



IPROMO

NATURAL HAZARDS AND DISASTER RISK MANAGEMENT IN MOUNTAINS

IPROMO 2011 – 4th Summer School

ENVIRONMENTAL IMPACT IN MOUNTAIN AREAS

Andrea Rondinara

Geologist – Specialized in Environmental Impact Assessment

ORMEA (CN) – 18th July 2011

ENVIRONMENTAL IMPACT

When we speak about ENVIRONMENTAL IMPACT we refer to

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

EIA was first introduced in the **USA** within the framework of the National Environmental Policy Act (NEPA) in 1969, which became law on January 1st, **1971**.

Later we had **European** implementation **from 1985**: Belgium 1985, Italy 1988, Germany 1990, Uk 1990, etc..

Since the 1992 Earth Summit, many countries have adopted national Environmental Impact Assessment (EIA) laws and policies to mitigate environmental damage resulting from economic development activities.



ENVIRONMENTAL IMPACT

Some example from some of your countries:

NEPAL: The government of Nepal introduced the National Environmental Impact Assessment Guidelines (NEIAG) in 1993. This Guidelines provided a general methodology for conducting an EIA study but there was no approval process and legal requirements of an EIA study. Only after the Environment Protection Act, 1997 (EPA97) and the Environment Protection Regulation, 1997 (EPR97) the EIA study became legally binding and it is made mandatory for the projects to get approval from the Ministry of Environment Science and Technology (MoEST).

COLOMBIA: The Ministry of the Environment of Colombia was created through Law 99 of 1993, with sustainable development as the fundamental basis for the new environmental legislation. The Law clearly defined the EIA process, the requirements for obtaining the environmental license to build and operate projects and, if so required, the submission of an environmental alternatives analysis of the proposed project.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

EIA is considered as a project management tool for collecting and analyzing information on the environmental effects of a project.

EIA is intended as an instrument of preventive environmental management.

As such, it is used to:

- identify potential environmental impacts;
- examine the significance of environmental implications;
- assess whether impacts can be mitigated;
- recommend preventive and corrective mitigating measures;
- inform decision makers and concerned parties about the environmental implications.

EIA PROCESS

In EIA systems there are sequence of activities implemented in project in a logical sequence and are termed as EIA process.

- Project screening
- Scoping
- Baseline data collection
- Identification of environmental impacts
- Impact prediction
- Comparison of alternatives
- Mitigation measures
- Public consultation and participation
- Environmental monitoring

EIA PROCESS

- **Project screening**
- **Scoping**
- **Baseline data collection**
- **Identification of environmental impacts**
- **Impact prediction**
- **Comparison of alternatives**
- **Mitigation measures**
- **Public consultation and participation**
- **Environmental monitoring**



EIA PROCESS

Project screening

Many projects are considered by the public and private agencies every year. Development projects have biophysical as well as social and economic impacts. Sufficient understanding of these factors are necessary for the initial screening decision. It is therefore, important to establish mechanisms by identifying projects which requires EIA, and this process of selection of project is referred to as "Screening".

EIA PROCESS

- Project screening
- **Scoping**
- Baseline data collection
- Identification of environmental impacts
- Impact prediction
- Comparison of alternatives
- Mitigation measures
- Public consultation and participation
- Environmental monitoring

EIA PROCESS

Scoping

Scoping is to determine what should be the coverage or scope of the EIA study for a project proposal as having potentially significant environmental impacts. It also helps in developing and selecting alternatives to the proposed action and in identifying the issues to be considered in an EIA.

EIA PROCESS

- Project screening
- Scoping
- **Baseline data collection**
- Identification of environmental impacts
- Impact prediction
- Comparison of alternatives
- Mitigation measures
- Public consultation and participation
- Environmental monitoring

EIA PROCESS

Baseline data collection

Baseline information is important reference point for conducting EIA. The term "baseline" refers to the collection of background information on the biophysical, social and economic settings proposed project area. Normally, information is obtained from secondary sources when there exists a facility of database, or the acquisition of new information through field samplings.

EIA PROCESS

- Project screening
- Scoping
- Baseline data collection
- **Identification of environmental impacts**
- Impact prediction
- Comparison of alternatives
- Mitigation measures
- Public consultation and participation
- Environmental monitoring

EIA PROCESS

Identification of environmental impacts

Any economic development project, whether it is a simple and small one or a large and complex one, has some environmental implications. The environmental implications may be beneficial or adverse, but the main objective of impact identification is to specify areas that are likely to be affected by the implementation of a project. Environmental impact, by definition, implies an alteration of environmental conditions or creation of a new set of adverse or beneficial environmental consequences caused by the action under consideration. Impact identification starts at the early stage of scoping when data on both the project and surrounding environment are made available. As the EIA study progresses, more data become available on the environment and socioeconomic conditions. The preliminary identification of impacts from scoping may be confirmed or new impacts may be identified as requiring investigation.

ENVIRONMENTAL IMPACTS ARE ONE OF OUR CHIEF SUBJECT OF THIS PRESENTATION

EIA PROCESS

- Project screening
- Scoping
- Baseline data collection
- Identification of environmental impacts
- **Impact prediction**
- Comparison of alternatives
- Mitigation measures
- Public consultation and participation
- Environmental monitoring

EIA PROCESS

Impact prediction

Prediction should be based on the available environmental baseline of the project data. Such predictions are described in quantitative or qualitative terms.

