



Review paper

Study on Evolution of Environmental Impact Assessment (EIA) in India

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ABSTRACT

Environmental Impact Assessment or EIA in India has come a long way from just being about getting clearances to something more about managing the environment over time. This paper deals with the changes that took over the period on the notification of EIA from 1994 to 2025 and presents the SWOT (Strengths, Weakness, Opportunities, Threats) analysis that how this EIA got evolved over time. EIA process is a scientific approach which is used before initiating any major project- like an industry, highway, or any metro line so that a pre-planned outline is in the mind that how it will affect the environment till what extent. This approach also helps to decide, monitor, minimize the harm and promote sustainable development. It also ensures integrating economic growth with ecological protection. Overall, this approach is meant for the better monitoring after projects starts stronger data and real public input to make EIA to help with sustainable decision so that it can balance the protection of environment.

1. Introduction

Environmental Impact Assessment (EIA) has emerged as a critical planning tool for ensuring that developmental projects are sustainable and environmentally sound. According to the United Nations Environment Programme (UNEP), EIA is defined as “a process of evaluating the likely environmental impacts of a proposed project or development, taking into account interrelated socio-economic, cultural, and human health impacts.”

In India, the need for EIA became pronounced following rapid industrialisation in the 1980s and

1990s, which led to increased environmental degradation. To address this, the Government of India, under the Environment (Protection) Act, 1986, introduced a structured EIA framework through the first EIA Notification (1994).

The EIA process helps identify, predict, and evaluate environmental consequences before project implementation. It ensures that development aligns with principles of sustainable development, integrating economic growth with ecological protection (Glasson et al., 2012; UNEP, 2002).

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2. Types of Impacts Considered in EIA

a. Environmental Impact

Change in the environment which can be adverse or beneficial, wholly or partially, resulting from human activity, industry, project, or policy.

b. Social Impact

Any change or effect on social structure, behavior, health, culture, livelihood, or quality of life arising from development activities.

c. Economic Impact

Change in economic conditions of individuals, communities, or regions resulting from a development activity, programmed, or policy.

EIA is basically a way to check what a project might do to the environment including social and health parts too according to UNEP in 2002. In India it started getting big in the 80s and 90s with all the industry boom and then the first notification came in 1994 under the Environment Protection Act of 1986. After that there have been changes to try and balance growth with protecting nature but it's not always smooth.

The analysis indicated a steady improvement in the clarity and inclusiveness of India's EIA framework. The 2006 Notification remains the most comprehensive, establishing project classification,

public hearings, and environmental management planning. However, post-clearance monitoring and public awareness remain weak areas needing reform (MoEFCC, 2006; MoEFCC, 2020; NITI Aayog, 2022)

3. Evolution of EIA in India

The EIA system in India has evolved continuously through successive notifications and amendments:

- EIA Notification 1994:** Introduced mandatory environmental clearance for 29 categories of projects. It was primarily controlled by the Ministry of Environment and Forests (MoEF) at the central level.
- EIA Notification 2006:** Issued under the MoEFCC, this landmark amendment decentralised environmental clearance by categorising projects as Category A (national-level) and Category B (state-level). It introduced structured stages—Screening, Scoping, Public Consultation, Appraisal, and Decision-making—which remain the backbone of India's EIA process today.
- Draft EIA Notification 2020:** Proposed digitalisation through the PARIVESH Portal, reduced clearance timelines, and introduced online monitoring. However, it raised debates about reduced public participation.
- Recent Updates (2021–2025):** Emphasise post-clearance monitoring, environmental auditing, and compliance reporting.

These changes signify India's transition from a clearance-based system to a management-based environmental governance model (MoEFCC, 1994; 2006; 2020; NITI Aayog, 2022).

