ▪ The areas surrounding national parks and wildlife reserves have been declared as buffer zones. The Buffer Zone Regulations provide limited access to development activities, with permission from the National Parks and Wildlife office. 	MFSC	Local people (incl. CBOs & user groups), citizens
25.	2053 (1997)	<p>Conservation Area Management Regulations 2053</p> <ul style="list-style-type: none"> ▪ This regulation prohibits the following activities within designated Conservation Areas: hunting, felling of trees or removing forest products; removing stones and mining operations; and, use of explosive and diverting of rivers and streams. However, in case of national priority project, the conservation area authority can provide permission if required. 	MFSC	local people (incl. CBOs & user groups), NGOs, development agencies, citizens

26.	2057 (2000)	<p>Local Self-Governance Regulations 2057 (LSGR57)</p> <ul style="list-style-type: none"> ▪ VDCs authorized to impose land tax, market/shop tax, vehicle tax, entertainment tax, rent tax, advertisement tax, and business/industry tax up to Rs. 1,000. ▪ Municipalities authorized to impose house/plot tax and land tax, rent tax, business/industry and service tax. ▪ Regarding hydropower, municipalities are authorized to impose tax within the range of Rs. 2,000-15,000 per year. ▪ Similarly, municipalities are authorized to impose vehicle tax, integrated property tax (excluding hydropower projects), entertainment tax, commercial video show tax, parking fees and property valuation fees. ▪ DDCs are authorized to impose road tax, and use the collected amount on maintenance of the roads. ▪ DDCs are not authorized to impose road tax for the maintenance of highways and sub-highways. ▪ DDCs authorized to impose commodity tax on exported goods/commodities from the district, including stone, gravel and sand (@Rs. 60/ truck for stone, gravel and sand). 	MLD	DDCs, NGOs, local people (incl. CBOs & user groups), VDCs, citizens
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ANNEX 6

Principal Project Components for Scoping Matrix

NOTE: Certain components may be lumped together, or may not be applicable, depending on the nature of a given project.

1. PERMANENT INFRASTRUCTURE FOR GENERATION

- 1.1. Main dam
- 1.2. Bottom outlet
- 1.3. Secondary dams and dykes
- 1.4. Intake
- 1.5. Spillway
- 1.6. Desander
- 1.7. Tunnel
- 1.8. Surge tank
- 1.9. Valve house
- 1.10. Penstock
- 1.11. Power house
- 1.12. Switchyard
- 1.13. Tailrace
- 1.14. Re-regulation weir
- 1.15. Permanent access roads
- 1.16. Offices and residential areas
- 1.17. Reservoir
- 1.18. Adits

2. CONSTRUCTION PHASE

- 2.1. Camp and office areas
- 2.2. Temporary access roads
- 2.3. Borrow pits
- 2.4. Spoil areas
- 2.5. Construction plants
- 2.6. Construction activities
- 2.7. Manpower requirement
- 2.8. Resources requirement for construction activities

3. OPERATIONAL PHASE

- 3.1. Reservoir filling
- 3.2. Reservoir operation
- 3.3. Downstream hydrology and water quality below intake point
- 3.4. Downstream hydrology and water quality below tailrace
- 3.5. Downstream hydrology and water quality below re-regulation weir

4. CATCHMENT AREA PROTECTION AND MANAGEMENT

- 4.1. Mass wasting
- 4.2. Man-made soil erosion
- 5. PERMANENT INFRASTRUCTURE FOR TRANSMISSION
 - 5.1. Towers
 - 5.2. Transmission lines
 - 5.3. Substations
 - 5.4. Protection structures
 - 5.5. Clearing right-of-way
- 6. OPERATIONAL PHASE FOR TRANSMISSION
 - 6.1. Right-of-way maintenance
 - 6.2. Transmission lines
 - 6.3. Towers
 - 6.4. Substations

