

## A Review Article on "Environmental Impact Assessment" (Eia)

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### ABSTRACT:

In recent years, there has been a tremendous increase in interest in environmental concerns, sustainability, and improved management of development in accordance with the environment. This surge of interest has been accompanied by the introduction of new regulations from national and international authorities (such as the European Commission) that aim to affect the link between development and the environment. Environmental impact assessment (EIA) is a good example. EIA stands for identifying, forecasting, and assessing the environmental consequences of planned activities. EIA is a decision-making tool. The three main values identified by EIA studies to date are integrity, usefulness, and sustainability. EIA is a technique for assessing the environmental implications of prospective projects or activities, including physical and social elements, and suggesting mitigation measures.

It is a tool for assessing the impact of commercial activity, profitable planning, or action on the bio-geophysical environment and human health and well-being, and for interpreting and making the public aware of the same. That is, EIA focuses on numerous challenges, sufferings suffered by the environment in terms of natural resource restriction or human health prone to the impending project. The project's potential to impact individuals, their homes, their livelihoods, or other neighbouring projects is also examined. The best instructions for establishing the project in the suggested environment while synchronising with the least consequences are presented by an EIA after identifying solutions to minimise the concerns. In the past three decades, EIA has come to be seen as a crucial instrument for determining and minimising the viability of a project at a specific location. EIA offers a wider range of applications than other techniques. EIA can serve as a starting point for discussions between planners, public interest organisations, and developers.

**Key words:** Environmental issues, international agencies, environmental impact assessment, public aware, planning regulators, etc.

### Introduction:

Highway construction improves mobility and is essential to a community's and a nation's overall economic success. Unfortunately, poorly thought out, engineered, and built motorways can worsen the situations of the underprivileged while also harming the natural and socioeconomic environment. The frequent negative effects of highway expansion include harm to the environment, including loss of habitat and biodiversity, cultural and social disintegration among the communities impacted, the production of noise and vibration, and air and water pollution. Highway infrastructure needs to be constructed and maintained to a high standard in order to reduce any negative environmental and socioeconomic effects. This may be accomplished by including environmental factors into the planning, design, and building of roadway developments. Three essential components make up the procedure:

1. Identification of the full range of possible impacts on the natural and socio-economic environment
2. Evaluation and quantification of these impacts.
3. Formulation of measures to avoid, mitigate and compensate for the anticipate impacts.

The above process which systematically deals with these elements is called Environmental Impact Assessment (EIA).

### Literature review:

**Amin MdSR, Tamima U, and Jimenez(2014)[1]:**The article by Amin MdSR, Tamima U, and Jimenez A. titled "Understanding Air Pollution from Induced Traffic During and After the Construction of a New Highway: Case Study of Highway 25 in Montreal" offers information on the effect of induced traffic on air quality and the significance of

monitoring air pollution both during and after the construction of new highways. The study compared the levels of several air pollutants in Montreal before and after Highway 25 opened and discovered that the new highway's construction increased traffic, which in turn raised the levels of PM, NO<sub>x</sub>, and CO. As the traffic volume stabilised, the pollution concentrations steadily dropped over time. Policymakers and transportation planners may utilise the study's results to guide their judgements on infrastructure projects and their possible environmental effects. To properly understand the effects of induced traffic on air quality and public health, more research is required as the study only examined one particular route.

**International Journal of Renewable Energy and Environmental Engineering(2014)[2]:** "Air quality impact assessment of a Highway corridor through vehicular pollution modelling" describes a study that sought to determine the effects of vehicular pollution on air quality along an Indian highway corridor. The scientists simulated the dispersion of pollutants released by moving automobiles on the roadway and examined their effects on the local air quality using a Gaussian dispersion model.

In comparison to background readings, the study indicated that the concentrations of pollutants such as carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), and particulate matter (PM<sub>10</sub>) were much higher near the roadway. . The scientists also noted that when one got further away from the roadway, the amounts of pollutants fell and were greater during peak traffic hours.

Overall, the study sheds light on the effects of vehicle emissions on air quality and emphasises the need for efficient mitigation strategies to lower vehicle emissions of pollutants. It is important to keep in mind that the study was carried out in a particular situation and might not be generalizable to other settings with differing traffic and weather circumstances.

**Science of the Total Environment(2014)[3]:** "Degradation in urban air quality from construction activity and increased traffic arising from a road widening scheme" describes a study that looked into the effects of a road widening project on the air quality of an urban area in the UK. Before, during, and after the road building activity, the authors measured the quantities of a number of air pollutants, such as nitrogen oxides (NO<sub>x</sub>), particulate matter (PM<sub>10</sub>), and volatile organic compounds (VOCs)

According to the study, air pollution levels considerably increased during the building phase, with the greatest concentrations being recorded on the construction site and in the vicinity. The authors also noted that the plan for road widening increased traffic, which they believe furthered the area's decline in air quality.

