

# A COMPARATIVE STUDY OF ENVIRONMENTAL IMPACT ASSESSMENT OF VARIOUS METRO RAIL PROJECTS IN INDIA

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## ABSTRACT

*This paper investigates the effect of the Delhi and Mumbai Metro, an intra-city mass rail transit system, on environment within Delhi and Mumbai. The objective of the present study is to carry out Environmental Impact Assessment (EIA) and preparation of Environmental Management Plan (EMP) for both the corridors. The Environmental baseline data collected for the study includes secondary data and primary data on quality of air, water and soil; noise; vibration; and sensitive receptors along the corridors. The identifying assumption is that in the absence of the extension there would be a smooth transition in pollution levels.*

*Various alternatives such as modes of transport, alignment, proposed design etc. have been considered and analyzed for its likely impacts on various environmental parameters. Additionally, an evaluation of potential environmental impacts in terms of 'with' and 'without' project situation has been considered for the justification of Corridor.*

*It is concluded to show that the Metro Projects has resulted in reductions of two important vehicular emissions, namely, nitrogen dioxide and carbon monoxide. It is estimated that a cumulative impact of a 35 percent reduction in CO levels for the regions around major traffic intersection in Delhi and Mumbai are observed. This is due to the traffic diversion effect, where people are switching from private modes of travel to the Metro. Given, documented evidence on the adverse health effects of air pollution, the findings suggest that these indirect benefits must be considered in any cost-benefit analysis of a rapid mass transport system. The Metro Rail Projects has proved to be a great success in the recent times as it turned out to be a boon for the people of the city.*

**Keywords :** - *Transportation , metro rail, transit system, Environmental Impact Assessment (EIA).*

## 1. INTRODUCTION

The purpose of this Environmental Impact Assessment (EIA) is to identify, evaluate and report the environmental and socio-economic effects of the proposed Expansion and modernization of the Project. It is a process of identification, prediction, evaluation, and mitigation of biophysical, social and other relevant effects of developmental activity on environment prior to make commitment is. This process includes identification of mitigation measures that will be used to reduce or eliminate potential adverse effects, where appropriate. Environmental Impact Assessment is usually considered as the appraisal of impacts that any developmental activity may effects on the environment. Environmental impacts may be positive or negative, harmful of beneficial. EIA process implemented prior to any developmental project in order to ensure that no adverse impact will be faced by the environment. Many developing Asian countries have been facing serious issues originated due to increase of environmental pollution. India is also experiencing environmental degradation due to rapid growth in economic, Population, Urbanization and industrialization.

Since 1991, The Indian economy has witnessed a rapid expansion and growth with the advent of economic liberalization in India. This led to the initiation of major infrastructure projects in India. With this, cities began to grow at a brisk pace as they provided a major share to the economy with people migrating from remote villages and towns in India looking for employment. Similarly, the city of Delhi and Mumbai also witnessed the same economic growth. With this, the population of Delhi and Mumbai also started increasing at an exponential rate. The increase in population significantly led to the increase in number of

vehicles running on the streets. The traffic movement witnessed slow pace due to increased number of vehicles leading to mass congestion. This congestion has resulted into people leaving their homes nearly 3 to 4 hours prior to the reporting time at their respective places in order to reach on time. The availability of public transport services like buses, taxis and auto-rickshaws have not matched to the ever-increasing levels of demands of the general public for their convenience in travelling to their workplaces.

## 2. OBJECTIVES

The main objectives of this project study are as follows:

1. To assess the positive and negative environmental impact of metro rail projects.
2. To see the impact due to project location, project design, project construction, project operations etc.
3. To review the related literature.
4. To compare two projects.