Magnitude of Impact: this is defined by the severity of each potential impact and indicates whether the impact is irreversible or, reversible and estimated potential rate of recovery. The magnitude of an impact can not be considered high if a major adverse impact can be mitigated.

Extent of Impact: the spatial extent or the zone of influence of the impact should always be determined. An impact can be site-specific or limited to the project area; a locally occurring impact within the watershed of the proposed project; a regional impact that may extend beyond the watershed; and a national impact affecting resources on a national scale.

Duration of Impact: environmental impacts have a temporal dimension and needs to be considered in an EIA. Impacts arising at different phases of the project cycle may need to be considered. The type of impacts produced during the construction phase are generally of short-termed.

EIA PROCESS

- Project screening
- Scoping
- Baseline data collection
- Identification of environmental impacts
- Impact prediction
- **Comparison of alternatives**
- Mitigation measures
- Public consultation and participation
- Environmental monitoring

EIA PROCESS

Comparison of alternatives

Assessment of alternatives in EIA has been considered as the "heart" of environmental impact reports. In order to achieve systematic decision-making in the choice of alternatives, it is desirable to use trade-off analyses, which typically involve the comparison of a set of alternatives relative to a series of decision factors. The following formal and informal approaches can be used to carry out the comparative analysis:

Qualitative approach: in which descriptive information on each alternative is presented;

Quantitative approach: in which quantitative information on each alternative is presented;

Ranking, rating or scaling approach: in which the qualitative or quantitative information, on each alternative is summarised through the assignment of rank, rating or scale value usually based on the characteristics of the impacts (severity, reversibility, etc.);

Weighting approach: in which the importance in weight of each alternative is presented in view of the relative importance of the decisive factors;

Weighting-ranking/rating/scaling approach: in which the relative importance of either environmental factors, or impacts are determined and numerical weights are assigned to each factor or impact. The important weight is multiplied by the ranking/rating of each alternative, then the resulting products for each alternative are summed up to develop an overall composite index or score for each alternative.

EIA PROCESS

- Project screening
- Scoping
- Baseline data collection
- Identification of environmental impacts
- Impact prediction
- Comparison of alternatives
- **Mitigation measures**
- Public consultation and participation
- Environmental monitoring

EIA PROCESS

Mitigation measures

Mitigation measures are recommended actions to reduce, avoid or offset the potential adverse environmental consequences of development activities. The target of mitigation measures is to maximise project benefits and minimise undesirable impacts.

MITIGATION MEASURES IS ANOTHER OF OUR CHIEF SUBJECT OF THIS PRESENTATION

EIA PROCESS

Mitigation measures

Measures most relevant to development projects are:

Preventative measures:

prevent or reduce potential adverse impacts before occurrence, e.g.

- health education programme, and
- public awareness programme

Compensatory measures:

actions that compensate unavoidable adverse impacts, e.g.

- restoration of damaged resources,
- creation of similar resources or habitats elsewhere to replace a loss, and
- compensation to affected persons

Corrective measures:

applied to reduce the adverse impact to the acceptable level, e.g.

- installation of pollution control devices
- construction of a fish ladder (in dams, weirs)

EIA PROCESS

- Project screening
- Scoping
- Baseline data collection
- Identification of environmental impacts
- Impact prediction
- Comparison of alternatives
- Mitigation measures
- **Public consultation and participation**
- Environmental monitoring

EIA PROCESS

Public consultation and participation

The involvement of the "*public*", or often referred to as "*stakeholders*", is a vital component in successful EIA.

Who are stakeholders??:

Local people: individuals, communities/villages, traditional authorities e.g. village leaders;

Project beneficiaries: not necessarily have to be local;

NGOs: those which are active in local area or have interest on natural resources or social welfare, interested parties in the country of any external financing agency;

Voluntary organizations: local community, recreational groups, neighborhood associations, labor unions, ethnic organizations, cooperatives;

Private sector: business interest groups, trade associations, professional societies;

National/local governments: those with responsibilities for management of natural resources along with people welfare and those likely to be affected by the development project;

Scientist/experts: those who focus on technical aspects of the project, such as land use planning, natural resource management, social infrastructure

EIA PROCESS

Public consultation and participation

Experience has shown that there are benefits of stakeholder involvement in EIA process. However, there are difficulties and constraints while formulating plans for public involvement.

Benefits

- improved understanding
- identification of alternative and mitigation measures
- clarification of trade-offs for each alternative
- identification of forums to resolve issues
- induces of transparent procedures
- creation of accountability and sense of local ownership

Disbenefits

- difficult to identify all affected parties
- communication difficulty due to linguistic and cultural diversities
- illiteracy
- lack of local knowledge on the projects
- unequal access to consultations (for example, women)
- time/cost implications

EIA PROCESS

- Project screening
- Scoping
- Baseline data collection
- Identification of environmental impacts
- Impact prediction
- Comparison of alternatives
- Mitigation measures
- Public consultation and participation
- **Environmental monitoring**

EIA PROCESS

Environmental monitoring

Environmental monitoring is defined as:

"an activity undertaken to provide specific information on the characteristics and functions of environmental and social variables in space and time."

Environmental monitoring is therefore one of the most important components of an EIA which is essential for:

ensuring that impacts do not exceed the legal standards;

- checking the implementation of mitigation measures in the manner described in the EIA report;
- providing early warning of potential environmental damages.

ENVIRONMENTAL MONITORING IS THE LAST SUBJECT OF THIS PRESENTATION