ANNEX 7

Major Environmental Indicators for Scoping Matrix

- 1. SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT
 - 1.1. Health and Sanitation
 - 1.1.1. Psychological environment: anxiety, comfort, privacy
 - 1.1.2. Waterborne diseases
 - 1.1.3. Introduced diseases, including STDs, AIDS
 - 1.1.4. Sanitation
 - 1.2. Safety
 - 1.2.1. Law and order
 - 1.2.2. Occupational hazards
 - 1.2.3. Fire hazards
 - 1.3. Economy
 - 1.3.1. Occupations/employment
 - 1.3.2. Settlements
 - 1.3.3. Migration
 - 1.3.4. Trade and Commerce
 - 1.3.5. Industry
 - 1.3.6. Income/expenditure
 - 1.3.7. Forest products
 - 1.3.8. Agro-products/cash crops
 - 1.3.9. Livestock and poultry
 - 1.3.10. Fisheries

- 1.3.11. Markets
- 1.3.12. Land tenure
- 1.3.13. Tourism
- 1.3.14. Water uses

1.4. Aesthetic Characteristics

- 1.4.1. Noise and vibrations
- 1.4.2. Visual qualities of landscape

1.5. Infrastructure

- 1.5.1. Transportation
- 1.5.2. Communications
- 1.5.3. Electricity
- 1.5.4. Sewage treatment
- 1.5.5. Water supply
- 1.5.6. Flood protection
- 1.5.7. Solid waste disposal
- 1.5.8. Development projects
- 1.5.9. Irrigation

1.6. Local Institutions

- 1.6.1. Police
- 1.6.2. Health care
- 1.6.3. Education
- 1.6.4. Government institutions/agencies
- 1.6.5. Local government
- 1.6.6. NGOs/CBOs

1.7. Demographic Characteristics

- 1.7.1. Birth and death rates
- 1.7.2. Density and distribution
- 1.7.3. In- and out-migration
- 1.7.4. Age and sex structure
- 1.7.5. Literacy

1.8. Culture

- 1.8.1. Belief systems: religious, social and cultural awareness
- 1.8.2. Traditions
- 1.8.3. Sociocultural values and norms
- 1.8.4. Caste and ethnicity
- 1.8.5. Gender issues

1.9. Important Sites

- 1.9.1. Recreational resources

- 1.9.2. Scientific resources
- 1.9.3. Historical sites
- 1.9.4. Religious sites
- 1.9.5. Archaeological resources

2. BIOLOGICAL ENVIRONMENT

2.1. Aquatic Fauna

- 2.1.1. Zooplankton
- 2.1.2. Fish
- 2.1.3. Other aquatic species
- 2.1.4. Disease vectors

2.2. Aquatic Flora

- 2.2.1. Phytoplankton
- 2.2.2. Aquatic weeds

2.3. Terrestrial Fauna

- 2.3.1. Endangered species
- 2.3.2. Endemic species
- 2.3.3. Game species
- 2.3.4. Agricultural pests
- 2.3.5. Species of biomedical interest

2.4. Terrestrial Vegetation and Flora

- 2.4.1. Forests
- 2.4.2. Croplands
- 2.4.3. Grazing lands
- 2.4.4. Other vegetation
- 2.4.5. Endangered species
- 2.4.6. Endemic species
- 2.4.7. Flood plains
- 2.4.8. Species of biomedical interest

3. PHYSICAL ENVIRONMENT

3.1. Meteorology

- 3.1.1. Rainfall
- 3.1.2. Temperature and humidity
- 3.1.3. Evaporation
- 3.1.4. Air quality
- 3.1.5. Wind

3.2. Hydrology

- 3.2.1. Drainage
- 3.2.2. Groundwater
- 3.2.3. Springs
- 3.2.4. Hydrological regime
- 3.2.5. Sediments and sedimentation
- 3.2.6. Water quality
- 3.2.7. Glacial lake outburst floods

3.3. Geology

- 3.3.1. Topography
- 3.3.2. Geomorphology
- 3.3.3. Soil
- 3.3.4. Seismicity
- 3.3.5. Landslides
- 3.3.6. Soil erosion
- 3.3.7. River morphology
- 3.3.8. Land-use
- 3.3.9. Mass wasting

ANNEX 9

Glossary of Terms Used for Scoping and EIA of Hydropower in Nepal

Adit: A tunnel used made for geological investigations.

Afterbay: A lake or water impoundment located downstream from the power plant that receives the water after it has passed through the hydroelectric turbines.