## 3. LITERATURE REVIEW

The present article reviews the various steps involved in EIA, environmental effects of construction industry and EIA with relation to construction industry. Indian construction industry is rapidly growing at a rate of 9.2% as against the world average of 5.5%. To study the beneficial or harmful effect; evaluation of any project through EIA has become a must. The environment is degrading severely by so many factors, some of which are caused by the activities of Construction Projects. This paper is to study environmental impact of construction project and its mitigation measures. For the present Environmental Impact Assessment study, the attributes of environment considered are: Noise Level Study; Water environment; Air environment (Meteorology, ambient air quality); Ecological Damage Assessment (vegetation, ecosystem, etc.); and Land use pattern (Geology, Geo-hydrology, land use, solid waste disposal.) Socio-economic environment (Demography, occupational structure, educational, medical facilities, literacy etc.). This aims to define the project in a systematic manner and suggest possible mitigation measures for development. The primary purpose of this study is to establish Eco-friendly management of the construction activities. It can be concluded on a positive note that due to the adequate provision and efficient operation of proposed environmental management systems and mitigation measures, the project activities during the operation phase would have manageable & largely have reversible impacts on the environment, and on balance the project would be beneficial to surrounding communities and the region.

## 4. METHODOLOGY

There are two types of methodologies used for EIA.

### Rapid EIA and Comprehensive EIA

The difference between Comprehensive EIA and Rapid EIA is in the time-scale of the data supplied. Rapid EIA is for speedier appraisal process. While both types of EIA require inclusion/ coverage of all significant environmental impacts and their mitigation, Rapid EIA achieves this through the collection of 'two seasons' (other than monsoon) data only to reduce the time required. This is acceptable if it does not compromise on the quality of decision-making. The review of Rapid EIA submissions will show whether a comprehensive EIA is warranted or not. It is, therefore, clear that the submission of a professionally prepared Comprehensive EIA in the first instance would generally be the more efficient approach.

**Rapid EIA:** This is carried out for projects having limited (or) less adverse impacts. Baseline data (or) information is collected for only one season (other than monsoon). Time frame for Rapid EIA is Shorter (3 months).

**Comprehensive EIA:** This is carried out for projects having series of adverse impacts. Baseline data (or) other related information for three seasons (other than monsoons) .Time frame for Comprehensive EIA is more than a year.

**Step 1- Screening** This entails the application of EIA to those projects that may have significant environmental impacts. It is quite likely, however, that screening is done partly by the EIA regulations, operating in a country at the time of assessment. Based on a project application, a decision needs to be made whether the development requires an EIA. For any work that will alter the physical nature of the land, the person proposing the development must submit an EIA screening application. An Approving authority is any public authority or person authorized under a written law to approve a development proposal. Examples of approving authorities include: • Ministry of Environment and forest (under Environmental protection act,1986) • Directorate of Town

and Country Planning (under Town and Country Planning Act, 1971) • Pollution control board (under Prevention and Control of Pollution Act, 1981). According to the EIA notification 2006, proposals that come under category-A and category -B will require EIA. Under category -B, any proposal that could come in general condition and special condition it can be treated as category -A. The category can be divided on the basis of threshold limit mentioned in the notifications amendments

**Step 2- Scoping** This step seeks to identify, at an early stage, the key, significant environmental issues from among a host of possible impacts of a project and all the available alternatives. It involves activities like formal and informal meeting with all affected people, physical site inspection, public participation, and writing up a Terms of Reference [TOR] for the conduct of the EIA study. However, the data collected from site inspection and information collated from face-to-face meeting can be provided as input into the system for further processing and subsequent TOR Report and EIA decision.

**Step 3 Data collection-** The baseline data collection also cannot be computerized. Due to changes in site variations, climatic factor, local peoples and environmental conditions the computerized process is not suit but the data collected from site inspection and information collated from face-to-face meeting can be provided as input into the system for further processing and subsequent TOR Report and EIA decision. **Step 4- Consideration of alternatives:** This seeks to ensure that the proponent has considered other feasible approaches, including alternative project locations, scales, processes, layouts, operating condition and the no-action option.

**Step 5- Description of the project/development action:** This step seeks to clarify the purpose and rationale of the project and understand its various characteristics, including the stages of development, location and processes.

**Step 6- Description of the environmental baseline Data:** This includes the establishment of both the present and future state of the environment, in the absence of the project, taking into account the changes resulting from natural events and from other human activities.