The Synergy of EIA Stages for Sustainable Outcomes

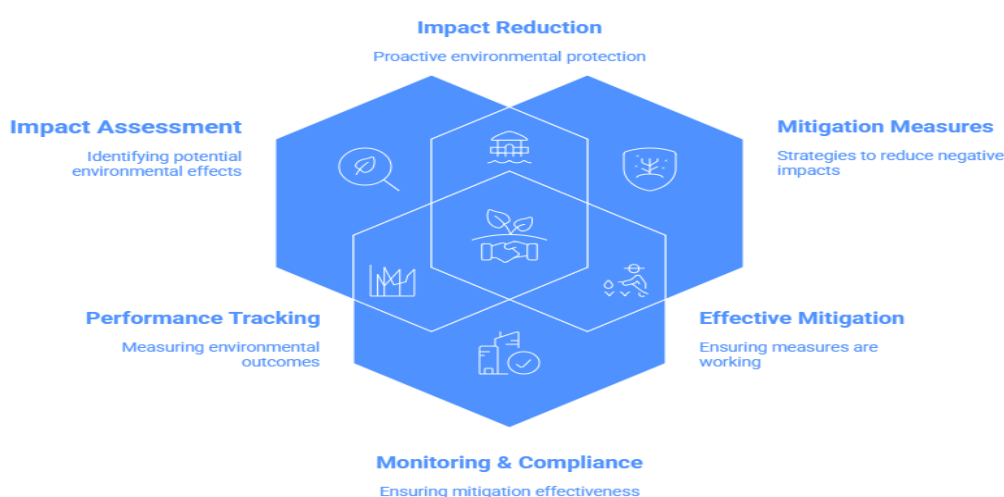


Fig. 1 Synergy of EIA stages

In the year 1994, 29 kinds of projects needed clearance and it was all handled by the central ministry MoEF. Then 2006 was a big shift it splits projects into A and B categories for more local handling and added steps like screening, public talks, appraisal and deciding that made things more open as

Paliwal et. al., talked in 2006. The draft in 2020 wanted to go digital with PARIVESH portal quicker times and online checks but people worried it cut down on public participation and allowed clearances after the fact Rathoure et. al., suggested in 2021. Lately from the year 2021 to 2025 it's about audits

after clearance and using tech more NITI Aayog mentioned in year 2022 as it seems that things are managing over time as quoted. As all this analysis indicated a steady improvement in the clarity and inclusiveness of India's EIA framework.

The evolution of Environmental Impact Assessment (EIA) in India through its key notifications — 1994, 2006, and the draft 2020 — reflects the progressive institutionalisation of environmental governance, though persistent implementation gaps remain. The 1994 EIA Notification marked a significant milestone by making environmental clearance (EC) mandatory for industrial and developmental activities listed under Schedule I of the notification. Its strength lay in introducing formal stages of screening, scoping,

mitigation, and public consultation, establishing India's first structured environmental approval system. However, weaknesses included excessive centralisation and lack of clear criteria for project categorisation.

The 2006 Notification, issued under the Environment (Protection) Act, 1986, improved procedural clarity by decentralising project appraisal into Category A (MoEFCC) and Category B (SEIAA) levels, ensuring faster decision-making and local accountability. It also introduced a scientific screening and scoping framework. Despite these strengths, challenges such as inadequate public participation, limited technical capacity of state authorities, and weak post-clearance monitoring persisted.

Evolution of Environmental Impact Assessment

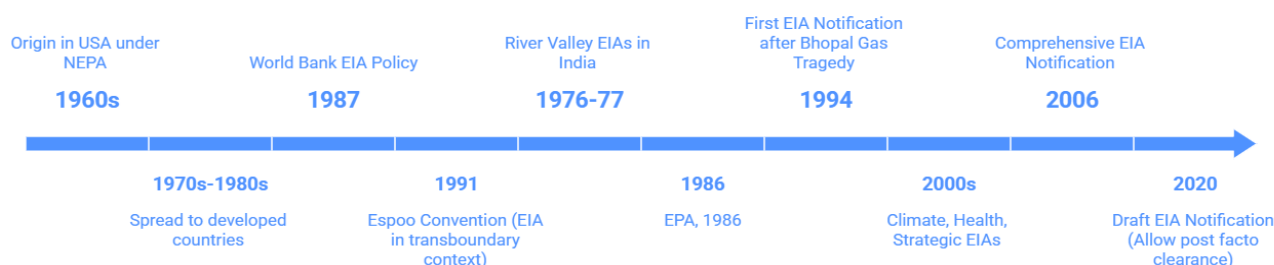


Fig. 2 Evolution of EIA

The Draft EIA Notification 2020, while aiming to modernise the process through digitalisation and the PARIVESH portal, has been widely critiqued for creating loopholes that could dilute environmental safeguards—such as provisions for post-facto clearance, reduced public consultation timelines, and expanded exemption categories for several industries. Its opportunities lie in enhancing transparency, integrating GIS-based monitoring, and harmonising compliance audits. Yet, threats emerge from potential misuse of exemptions and reduced accountability mechanisms. Overall, while EIA in India has evolved toward efficiency and transparency, its effectiveness depends on balancing rapid project clearance with robust environmental protection and meaningful public engagement (Tiwari *et al.*, 2020).