Aggressive Water: Water that attacks and degrades concrete and metal structures.

Altitude: The height of a project component in meters above sea level (m a.s.l.).

Arch Dam: Curved masonry or concrete dam, convex in shape upstream, that depends on arch action for its stability; the load or water pressure is transferred by the arch to the Abutments.

Bed load: Heavy sediments that are pushed along the riverbed.

Borrow Pits: Areas from where construction materials (rock, sand, and/or clay) are excavated.

Bottom Outlet: A structure designed to permit a restricted flow of water in the river between the dam and the tailrace.

Buttress Dam: A dam consisting of a watertight upstream face supported at intervals on the downstream side by a series of buttresses.

Canal: A constructed open channel for transporting water.

Catchment Area: The area of land, in square kilometers (km²) or hectares (ha), that drains to a specific point on a river.

Channel: See canal.

Check dam: A small dam constructed in a gully or other small water course to decrease the stream flow velocity, minimize channel erosion, promote deposition of sediment and to divert water from a channel.

Coffer Dam: A temporary dam used to divert the river during the construction phase.

Dam: A concrete or earthen barrier constructed across a river and designed to control water flow or create a reservoir.

DDC: District Development Committee, a district level local government body comprised of all VDCs in that district.

Dead Storage: The volume, in millions of cubic meters (Mm³), provided in a reservoir, below the invert level of intake structures, to accommodate sediment

deposit during its useful life. Water in dead storage cannot be used for power generation.

Demand: The rate at which electric energy is used, whether at a given instant, or averaged over any designated period of time.

Desander: A structure designed to remove sediments from the water being diverted to the head race.

Dike: (Engineering) An embankment to confine or control water, especially one built along the banks of a river to prevent overflow of lowlands; a levee.

Discharge: Volume of water released from a dam or powerhouse at a given time, usually expressed in cubic meters per second (m^3/s).

Diversion: The transfer of water from a stream, lake, aquifer, or other source of water by a canal, pipe, well, or other conduit to another watercourse or to the land, as in the case of an irrigation system.

Diversion channel: (1) An artificial channel constructed around a town or other point of high potential flood damages to divert floodwater from the main channel to minimize flood damages. (2) Channel carrying water from a diversion dam.

Diversion Dam: A barrier built to divert part or all of the water from a stream into a different course.

Drainage area: See catchment area.

Drawdown: The release of water from a reservoir for power generation, flood control, irrigation or other water management activity.

Earthfill or Earth Dam: An embankment dam in which more than 50 percent of the total volume is formed of compacted fine-grained material obtained from a borrow area (i.e., excavation pit).

Elevation: Height in meters above sea level (m a.s.l.).

Embankment: An artificial deposit of material that is raised above the natural surface of the land and used to contain, divert, or store water, support roads, or for other similar purposes.

Embankment Dam: A dam structure constructed of fill material, usually earth or rock, placed with sloping sides and usually with a length greater than its height.

Endangered Species: Any species plant or animal defined through the legislation of the Kingdom of Nepal as being in danger of extinction throughout all or a significant portion or its range, and published in His Majesty's Government of Nepal Gazette.

Endemic Species: A species of animal or plant native to, or limited to, a specific geographical area.

Erosion: Wearing away of rock or soil by the gradual detachment of soil or rock fragments by water, wind, ice, and other mechanical, chemical, or biological forces.

Fill Dam: Any dam constructed using excavated natural materials.

Firm Energy: The amount of energy that can be generated over a period of time under specific hydrological conditions.

Flash Flood: A sudden flood of great volume, usually caused by a heavy rain. Also, a flood that crests in a short length of time and is often characterized by high velocity flows. It is often the result of heavy rainfall in a localized area.

Floodplain: Land that gets covered with water as a result of the flooding of a nearby stream, or level lowland bordering a stream or river onto which the flow spreads at flood stage.

Forebay: The part of a dam's reservoir that is immediately upstream from the powerhouse.

Gauging station: A particular site in a stream, lake, reservoir, etc., where hydrologic data are obtained.

Game Species: Any species of wildlife hunted for subsistence or for sport.

Glacial Lake Outburst Flood (GLOF): Catastrophic event, frequent in Nepal, due to sudden breakage of boundary of a glacial lake in the High Himalayas.