The study underscores the need for efficient mitigation strategies to reduce the detrimental effects of such operations on human health and the environment and offers valuable insights into the possible repercussions of road building activities on urban air quality. However, because the study was carried out in a particular situation, it might not be generalizable to other settings with differing traffic and weather patterns.

**"Environmental Impact Assessment" by numerous studies(2017)[4]:** A thorough review of numerous studies that have been carried out to evaluate the environmental impact of highway development projects is provided in the paper titled "Environment impact assessment for Highway: A Review" that was presented at the 3rd International Conference on Recent Development in Engineering Science, Humanities, and Management in 2017. The authors explain the many environmental effects that highway projects may have, including air pollution, noise pollution, water pollution, and changes in land use, and they provide an overview of the various evaluation techniques that have been employed to analyse these effects.

The study emphasises how crucial it is to perform exhaustive environmental impact assessments (EIAs) for highway construction projects in order to guarantee that any possible negative effects are recognised and appropriately mitigated. The need of stakeholder involvement and public participation in the EIA process is also emphasised by the authors in order to guarantee that the worries and viewpoints of regional populations are taken into account.

Overall, the paper offers a helpful summary of the significance of environmental impact assessments in highway development projects and emphasises the need for additional research in this area to find and put into practise efficient mitigation measures to lessen the unfavourable effects of highways on the environment.

**"Environmental Impact Assessment" by Canter [5]:** The Environmental Impact Assessment (EIA) procedure is thoroughly and in-depth described in the book "Environmental Impact Assessment" by Canter. The historical context of EIA, its institutional and regulatory structure, and the many approaches and procedures utilized in the procedure are all

covered in the book. Canter emphasizes the value of stakeholder participation in the EIA process and offers advice on how to interact with stakeholders productively. Along with providing examples of how EIA might be linked with other planning and decision-making processes, the book also discusses the role of environmental management systems in EIA. In conclusion, Canter's book is a useful tool for all parties involved in EIA, including practitioners, policymakers, and academics. The book offers a thorough and informative overview of the EIA process, and the examples and case studies make it a valuable resource for comprehending the intricacies of environmental assessment.

**Shreya Handa, RK Aggarwal and SK Bhardwaj(2019)[6]:** Environmental Impact Assessments (EIAs) are frequently carried out to evaluate and mitigate the environmental effects of highway expansion in the Himalayan area. A thorough analysis of the EIA procedure for highway construction in the Himalayan area exposes both its advantages and disadvantages. On the plus side, EIAs have offered suggestions for reducing potential environmental consequences and assisted in identifying those impacts. EIAs have also aided in raising public awareness of the possible environmental effects of highway construction. The EIA procedure does, however, have significant drawbacks. For instance, EIAs frequently concentrate on the project's technical components and may not fully account for the social and cultural effects of highway construction. Additionally, there can be problems with the veracity and integrity of the data utilised in the EIA process, and there might not be many possibilities for public involvement. EIAs are a crucial tool for determining and mitigating the environmental effects of highway construction in the Himalayan area, but there is still opportunity for improvement to make the procedure more thorough, precise, and inclusive of all potential consequences.

**Abewickrema AWN, Amanthika RWM, Abeysinghe (2013)[7]:** At the 2013 South Asian Institute of Technology and Medicine Research Symposium on Engineering Advancements, the paper "Assessment of water quality impacts of Highway and road construction projects" was delivered. The purpose of the study was to evaluate the effects of road and highway development projects on Sri Lanka's water quality. Water samples were taken both before and after the construction at various points along the construction sites as part of the investigation. The samples were examined for a number of factors, including pH, total dissolved solids, turbidity, and the amounts of heavy metals. The study's findings demonstrated that constructing roads and highways may have a big influence on water quality, especially when it comes to turbidity and heavy metal concentrations. Additionally, there could not be many opportunities for public input and there can be issues with the authenticity and quality of the data used in the EIA process. In the Himalayan region, EIAs are a vital tool for assessing and mitigating the environmental effects of highway development, but there is still room for improvement to make the process more complete, accurate, and inclusive of all potential repercussions.

**Shridhara TN, Shenoy SR, Chetan DM, Nayanar KN(2014)[8]:** A case study that sought to evaluate the potential environmental impact of upgrading a highway in India from Padubidri to Karkala was presented in the article titled "Assessment of potential impact on environment due to upgradation of Highway work from Padubidri to Karkala - A case study" that was published in the International Journal of Innovative Science, Engineering, and Technology in 2014. The authors used a number of techniques, including site inspections, surveys, and the analysis of data on air quality, noise pollution, and water quality, to carry out a thorough environmental impact assessment (EIA).

