REGULATING COAL OPERATIONS

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THROUGH THE LENS OF THE NATIONAL GREEN TRIBUNAL

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Vikalp Social Organisation

May 2025

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Published by:	Vikalp Social Organisation
	C/o Balesh Bhawan, Near Little Angel School, Second Gate Wali Gali, Mohit Vihar, New Madho Nagar SAHARANPUR - 247001 (U.P.)
Date:	May 2025

Authors:	Kush Tanvani, Shripad Dharmadhikary
	Kush Tanvani is a lawyer and freelance human rights researcher. He holds a Master's in Law from the University of Nottingham.
	Shripad Dharmadhikary is an activist and researcher on water and energy issues, and the founder of Manthan Adhyayan Kendra.
Authors Contact:	manthan.shripad@gmail.com

Acknowledgement:	The authors wish to thank Meenakshi Kapoor for her review and comments on the draft of this paper.
Cover Images:	Images on cover prepared by MS Co-pilot AI Companion
Layout and design:	Ravi Kumar Kawre

Contents

Summary

This study examines several cases before the National Green Tribunal (NGT) which deal with impacts of various elements of coal-based power generation. The NGT is a unique platform that adjudicates cases based on a framework combining the legal regime with technical analysis, and allows direct participation of affected communities as applicants. Therefore, an analysis of NGT orders in these cases can offer important insights in addressing the environmental, livelihoods, economic and health impacts of coal-based power generation.

India has announced plans to reach Net Zero emissions by 2070 and has pledged to decarbonise its economy, including the power generation sector which is right now overwhelmingly dependent on coal. In spite of this intent, and commendable efforts in increasing the contribution of non-carbon, renewable energy sources like solar and wind in electricity generation, coal will remain a very significant, even the dominant source of electricity generation for several decades to come. However, the process of electricity generation from coal can have severe impacts on the environment, on local communities, and their economy, livelihoods and health. Therefore, it is critical to address these impacts adequately.

There is a fairly comprehensive legal and regulatory framework for identifying and addressing these impacts including various laws, subordinate legislations, office memos as well as institutions to regulate and monitor activities and impacts of the concerned entities. Unfortunately, in spite of this, coal operations continue to have serious adverse impacts, as is articulated by impacted communities, documented by the media, various research and civil society organisations and even official agencies. The NGT is a unique platform to understand why these impacts persist and can offer important insights in terms of how to address these.

This study analyses eight cases that deal with coal operations, diverse in terms of location, coastal and inland power plants, and range of issues like coal storage and transport, fly ash management, effluent discharges etc. Most of these matters have the impacted communities represented as a party, though a couple of them are *suo moto* matters.

In almost all the cases, the NGT has been aided by expert committees that it has appointed to assess ground situations and suggest measure to address the issues. These committees include regulatory bodies like pollution control boards, and independent experts. Key findings of the study are given below.

All the cases **document and establish serious impacts** on the ecology, livelihoods and health of local communities. Coal storage, transport, dumping of coal in open areas and spontaneous combustion has led to heavy dust pollution due to coal dust and fly ash, and created safety hazards for the people as loaded trucks use local roads. Recommendations of adequate covering of trucks, switching to rail transport and separate roads dedicated for coal transport have often not been complied with. All these have led to air and water pollution.

The unscientific disposal of fly ash, frequent ash-dyke breaches, and inadequate containment measures have caused severe environmental damage, public health risks, and socio-economic losses. One matter documents that flyash dumped in water bodies and wetlands has resulted in toxic contamination, loss of aquatic biodiversity, and severe disruptions to local ecosystems. Another case records how an ash-dyke breach had severely impacted agricultural lands, canal water, lake water and nearby ponds. The health dangers due to airborne fly ash have been highlighted. The discharge of untreated waste water from mines into agricultural fields was also noted in one case. Overall, the eight cases

examined document severe impacts of various coal operations on air, water and soil, through multiple pathways, leading to environmental degradation, loss of livelihoods, other economic consequences and health impacts.