Gradient: Vertical drop per unit of horizontal distance.

Gravity Dam: A dam, constructed of concrete and/or masonry, that relies on its own weight for stability.

Groundwater: Subsurface water and underground streams that can be collected with wells, or that flow naturally to the earth's surface through springs.

Guideline: Administrative constraints applicable in developing a plan and criteria directing the actions taken to achieve objectives.

Habitat: The local environment, in which an organism normally lives and grows.

Hatchery: Refers to facilities that incubate eggs and rear the young for release into streams and rivers.

Head Race: The water conveyance system that carries diverted water for power generation.

Headwater: Referring to the source of a stream or river.

Headworks: The flow control structures of a hydroelectric project that are located upstream of the power house.

Hydraulic head: The vertical distance between the surface of the reservoir and the surface of the river immediately downstream from the powerhouse.

Hydroelectricity (Hydroelectric power): The production of electric power through use of the gravitational force of falling water.

Impoundment: A body of water formed behind a dam.

Inflow: Water that flows into a reservoir or forebay during a specified period.

Installed Capacity: The "nameplate" capacity of the total number of generators installed in the powerhouse.

Intake: The entrance to a turbine at a dam, diversion works, or pumping station.

Intake screens: Large screens, which may have moving or non moving parts, designed to be placed in a dam's turbine intake at an angle to deflect juvenile fish from the intakes into a bypass system.

Interbasin diversion: Artificial conveyance of water from one river system to another.

Irrigation diversion: Generally, a ditch or channel that deflects water from a stream channel for irrigation purposes.

Kilowatt (kW): The electrical unit of power, which equals 1,000 watts or 1.341 horsepower.

Kilowatt-hour (kWh): A basic unit of electrical energy that equals one kilowatt of power applied for one hour.

Landslide: A movement of earth and rocks down a steep slope.

Levee: An embankment constructed to prevent a river from overflowing (flooding).

Live Storage: The storage, in millions of cubic meters (Mm³), between full reservoir level and dead storage level. Water in live storage can be used for power generation.

Macrophytes: Aquatic plants that are large enough to be seen with the naked eye.

Masonry Dam: A dam constructed mainly of stone, brick, or concrete blocks that may or may not be joined with mortar. A dam having only masonry facing should not be referred to as a masonry dam.

Mass Wasting: The downslope movement of earth caused by gravity. Includes but is not limited to landslides, rock falls, debris avalanches, and creep. It does not however, include surface erosion by running water. It may be caused by natural erosion processes or by natural disturbances (e.g., earthquakes or fire events) or human disturbances (e.g., mining or road construction).

MCM: Volume of water in a reservoir in million of cubic meters (10^6m^3).

Megawatts (MW): A megawatt is one million watts or one thousand kilowatts, a measure of electrical power or generating capacity. In developed countries megawatt will typically serve about 1,000 people.

Minimum flow level: The level of stream flow sufficient to support fish and other aquatic life; to minimize pollution; or, to maintain other instream uses such as domestic use, watering stock, subsistence irrigation, religious purposes, recreation and navigation.

Mitigating measures: Modifications of actions that (1) avoid impacts by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation; (3) rectify impacts by repairing, rehabilitating, or restoring the affected environment; (4) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (5) compensate for impacts by replacing or providing substitute resources or environments.

Mitigation: The act of alleviating or making less severe

Monitor: To measure, systematically and repeatedly, the conditions in order to track change.

Off-channel area: Any relatively calm portion of a stream outside of the main flow.

Off-site enhancement: The improvement in conditions for fish or wildlife species away from the site of a hydroelectric project that had detrimental effects on fish and/or wildlife, as part or total compensation for those effects

Off-peak hours: Period of relatively low demand for electrical energy, as specified by the supplier (such as the middle of the night).

On-site enhancement: Usually refers to projects or activities designed to address harm caused to fish and wildlife at the site of the impact.

Outflow: The water that is released from a project during the specified period.

Overburden: The unusable material which overlays clays, gravel, or rock to be excavated for construction purposes.

Peak flow: Refers to a specific period of time when the discharge of a stream or river is at its highest point.