4. Comparative SWOT Analysis of EIA in India (1994-2025)

One strength is the solid laws in place and the structured steps from 2006 which helps organize everything. Digital stuff in 2020 is good too for tracking. But weakness like bad baseline data and not much monitoring after clearance are problems and public participation got weaker in some updates. Opportunities could be using GIS for monitoring real time systems and raising awareness among people.

Threats though include politics pushing things through and industry rushing without care which might water down the rules.

The 2006 EIA Notification, as discussed by Ritu Paliwal (2006), represented a turning point in institutionalising India's environmental governance. Its strengths lay in establishing a clear legislative, administrative, and procedural framework under the Environment (Protection) Act, 1986. The introduction of screening, scoping, and public consultation stages brought transparency and accountability to project approvals. However, weaknesses persisted in the form of poor screening quality, inadequate baseline data, and limited follow-up monitoring. The system's opportunities were linked to rising public awareness and involvement of expert committees, while threats stemmed from rapid industrialisation and political interference affecting EIA integrity.

By 2012, Panigrahi *et al.* (2012) observed that while EIA had matured as a legal tool, its implementation remained inconsistent across states. The strength of this phase was the growing technical capacity and institutional experience of environmental appraisal committees. Still, the weaknesses included delays in decision-making, weak post-clearance monitoring, and insufficient participation from local communities. The

opportunities involved mainstreaming sustainability indicators and capacity building of regional offices, whereas threats arose from non-compliance and lack of deterrence for violations.

The 2017 evaluation by A.K.A. Rathi (2017) shifted focus to project-level EIA performance. The study's strengths highlighted improved awareness among consultants, structured review formats, and the use of sector-specific guidelines. However, weaknesses such as poor-quality EIA reports, minimal stakeholder involvement, and redundancy in conditions persisted. The opportunities included enhancing consultant accreditation, promoting cumulative impact assessments, and integrating social dimensions, while threats came from procedural formalities overriding genuine environmental appraisal, turning EIA into a clearance mechanism rather than a decision-support tool.

In 2021, Ashok K. Rathoure (2021) re-evaluated EIA in the context of the Draft EIA Notification 2020.

The strength of this period was digitalisation through the PARIVESH portal, decentralisation of authority, and simplified clearance for minor projects. Nonetheless, the weaknesses were significant—particularly the potential dilution of public participation and post-facto clearances undermining transparency. Opportunities included integrating GIS-based environmental data and strengthening real-time monitoring mechanisms, while threats involved reduced accountability and environmental weakening under the guise of economic growth.

Together, these analyses (2006–2021) reveal that India's EIA framework has evolved from a rule-based to a system-based mechanism, yet still struggles with consistency, public engagement, and enforcement. While technological innovations and policy reforms offer hope, effective implementation remains the critical determinant of EIA's success (Paliwal et al., 2006; Panigrahi et al., 2012; Rathi et al., 2017; Rathoure et al., 2021).