In many of these cases, the NGT has awarded **environmental compensation** being guided by the polluter pays principle. In some cases, the compensation amount has been calculated using a formula put out by the Central Pollution Control Board (CPCB), but the NGT has gone beyond this as it did not account for the cost of remediation, the financial capacity of the polluting party, and deterrent measures. At times, the NGT had fixed an interim amount and then asked the expert committee to decide the final compensation based on detailed studies. Significantly, the NGT has not always clearly ordered that the environmental compensation or a part must be paid to the impacted communities. One matter has laid down an important principle that compensation should be based on the principle of *absolute liability*, meaning that polluters bear full responsibility for damages regardless of fault or the care taken. The compensation in most cases was challenged in the higher courts and often stayed. The study found that in only one case the compensation had actually been received by the impacted communities.

In almost each of the matters studied, the NGT has ordered for **environmental remediation and restoration**, including its costs, underlining the fact that only when the existing pollution is cleaned up can one say that the problem of pollution and environmental damage has been addressed. Often, the expert committee appointed by the NGT has been directed to prepare the restoration plan, and oversee its implementation. One of the matters lays down an important principle of public participation, especially of the affected communities, in the preparation and implementation of restoration plans. Unfortunately, in most cases, the NGT has disposed off matters after issuing restoration directives, placing the implementation burden on regulatory agencies or committees. Timelines also have not been ordered for the implementation. This often results in weak enforcement and delayed action.

Environmental clean-up and restoration are critical not only from the point of addressing the continuing impacts of pollution, but also in context of Energy Transition. Energy transition envisages decarbonisation of the energy sector, a key element of this being a shift away from coal-based electricity generation to renewable energy based generation. There is a lot of emphasis that this transition should be a "Just" Transition. However, this aim would be vitiated if restoration is not carried out properly and in time, leaving these areas as toxic legacies of coal operations.

The NGT has consistently highlighted the critical **role of regulatory authorities** in monitoring compliance, imposing penalties, and ensuring environmental restoration. It has included them in all the expert committees. However, across multiple cases, the NGT and the committees appointed by it have repeatedly pointed out the failure of these authorities to prevent and halt continued environmental damage and a reluctance to use their powers, resulting in impunity for polluters. Another glaring issue highlighted by these cases is the complete lack of space and opportunity for involvement of the affected communities in any attempt to redress pollution and the environmental and social impacts of coal operations.

This analysis of the eight cases offers some important insights. One, that even with the best implementation of all laws and regulations, coal will have several impacts that are impossible to avoid. Dewatering of groundwater around mines and generation of massive amounts of ash are just two examples. In the long run, it is critical to shift to cleaner sources of electricity generation. Two, that a proper implementation of these laws and regulations can certainly ameliorate and cut down significant parts of these impacts. But such effective implementation is not happening. Three, that it is critical to strengthen the regulatory agencies by building their capacities and providing adequate financial and human resources so that they can be effective in their functioning. At the same time, they also need to be made accountable for the responsibilities and functions they are supposed to carry

out. Four, that one of the most important ways to address the impacts, and also build accountability into the process, is to ensure the involvement of local, impacted communities. This needs to be done in a formal, structured, systemic and sustained manner. The process should also involve independent experts and civil society groups. Five, these cases reveal that while coal operations potentially can impact people's health very severely, and this conclusion is also supported by scientific literature, detailed studies and documentation of the specific impacts in any given area are inadequate. The NGT has ordered such studies to fill this gap, and these need to be taken up in earnest. Based on these insights the study makes several corollary recommendations.

Moreover, media reports, research papers, community voices and even several official documents indicate that these eight cases are not isolated examples but rather are typical of all areas with coal operations. Given that, the study urges that these recommendations be extended to all coal-operation areas. In particular, thorough assessments of social and environmental impacts, comprehensive health impact studies, and restoration and clean-up plans should be taken up for all such areas, with the meaningful participation of local, affected communities and independent experts.