Peak load: The maximum electrical demand in a stated period of time (eg: day, year).

Peak power: The generation of electricity to meet maximum instantaneous power requirements, and usually refers to daily peaks.

Peaking run-of-river: A hydroelectric project designed to produce electricity, by regulating the river flow on a daily basis, to cater for peak load demand on that day.

Penstock: A closed conduit supplying water under pressure to the turbine(s).

Phytoplankton: Microscopic floating plants, mainly algae, that live suspended in bodies of water and that drift about because they cannot move by themselves or because they are too small or too weak to swim effectively against a current.

Plankton: Minute floating forms of microscopic plants and animals in water that cannot get about to any extent under their own power. They form the important beginnings of food chains for larger animals.

Powerhouse: A primary part of a hydroelectric dam where the turbines and generators are housed and where power is produced by falling water rotating turbine blades.

Project: Run-of-river or storage dam and related facilities; also a diversion facility.

Project outflow: The volume of water per unit of time released from a project after generating power.

Pumped storage: Water generates power during peak demand, while the same water is pumped back into the reservoir during low demand periods.

Reach: A section of stream between two defined points.

Recreational Rivers: Rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shoreline, and that may have undergone some impoundment or diversion in the past.

Reregulating project: A dam and reservoir, located downstream from a hydroelectric peaking plant, with sufficient storage capacity to store the widely fluctuating discharges from the peaking plant and to release them in a relatively uniform manner downstream.

Reregulation: Storing erratic discharges of water from an upstream hydroelectric plant and releasing them uniformly from a downstream plant.

Reservoir: A body of water collected and stored in an artificial lake behind a dam.

Restoration: The renewing or repairing of a natural system so that its functions and qualities are comparable to its original, unaltered state.

Riffle: A reach of stream that is characterized by shallow, fast moving water broken by the presence of rocks and boulders.

Right-of-way (ROW): The cleared and managed areas that are either side of a transmission line.

Riparian area: An area of land and vegetation adjacent to a stream that has a direct effect on the stream. This includes woodlands, vegetation, and floodplains.

River basin: The catchment area of a river.

River Basin Plan: A plan for the development of water and related land resources to make the best use of such resources to meet the basin needs and make the greatest long-term contribution to the economic growth and social well-being of the people of the basin and the nation.

River Channels: Natural or artificial open conduits which continuously or periodically contain moving water, or which form a connection between two bodies of water.

Riverine: Relating to, formed by, or resembling a river including tributaries, streams, brooks, etc.

Riverine habitat: The aquatic habitat within streams and rivers.

Rockfill Dam: An embankment dam in which more than 50 percent of the total volume is comprised of compacted or dumped pervious natural or crushed rock.

Rolled Fill Dam: An embankment dam of earth or rock in which the material is placed in layers and compacted by using rollers or rolling equipment.

Run-of-river dams: Hydroelectric generating plants that operate based only on available inflow and a limited amount of short-term storage (daily/weekly pondage).

Runoff: Water that flows over the ground and reaches a stream as a result of rainfall or snowmelt.

Sand: Small substrate particles, generally referring to particles less than 2 mm in diameter. Sand is larger than silt and smaller than cobble or rubble.

Scenic Rivers: Rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive, and shorelines largely undeveloped but accessible in places by roads.

Scour: The erosive action of running water in streams, which excavates and carries away material from the bed and banks. Scour may occur in both earth and solid rock material.

Seasonal Storage: A project designed to store excess water from one season, and use it for the generation of electricity during another season.

Sediment: The inorganic material that is transported and deposited by wind and water.

Sedimentation: Deposition of sediment.

Silt: Substrate particles smaller than sand and larger than clay.

Siltation: The deposition or accumulation of fine soil particles.

Slope: The side of a hill or mountain, the inclined face of a cutting, canal or embankment or an inclination from the horizontal.

Slope stability: The resistance of a natural or artificial slope or other inclined surface to failure by landsliding (mass wasting).

Sluiceway: An open channel inside a dam designed to collect and divert ice and trash in the river (e.g., logs) before they get into the turbine units and cause damage.

Spill: Releasing water through the spillway rather than through the turbine units.

