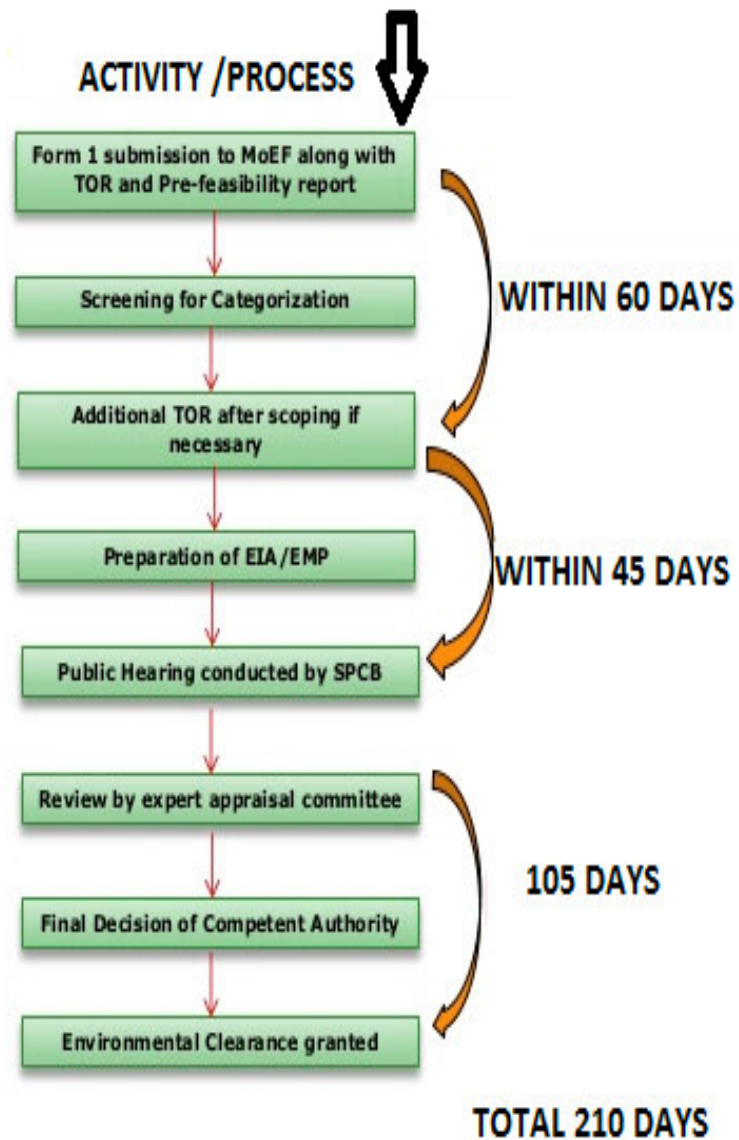


Normal Time duration for various activities of EIA Process



TOR-----Terms of Reference

SPCB----State Pollution Control Board

NOTE:- The time duration may vary from one project to the other depending on a number of factors(to be discussed in Assignment--2)

LECTURE 21+22(L21-L22)

Prediction and assessment of impacts

In the impact prediction and evaluation stage of an EIA, issues identified through scoping are analyzed and expected impacts are defined. This analysis should:

- (a) **Identify** the types of impact;
- (b) **Predict** the magnitude, the probability of occurrence, and the extent of the impact; and
- (c) **Determine** the significance of the impact.

Types of impacts

Impacts on the environment can lead to changes in existing conditions; the impacts can be **direct, indirect or cumulative**. These changes can be found at different ecological (species) and social (individual or community) levels, can vary over space and time, and can be either **positive or negative**.

(1) **Direct impacts** refer to changes in environmental components that result from direct effect of consequences of interactions between the environment and project activities.

(2) **Indirect impacts** result from cause-effect consequences of interactions between the environment and direct impacts. For example, the effect of pollution may not only be seen directly in the loss of local vegetation, but indirectly as a degeneration of the health, culture and social structure of local people. these impacts refer to the existing and proposed activities, including activities associated with the project(under assessment).

L21-L22

These changes occur over space and time and can be brought about by;

- * **Environmental** effects that are additive or interactive.
- * **Marine mammals** in the sea, for example, can be affected by hunting, oil spills, loss of habitat, and commercial fishing pressure on prey species.

(3) **Cumulative impacts**

It is important to describe and analyze the accumulation of change to the environment due to project related impacts, even though the projects may be small and their impacts minor. Cumulative impacts resulting from development activities should be considered at the resource and land use planning level. Cumulative impact assessment is at the **project level**, along with an understanding of environmental impacts at the **resource** and **land use** planning level, helps set that project and its impacts in a broader ecological and development context.

Cumulative impacts may be characterized by the **intensity, type and extent** (spatial and temporal) of human activity or source of change to the environment, and by the influence this change may have on the environment. The source of change could be:

- (a) **Activities** resulting from several developments occurring at the same time or sequentially (e.g. **mine development, construction of access roads**);
- (b) **Activities** resulting from many different developments over extended time periods and space (e.g. **mine development, construction of access roads, urban development**); and
- (c) **Activities** resulting from global occurrences widely dispersed over time and space

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Some key issues to be considered when assessing cumulative impacts associated with the project:

- *Focus should be on **valued ecological components**, including sensitive areas;
- *Spatial boundaries should be defined with respect to **valued ecological components**;
- *Temporal boundaries will vary with **projected life span** of project impacts; assessment should be kept at reasonable and manageable levels.
- *The spatial and temporal boundaries of the cumulative impact assessment should be established, and the activities (**past, existing and proposed activities**), including those associated with the present project under assessment that will be addressed in the assessment should be identified.
- ***Time and resources**, and the roles and responsibilities in cumulative impact assessment, should also be determined.