1. Introduction

India has declared[1] plans to reach carbon neutrality or Net Zero emissions by 2070 and pledged[2] at the United Nations Framework Convention on Climate Change (UNFCC), among other things to "achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030". Its performance in terms of adding electricity generation capacity based on renewable energy (RE) has been remarkable[3]. Additionally, there are ambitious plans[4] for the next decade and more to continue this.

In spite of this ambitious intent and on-ground progress, signifying a high level of commitment to decarbonisation and fighting climate change, coal and coal-based power generation will remain a significant part of India's energy basket for some time to come. In 2022-23, coal and lignite-based capacity contributed an overwhelming 73% of the country's electricity generation.[5] By 2031-32, it is still expected to contribute around 50% of the electricity generation and will remain the most dominant source, with solar PV coming in a distant second at 25% of the total electricity generation.[6]

Thus, it is clear that coal-based power generation will be with us for a long time, at least for the next couple of decades, if not more.

Unfortunately, as the Ministry of Environment, Forests and Climate Change's (MoEFCC)'s *Technical EIA Guidance Manual for Thermal Power Plants* notes,

> "Coal-based power plants significantly impact the local environment. Direct impacts resulting from construction and ongoing operations include…Ambient Air Pollution… Water Pollution…Land Degradation…Noise Pollution…

> "The indirect impacts result mainly from coal mining, which includes degradation and destruction of land, water, forests, habitats, and societies. In addition to the impact of the coal-power plants, there is also a larger issue of the environmental and social impact of coal mining." [7]

Further, there are also the severe impacts of coal washing, coal transport and handling, and ash transport and handling, apart from the impacts of forced displacement for mines, power plants, and other infrastructure.

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1 National Statement by PM at COP26 Summit in Glasgow, 1-Nov-2021 https://www.pmindia.gov.in/en/news_updates/national-statement-by-pm-at-cop26-summit-in-glasgow/

2 India's Updated First Nationally Determined Contribution Under Paris Agreement (2021-2030), August 2022 Submission to UNFCCC; August 2022 https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf

3 https://mnre.gov.in/en/year-wise-achievement/ and https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b-771da77391355749f3/uploads/2023/08/2023080333.pdf Accessed 10 Mar 2025. Throughout this document, when we use the term Renewable Energy capacity, it excludes large hydro. This is the way official statistics also report it.

4 National Electricity Plan, Volume I – Generation. Ministry of Power, Government of India. March 2023. Page 5.15

5 Report on Optimal Generation Capacity Mix for 2029-30: Version 2.0. Ministry of Power, Government of India, April 2023. Page 14

6 National Electricity Plan, Volume I – Generation. Ministry of Power, Government of India. March 2023. Pages 5.18 and 5.22

7 Technical EIA Guidance Manual for Thermal Power Plants, Prepared for Ministry of Environment and Forests, Government of India, IL&FS Ecosmart Ltd., August 2010 Page 3-16 (pdf 53)

Given these serious impacts and that coal power is likely to be with us for at least several more decades, it is imperative that electricity generation from coal-based plants happens without adversely impacting the environment or the health and livelihoods of communities that live in the impact zone of such power plants, mines and other related infrastructure. Unfortunately, as seen from the experiences till date it is an uphill task.

There is a legal regime in place that aims to regulate these impacts to ensure that they are avoided, mitigated or compensated. However, its implementation lacks efficacy, and often leaves out the most important stakeholders, namely the communities that are adversely affected. There have been many efforts, both by official and non-official entities, at documenting such impacts and of ways to address them. However, many of these efforts, especially those by non-official entities, are contested and not given due consideration. Interestingly, there is one forum where the affected communities can have a voice, the impacts can be and are documented, such documentation is given due consideration, and an attempt is made to consider all this in light of the extant legal regime. This forum is the National Green Tribunal (NGT), where many cases pertaining to the impacts of coal-based power generation have been and are being heard, attempting to address these impacts through the legal and technical framework.

A study of such matters in the NGT can provide judicially confirmed documentation of the impacts of coal-based power generation, highlight possible means of addressing them as well as the effectiveness and limitations of these means, and offer valuable insights into the operation, strengths and weaknesses of the legal regime.