Spillway: The channel or passageway around or over a dam through which excess water is released or "spilled" past the dam without going through the turbines. A spillway is a safety valve for a dam and, as such, must be capable of discharging major floods without damaging the dam, while maintaining the reservoir level below some predetermined maximum level.

Spillway crest elevation: The point at which the reservoir behind a dam is level with the top of the dam's spillway.

Spoil: The rock and debris produced by tunneling and other excavations.

Stone: Rock fragments larger than 25.4 cm (10 inches) but less than 60.4 cm (24 inches).

Storage: The volume of water in a reservoir at a given time.

Storage reservoir: A reservoir in which storage is held over from the annual high water period to the following low water period.

Stream: A general term for a body of flowing water, or a natural watercourse containing water at least part of the year. In hydrology, the term is generally applied to the water flowing in a natural channel as distinct from a canal. More generally, as in the term "stream gauging", it is applied to the water flowing in any channel, natural or artificial.

Stream Channel: The bed where a natural stream of water runs or may run; the long narrow depression shaped by the concentrated flow of a stream and covered continuously or periodically by water.

Stream gradient: A general slope or rate of change in vertical elevation per unit of horizontal distance of the water surface of a flowing stream.

Stream morphology: The form and structure of streams.

Streambank erosion: The wearing away of streambanks by flowing water.

Streambank stabilization: Natural geological tendency for a stream to mold its banks to conform to the channel of least resistance to flow. Also the lining of streambanks with riprap, matting, etc., to control erosion.

Streambed: The channel through which a natural stream of water runs or used to run, as a dry streambed.

Streamflow: The rate at which water passes a given point in a stream or river, usually expressed in cubic feet per second (m³/s).

Streamlet: A small stream.

Substation: A facility that switches, changes, or regulates electricity voltage. Substations route and control electrical power flows, transform voltage levels, and serve as delivery points to industrial customers.

Surface erosion: The detachment and transport of soil particles by wind, water, or gravity. Or groups of processes whereby soil materials are removed by running water, waves and currents, moving ice, or wind.

Surface Water: All waters whose surface is naturally exposed to the atmosphere, for example, rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc., and all springs, wells, or other collectors directly influenced by surface water.

Surge Tank (headrace): This structure is located between the head race tunnel and the penstock. It provides sufficient water to the power house in case of sudden load acceptance. It also prevents high water pressures being transmitted to the head race tunnel during load rejection or sudden stopping of the turbines.

Surge Tank (tailrace): This structure is located between the turbine at the power house and the tailrace channel.

Suspended sediment: Sediment suspended in a fluid by the upward components of turbulent currents, moving ice, or wind.

Switch Yard: The area where outdoors switching equipments are installed.

Tailrace: The canal or channel that carries water away from the power house after electricity generation to discharge into a natural stream.

Tailwater: The water surface immediately downstream from a dam or hydroelectric power plant.

Thermocline: That layer of water in a lake in which the temperature changes 1°C with each meter increase in depth.

Transition period: A period of environmental change during which a population increases or decreased to a new stable equilibrium level.

Transmission Lines: The high voltage lines, transformers and switches used to move electrical power from generators to the distribution system.

Tributary: A stream that flows into another stream, river, or lake.

Turbidity: "The term "turbid" is applied to waters containing suspended matter that interferes with the passage of light through the water or in which visual depth is restricted."

Turbine: An engine in a power house that rotates with the force of falling water and produces electricity.

Useful Storage: The volume, in millions of cubic meters (Mm³), of the live storage, less the silting above dead storage level and the evaporation losses during the non-monsoon period.

Valve House: Valves are usually installed at two places in the penstock. One valve is immediately after the surge tank (control valve or penstock valve) The second is at the downstream end of the conduit, immediately upstream of the turbine (inlet valve or turbine valve).

VDC: Village Development Committee, which is the first second of local administration in Nepal.

Washout: (1) Erosion of a relatively soft surface, such as a roadbed, by a sudden gush of water, as from a downpour or floods. (2) A channel produced by such erosion.

Wasteway: An open ditch or canal that discharges excess irrigation water or power plant effluent into the river channel.