Year / Study	Strengths (Internal)	Weaknesses (Internal)	Opportunities (External)	Threats (External)
Tiwari et al., 1994	a. Environment clearance is must for all activities including expansion and modernisation b. 5 stage process: screening, scoping, selection, mitigation, submission c. If any wrong information found project got rejected	a. Small scale project is exempted b. Public hearing is at the end only	a. Local communities are invited b. Public hearing initiated	a. No experts got appointed by central government b. ToR got decided by public proponent
Paliwal et al., 2006	a. Formal legal and procedural framework under EPA 1986 b. Introduction of screening, scoping, and public consultation c. Improved transparency in approvals d. Replace earlier version of 1994 e. Became 1 st framework for EIA in India	a. Poor quality of screening b. Inadequate baseline environmental data c. Weak post-clearance monitoring d. Require environment commission before project initiation e. Project like thermal power, mining, industries seek clearance	a. Rising environmental awareness b. Role of expert appraisal committees c. Scope for strengthening data systems d. 13 amendments were made e. Procedure got refined	a. Rapid industrialisation pressure b. Political interference in approvals c. Compromised EIA integrity d. Poor governance and corruption
Panigrahi et al., 2012	a. Increased institutional experience b. Improved technical capacity c. More structured appraisal procedures	a. Delays in decision-making b. Weak compliance monitoring c. Limited community participation	a. Integration of sustainability indicators b. Capacity building of regional offices c. Improved inter-agency coordination	a. Non-compliance by project proponents b. Lack of deterrent penalties c. Uneven state-level enforcement
Rathi et al., 2017	a. Sector-specific guidelines b. Structured review formats c. Greater consultant awareness	a. Poor-quality EIA reports b. Tokenistic stakeholder involvement c. Repetitive clearance conditions	a. Consultant accreditation systems b. Cumulative impact assessment c. Integration of social dimensions	a. EIA becoming a procedural formality b. Clearance-driven rather than impact-driven system
Tiwari et al., 2020	a. Ease of doing business b. Digital submission and monitoring system c. Periodic compliance reporting d. Clearer timelines	a. Allowed ex-post facto clearance b. Public consultation period reduced c. Many projects exempted from full EIA d. Transparency reduced e. Seen as industry – friendly	a. Online monitoring b. Real time environment performance evaluation c. Better public participation d. Clearer view of evaluation e. Focus on environment more	a. Dilution of environment safeguards b. Public distrust c. Violation regularisation d. Need more public participation

Rathoure et al., 2021	a. Digitalisation via PARIVESH portal	a. Dilution of public consultation	a. GIS-based environmental databases	a. Reduced regulatory accountability
	b. Decentralised clearances	b. Post-facto clearances	b. Real-time monitoring tools	b. Environmental safeguards weakened for economic growth
	c. Simplified procedures for minor projects	c. Reduced preventive approach	c. Evidence-based governance	

This longitudinal analysis shows that the EIA system in India has evolved from foundational framework development (2006) to institutional maturation (2012) and digital transformation (2021), while continuing to face challenges in enforcement and stakeholder engagement.

Together, these analyses (2006–2021) reveal that India's EIA framework has evolved from a rule-based to a system-based mechanism, yet still struggles with consistency, public engagement, and enforcement. While technological innovations and policy reforms offer hope, effective implementation remains the critical determinant of EIA's success (Paliwal et al., 2006; Panigrahi et al., 2012; Rathi et al., 2017; Rathoure et al., 2021).

5. Conclusion

The evolution of the EIA from 1994 to 2025 reflects a dynamic interplay of strengths, weaknesses, opportunities, and threats with the policy amendments. While the framework has made significant strides in enhancing environmental governance, challenges remain that must be addressed to ensure its effectiveness. Moving forward, leveraging opportunities such as sustainable development and climate adaptation, while mitigating threats from political and economic pressures, will be crucial for the continued evolution and success of the EIA process.

The introduction of the 1994 Notification laid the foundation for integrating environmental considerations into developmental planning, while the 2006 Notification strengthened the process through decentralisation, improved procedural clarity, and incorporation of public participation mechanisms. More recent developments, particularly the Draft EIA Notification 2020 and subsequent updates, have attempted to modernise the system through digitalisation and faster clearances, although these reforms have also raised concerns regarding transparency and reduced public engagement (Rathoure et al., 2021; O'Faircheallaigh et al., 2010).

It also formulates clear understanding of strengths and limitation of existing regulatory framework. This study also summarizes the stages of EIA- screening, scoping, impact prediction, public participation and EMP formulation in a better way. The future of EIA hinges on a collaborative approach that prioritizes environmental integrity, stakeholder engagement, and adaptive management in the face of emerging global challenges.

The SWOT analysis presented in this study highlights that while India's EIA framework possesses strong legal backing and institutional structure, it continues to face critical challenges such as weak post-clearance monitoring, inconsistent implementation across states, and limited stakeholder involvement. These findings align with broader global observations that the effectiveness of EIA systems depends not only on regulatory design but also on enforcement, technical capacity, and participatory governance (Morgan et al., 2012; Cashmore et al., 2004).

At the same time, emerging opportunities such as the integration of geospatial technologies, real-time environmental monitoring, and increased environmental awareness provide pathways for strengthening the EIA process. The incorporation of sustainability assessment approaches and adaptive management strategies can further enhance its role as a decision-support tool rather than merely a clearance mechanism (Bond et al., 2012; Noble et al., 2015).

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