**Step 7- Identification of key impacts:** This brings together the previous steps with a view to ensuring that all potentially significant environmental impacts (adverse and beneficial) are identified and taken into account in the process.

**Step 8- The prediction of impacts:** This step aims to identify the likely magnitude of the change (i.e., impact) in the environment when the project is implemented in comparison with the situation when the project is not carried out.

**Step 10- Evaluation and assessment of significance of Impacts:** This seeks to assess the relative significance of the predicted impacts to allow a focus on key adverse impacts. Formal definition of significance is the product of consequence and likelihood as  $\text{Significance} = \text{Consequence} \times \text{Likelihood}$

**Step 11- Mitigation and Environmental Management Plan (EMP):** The implementation of an EMP, mitigation measures are some of the weaknesses in EIA system. This step of EIA can check for regulatory compliance of climate change regulations and other pollution levels. This involves the introduction of measures to avoid, reduce, remedy or compensate for any significant adverse impacts.

**Step 12- Public consultation and participation:** The public should be able to view the Application and its related information online. All the data and information collected so far in the process of the application is available online for public knowledge. The EIA process becomes transparent and accountable. The public can air their concerns about the proposed development via online submissions or attend public scoping meetings to be heard. The applicant and the processing authority are present to answer questions. This aims to assure the quality, comprehensiveness and effectiveness of the EIA, as well as to ensure that the public's views are adequately taken into consideration in the decision-making process.

**Step 13- EIS presentation:** This is a vital step in the process. If done badly, much good work in the EIA may be negated.

**Step 14- Review:** This involves a systematic appraisal of the quality of the EIS, as a contribution to the decision-making process.

**Step 15- Appraisal:** At this stage, decisions are made by the relevant authority of the EIS (including consultation responses) together with other material considerations as to whether to accept, defer or reject the project. In India the online submission of TOR and EIA report are available on e-Government Portal and State Environmental Impact Assessment Authority (SEIAA) website. A resubmission appeal needs to contain strategies for mitigating those environmental impacts.

**Step 16- Post-decision monitoring:** Monitoring and EMP are same part of the process. Development projects are monitored to check whether it is complying or not with the required regulations. A monitoring component can be added into the system. This involves the recording of outcomes associated with development impacts, after the decision to proceed with the project. It can contribute to effective project management.

**Step 17- Auditing:** This follows monitoring and involves comparing actual outcomes with predicted outcomes, and can be used to assess the quality of predictions and the effectiveness of mitigation provides a vital step in the EIA learning process.

## 5.CONCLUSIONS

The following conclusions can be get based on the results and discussion presented previously Environmental Impact Assessment (EIA) can be defined as a Process, providing an anticipatory and preventive mechanism for environmental management and protection to achieve sustainable development. EIA certainly plays a vital role in assessing the environmental impacts of surrounding developmental project. It is a study of the effects of a proposed project, plan or program on the environment. In other words, EIA is an administrative process that identifies the potential environmental effects of any proposal along with its advantages and disadvantages on environment. Positive effects are maximized whereas; adverse effects are minimized to greatest possible extent. It can be concluded on a positive note that due to the adequate provision and efficient operation of proposed environmental management systems and mitigation measures, the project activities during the operation phase would have manageable & largely have reversible impacts on the environment, and on balance the project would be beneficial to surrounding communities and the region. Planned approach is essential for integration between urban development, environmental conservation and overall wellbeing of people thus creation and maintenance of eco-friendly and sustainability is a future consideration of environment to save the resources, environmental quality and human health also So every developmental projects need an effective EIA preparation as well as existing projects also must need to maintenance the environmental quality by properly doing of environmental monitoring program and also good environmental management plan (EMP) is needed to ensure the mitigation measures specified in the EIA report. This paper shows to suggest that EIA documentation process and environmental monitoring can be recommended to done as systematic to solve the problems and issues in the current manual EIA process.

It can be concluded on positive note that after the implementation of Environmental Management Plan and Monitoring Plan in both the projects of DMRC & MMRC will have negligible impact on environment and will also lead to sustainable transport development of the city.

## 6.REFERENCES

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