Water Conservation: The physical control, protection, management, and use of water resources in such a way as to maintain crop, grazing, and forest lands, vegetative cover, wildlife, and wildlife habitat for maximum sustained benefits to people, agriculture, industry, commerce, and other segments of the national economy.

Water Pollution: Generally, the presence in water of enough harmful or objectionable material to damage the water's quality.

Water quality: A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Watershed: The dividing line between two adjacent river basins. The term is also frequently used as a synonym of "catchment area".

Watershed management (Catchment Area management): The analysis, protection, development, operation or maintenance of the land, vegetation and water resources of a drainage basin for the conservation of all its resources for the benefit of its residents.

Weir (dam): A dam in a river to stop and raise the water, for the purpose of conducting it to a mill, forming a fishpond, or the like. When uncontrolled, the weir is termed a fixed-crest weir. Other types of weirs include broad-crested, sharp-crested, drowned, and submerged.

Zooplankton: Small aquatic animals that are suspended or swimming in water.

ANNEX 10

Format for the Scoping Report

The Scoping document should be concise. Use tables and graphs wherever possible.

1. INTRODUCTION

- 1.1. Agency or individual responsible for preparing scoping document
- 1.2. Objective of scoping and EIA

2. PROJECT DESCRIPTION

- 2.1. Background and objectives of the project
- 2.2. Project description

3. SCOPING METHODOLOGY

- 3.1 Methodology
- 3.2 Public notice and the responses
- 3.3 List of authorities, interested and affected parties consulted

4. DESCRIPTION OF EXISTING ENVIRONMENT

- 4.1. Definition of impact area
- 4.2. Description of existing environment

5. ENVIRONMENTAL IMPACTS

5.1. Key impacts

- 5.1.1. Physical environment
 - Construction stage
 - Operation stage
- 5.1.2. Biological environment
 - Construction stage
 - Operation stage
- 5.1.3. Socio-economic and cultural environment
 - Construction stage
 - Operation stage

5.2. Proposed alternatives to be examined in the EIA

6. SUMMARY AND CONCLUSIONS

- 6.1. Summary
- 6.2. Conclusions
- 6.3. Recommendations

7. REFERENCES

- 7.1. Literature
- 7.2. Maps
- 7.3. Other

8. ANNEXES

Annex 11: List of Participants of the Scoping and TOR Workshop.

Dr. Kishor Babu Aryal	Department of Electricity Development
Mr. B.B. Thapa	Department of Electricity Development
Mr. Mahendra P. Dhungel	Department of Electricity Development
Mr. R.K. Shilpakar	Department of Electricity Development
Mr S.K. Malla	Department of Electricity Development
Mr. Buddi Man Gauchan	Department of Electricity Development
Mr. Dilip Kumar Sadaula	Department of Electricity Development
Mr. J. Mandal	Department of Electricity Development
Mr. Amitabh Rajouria	Department of Electricity Development
Mr. Gokarna Panth	Department of Electricity Development
Mr. P. Acharya	Department of Electricity Development
Mr. Madhu Prasad Bhetwal	Department of Electricity Development
Mr. D.B. Singh	Ministry of Water Resources
Mr. Raju Maharjan	Ministry of Water Resources
Mr. Dow Nichol	International Resources Group
Dr. S. Gorzula	International Resources Group
Mr. Bharat Sharma	International Resources Group and METCON
Dr. Govind Ghimire	International Resources Group and METCON
Dr. R.B. Khadka	International Resources Group and National Environmental Impact Association of Nepal
Mr. R.C. Arya	Water and Energy Commission Secretariat
Mr. U.D. Bhatta	Nepal Electricity Authority
Mr. Ajay Mathema	National Environmental Impact Association of Nepal
Ms. Hasina Shrestha	National Environmental Impact Association of Nepal
Mr. Tony Carvalho	United States Agency for International Development
Mr. B.N. Pradhan	United States Agency for International Development
Mr. Rudra Sapkota	Department of Soil Conservation and Watershed Management
Mr. Arjun Kumar Karki	Department of Water Induced Disaster Prevention
Mr. Ramesh Shakya	Department of Forests
Mr. Shubha Nath Pandit	Butwal Power Company
Dr. H.O. Skar	Himal Power Limited
Mr. Kumar Pandey	Lamjung Electricity Development Company