This study looks at certain NGT matters with the objective of understanding how this judicial-technical body has dealt with the impacts of coal operations[8], and the insights that this offers for addressing these impacts.

1.1. The NGT and this Study

While environmental issues have been litigated before the constitutional courts (Supreme Court and High Courts), and for a while from 1997 in the National Environmental Appellate Authority[9], in 2010, the NGT was established as a dedicated judicial-expert body for expeditious and effective disposal of matters relating to environmental protection, conservation of forests and other natural resources.[10] It has jurisdiction over all civil cases where a 'substantial question relating to environment' is involved and where such a question arises out of the implementation of the laws specified in its Schedule I.[11] The Tribunal consists of judicial and expert members. In exercising its jurisdiction, it has powers to issue directions for restitution of environmental damage and provide relief to the victims through compensation.[12]

In this study, we have examined eight cases before the NGT. These cases deal with coal operations like mining, power plant operations, flyash management, effluent discharge, coal and fly ash storage, handing and transportation. The cases are listed in Annexure 1.

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8 In this Report, when we use the term coal operations, we mean all the operations related to use of coal in power generation. This report does not deal with other sectors in which coal is being used. In the power sector, the range of operations covered include the entire coal chain including coal mining, washing, processing, transport and handling, burning, waste disposal etc.

9 An independent authority established under The National Environment Appellate Authority Act, 1997 to address cases in which environmental clearances were granted by the Ministry of Environment and Forest

10 https://www.greentribunal.gov.in/about-us

11 Section 14 of the National Green Tribunal Act, 2010 (NGT Act)

12 Section 15 of the NGT Act

The criteria for selecting these cases included important procedural and judicial principles established by the matters, the need to ensure diversity of representation, including geographical spread, coastal and inland power plants, issues dealt with in the matters, etc. In spite of this attempt, some of the issues and areas have not been fully represented as we could not find appropriate cases that dealt with them.

Some of the matters involve proceedings that have gone on for years with many detailed submissions, and appeals in the Supreme Court. Some matters are relatively briefer and have been disposed of in less time. Almost every matter has involved the Tribunal setting up some committee with expert members to examine the situation on the ground and report back to it or to prepare suitable action plans. Sometimes, the same matter has involved multiple such committees. Several matters had applicants – individuals and organisations - who were active in pursuing the matter. In contrast, in two cases, the Tribunal initiated proceedings *suo moto*, and hence, there were no formal applicants. We were able to look at only eight cases mainly due to l imitations of time and human resources. However, we believe that a more extensive examination will offer more detailed insights.

We begin this report with a broad overview of the legal and regulatory framework applicable to coal operations, provide insights from the NGT orders and judgements, and committees that has been set up from time-to-time (referred to as Joint Committees (JC))[13] in these matters, and end the report with some discussions and recommendations based on these insights.

13 We have categorised the insights into the four categories- Environmental, health and socio-economic impacts; Environmental Compensation; Environmental Remediation and Restoration; and Role of Regulatory Authorities and Institutions

2. A broad overview of the legal and regulatory framework applicable to coal operations

This section aims to provide a broad overview of the legal and regulatory framework that governs the environmental regulation of coal operations, within which the analysis of the NGT orders can be understood. Since the aim is mainly to provide context, we do not get into any detailed or nuanced analysis of this legal regime.

This legislative framework around coal operations in India is based on a consent-based clearance mechanism. These consents are provided under different laws and regulations and are enforced by regulatory authorities, including Central and State Pollution Control Boards. At the forefront are the Water (Prevention and Control of Pollution) Act, 1974 (the Water Act) and the Air (Prevention and Control of Pollution) Act, 1981 (the Air Act). Both Acts impose rigorous standards and require that coal operations implement adequate pollution control measures to protect water and air quality. Under the Water Act, any operations must secure necessary consents before discharging effluents into water bodies, ensuring that pollution levels do not exceed prescribed limits.[14] Similarly, the Air Act mandates that operations adopt effective monitoring and control practices to manage emissions, safeguarding air quality and public health.