Impact Prediction

The knowledge gathered and the findings of the environmental investigations form the basis for the prediction of impacts. The requirements for exact predictions are not necessarily met because of uncertainties in the data and a lack of baseline data. Claims of exact predictions do not necessarily indicate assessments of high quality or accuracy, in fact, **detailed** predictions may be **misleading** and direct attention and resources away from central issues.

L21-L22

Hence, it is important that the predictions outline different **scenarios** and that the underlying assumptions are presented **transparently**.

Once a potential impact has been determined during the scoping process, it is necessary to identify which project activity will cause the impact, the **probability** of occurrence of the impact, and its **magnitude and extent** (spatial and temporal).

This information is important for evaluating the significance of the impact, and for defining mitigation and monitoring strategies.

Important considerations for impact prediction

(a) **Baseline condition.**

The baseline condition of a resource, ecosystem, or community **without** the potential effects of the proposed project must be established before the impact prediction process begins.

(b) **Uncertainty.**

EIAs contain uncertainties resulting from **measurement error** and absence of **information**, particularly in the case of cumulative and socio cultural impacts. Qualitative risk and scenario analyses may **increase** some of the problems caused by the uncertainties.

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(c) **Spatial limits.**

Impact assessment, including cumulative impacts, must consider all activities that affect environmental components, even those components that lie outside the immediate area affected by the project. Because of the natural conditions in the Arctic, the affected area often is larger than in temperate areas.

(d) **Temporal boundaries.**

Impact assessment, particularly for assessments of **cumulative impacts**, may extend beyond the period of time required for the assessment of the project activities. This is especially true in **many cases** because most physical,

chemical and ecological processes are slower than in more temperate regions. Assessments should take into account the impacts of **past, existing** and **planned** activities as well as those activities associated with the **present** project.

(e) **Incremental condition.**

An impact prediction process should describe the incremental contribution of the project to impacts on the environment. Thresholds and additional criteria can be identified for some specific resources, which establish levels of impact beyond which resources cannot be sustained.

(F) **Interactions.**

Assessments of the interactions between **impacts**, particularly when considering **cumulative** impacts, should be included in the impact prediction process; for example, transfers of material between **ecosystems** or ecosystem components, and **connections** between human culture, resource use and the environment.

LECTURE-23(L23)

Quantitative and qualitative methods.

Example of Arctic Region:-

The understanding of the complex interactions of effects is particularly important in the Arctic region because of its **slow, nonlinear**, and potentially irreversible ecological and physical processes. Several arctic characteristics play a major role in impact prediction; for example, the effect of **temperature** on chemicals, the **recovery rate** of vegetation after the construction phase and changes in the perma frost after a disturbance. There are common arctic features that need to be considered that play a major role in impact prediction.

Evaluation of impacts

Purpose:-

The purpose of impact evaluation is to assign **relative significance** to predicted impacts associated with the project, and to determine the **order** in which impacts are to be **avoided, mitigated or compensated**.

Significance Phase:-

The significance of impacts may be determined during many phases of an assessment; however, determination usually occurs during **impact prediction**. Consideration of impact significance could affect the scoping exercise, and monitoring results could lead to a reevaluation of impact significance. Decisions on impact significance should be presented **clearly**, and in the case

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of **disagreement**, the different points of view on significance should be presented.

Impact Significance (Requirements)

Decisions on significance should be based on existing standards, discussions, judgement and agreement. These decisions should take into account the **characteristics** of the impact such as the number of **affected** persons, and the **magnitude, extent, duration and reversibility** of the impact. The applied methods and the criteria used for ranking significance should be clearly presented. The **key elements** for assessing the significance of impacts include:

- (a) level of public concern;**
- (b) scientific and professional judgement;**
- (c) measure of disturbance to ecological systems;**
- (d) impacts on social values and quality of life;**
- (e) existence of environmental standards, that is, international, national,**
- (f) provincial or local agreements;**
- (g) availability of mitigation practice and**
- (h) technology to assess impacts.**

Environmental impacts in the particular regions are often complex, multidimensional and widespread, and the associated social and political issues are value laden and conflict prone. The interpretation of the assessment findings should recognize that:

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- * Many important impacts cannot be **quantified**;
- * There is no **common base** for comparing the significance of different types of impacts such as:-
 - * impacts on **flora** and **fauna** and impacts on **cultural** values;
 - * **developers, indigenous** people and other groups can have widely different views through which they interpret assessment findings, and judge the significance of the findings;
 - * the different knowledge gained from **local** and indigenous people has to be analyzed and evaluated using suitable methods for determining the significance of impacts;
 - * the sensitivity of the particular environment demands special attention, possibly in the form of **special thresholds for significance**; and
 - * the various **alternatives** in the particular region and the importance of the particular approach.