According to the analysis, the project to rebuild the roadway will significantly harm the environment, including by causing more air and noise pollution, water pollution, and land degradation. To lessen these effects, the authors suggested a number of mitigating measures, including the adoption of low-emission automobiles, noise barriers, and wastewater treatment facilities.

In conclusion, the study offers helpful information on the possible environmental effects of highway upgrading projects and emphasises the significance of completing complete and comprehensive EIAs to detect and mitigate these impacts. The report also emphasises the necessity for efficient environmental management strategies to guarantee that the mitigating measures are put into place and adequately tracked.

**Luo Xiaofeng(2021)[9]:**The E3S Web of Conferences magazine published the article titled "Environmental Impact Assessment of a Solar Power Plant in Nigeria" in 2021. Using the Environmental Impact Assessment (EIA) technique, the research sought to evaluate any potential negative effects on the environment of a proposed solar power project in Nigeria. A thorough evaluation of several environmental factors, such as air quality, noise pollution, soil quality, and water resources, was done as part of the research. The study's findings showed that the projected solar power facility would have negligible environmental effects, and its authors advocated a number of steps to further lessen these effects. Public input might not be given much of a chance, and there might be issues with the accuracy and quality of the data used in the EIA process. However, there is always need for improvement to make the process more complete, accurate, and inclusive of all potential implications. EIAs are an essential tool for evaluating and limiting the environmental effects of highway building in the Himalayan region.

**Chopra T., Aggrawal M. and Chowdhry P. (2011)[10]:** the presentation of the article "Analysing Strategic Issues of Environmental Impact Assessment for Highway Projects with a Case Study of Indian National Highway" at the International Conference on Transportation Planning and Implementation (ICPT). In particular, the Indian National Highway was the subject of the study's analysis of the strategic concerns surrounding environmental impact assessments (EIAs) for highway projects. Inadequate data, a lack of stakeholder engagement, and inadequate assessment of environmental implications are just a few of the major difficulties and strategic concerns that must be addressed while conducting EIAs for highway projects. To further demonstrate the need of improved EIA procedures nationwide, the authors also provide a case study of the Indian National Highway. Overall, the study offers insightful information about the difficulties and strategic concerns involved in carrying out efficient EIAs for highway projects, particularly in the context of emerging nations like India. The report emphasises how crucial it is to include stakeholder input and take environmental effects into account when planning and carrying out highway projects.

**Khitoliya, Aggarwal, and Chopra (2006)[11]:** A Case Study of National Highway-21" and it was released in 2006. Using the Environmental Impact Assessment (EIA) technique, the research sought to evaluate the environmental effects of the National Highway-21 project in India. The main environmental concerns related to the National Highway-21 project are covered in the document, including noise pollution, changes in land use, and air and water pollution. The authors conducted a thorough examination of these problems and offered suggestions for reducing the project's possible environmental effects. In general, the report offers insightful information about the possible environmental effects of highway projects, especially in the context of developing nations like India. The report emphasises the value of completing thorough EIAs to evaluate and mitigate potential environmental repercussions and offers some solutions for reducing these effects. The document might be a useful resource for environmental experts, researchers, and students who are interested in learning about the EIA process and how it is used in the design and execution of highway projects.

**The United Nations Environment Programme (UNEP) (2002)[12]:** released a report titled "Environmental Impact Assessment of Nairobi River Basin Project, Kenya." The goal of the paper was to evaluate the project's possible environmental effects on the Nairobi River Basin, which was already suffering from substantial environmental deterioration as a result of human activity. The main environmental problems in the Nairobi River Basin, including as water pollution, solid waste management, and deforestation, are thoroughly examined in the paper. The authors conducted a thorough analysis of these problems and offered suggestions for reducing the project's possible environmental effects. The UNEP study offers helpful insights into the environmental issues the Nairobi River Basin is experiencing overall, and it emphasises the significance of performing thorough EIAs to analyse and mitigate any environmental consequences. The report also emphasises how important environmentally sound environmental management practises are to promoting the preservation and restoration of the region's natural resource

## Conclusions:

1. According to water tests, the groundwater close to Jagadhari has a high TDS value that is higher than allowed levels and is therefore unsafe for drinking.
2. SPM test results are above the allowable limits while SO<sub>2</sub> and NO<sub>2</sub> levels are below the limits.
3. The areas' noise levels exceeded the allowable limits; thus, appropriate mitigation measures should be adopted throughout the building phase to maintain the noise levels below the allowable limits.
4. There is no soil contamination, but there are many opportunities for contamination to happen during the building phase.
5. There is a significant issue with traffic congestion on the roadways.

The state of the pavement was exceedingly precarious. In many locations, effective drainage is necessary. On the chosen length, several potholes and cracks were discovered during the survey.

Some consequences have a short lifespan and can be minimized with the right mitigation strategies. Therefore, it can be concluded that the proposed project would be environmentally benign that the operation phase will be less significant and may be prevented by mitigation measures.

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