In addition to these, several Notifications issued under the Environment Protection Act 1986 (EPA 1986) are important in governing the impacts of coal. The Environmental Impact Assessment (EIA) Notification, 2006 is critical in the regulatory landscape.[15] It requires coal projects to seek prior environmental clearance. For this, project proponents need to undertake comprehensive studies on the prospective environmental, social, and economic impacts of setting up or expanding industries or related infrastructure. Based on the EIA findings, the responsible authorities can grant an Environmental Clearance to the projects, with an aim to ensure that any project not only contributes to economic development but also adheres to sustainable environmental practices. A large number of NGT cases involve challenges to such Environmental Clearance. However, we have not looked at those cases, or the issues related to Environmental Clearances in general, as our focus have been on compliance during the operational phase.

A further regulatory component specifically pertinent to coal operations is the Flyash Notification 1999. This Notification underscores the necessity for the effective management and 100% utilisation of fly ash generated in thermal power plants and coal-fired installations. The 1999 Notification has now been replaced by the 2021 Notification[16], which has been amended in 2022 and 2024.[17]

Moreover, the Environment (Protection) Rules 1986, under their various schedules and sections, lay down standards for emission and effluent discharges from thermal power plants, coal mines and washeries, as well as limits on specific water consumption by thermal power plants and requirements of zero wastewater discharge. In addition to these, various Notifications and Office Memoranda issued from time to time by the MoEFCC give detailed provisions to regulate different parameters like changes in the source of coal, transport and handling of coal, etc.

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14 Section 24 and 25 of the Water Act.

15 EIA Notification, 2006 and subsequent amendments https://environmentclearance.nic.in/report/EIA_Notifications.aspx

16 Notification on Ash Utilisation from Coal or Lignite Thermal Power Plants, dated 31 Dec 2021 https://cpcb.nic.in/uploads/flyash/Ash_Notification_dated_31.12.2021.pdf

17 Fly Ash Notification dated 31.12.2021 and subsequent amendment notifications dated 30.12.2022 and 01.01.2024 https://cpcb.nic.in/fly-ash-management-and-utilization/

Several other legislations and regulations are also important for governing coal operations, often from the siting and land acquisition point of view. These include the Forest (Conservation) Act 1980 (FCA), the Wildlife (Protection) Act 1972, The Coal Bearing Areas (Acquisition and Development) Act, 1957, the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, the Mines and Minerals (Development and Regulation) Act, 1957, the Mineral Conservation and Development Rules, 2017, Guidelines for Preparation of Mining Plan and Mine Closure Plan for Coal and Lignite Blocks 2025, Guidelines for the Management of Mines Discontinued/Abandoned/Closed Before the Year 2009 and the Coastal Regulation Zone (CRZ) Notifications. It may be noted that several of these are not included in its ambit of the NGT as the jurisdiction of the NGT is limited only to seven legislations that pertain directly to the environment[18], including the Water Act, Air Act, EPA 1986 and FCA 1980.

The sections 3 to 6 that follow deal with the insights from the NGT cases.

18 See Schedule I of the National Green Tribunal Act, 2010.

3. Environmental, health and socio-economic impacts

Coal, one of the most polluting fossil fuels, releases numerous contaminants into the air, water, and soil throughout its life cycle. The environmental toll of coal operations has been well-documented over the years. In 2009, when the Central Pollution Control Board (CPCB) first brought out its *Comprehensive Environmental Assessment of Industrial Clusters* where 88 industrial clusters were evaluated based on a "pollutant, pathway, and receptor" framework to arrive at a Comprehensive Environmental Pollution Index (CEPI), it was not surprising that four coal mining-power plant areas figured in the top 10 most polluted clusters. Several others also figured in the list with scores high enough to be classified as Critically Polluted Areas or Severely Polluted Areas. [19]

A subsequent assessment in 2018 by CPCB[20] shows improvement in the pollution scores of these areas, but on the ground, they remain heavily polluted. The human cost of this pollution is equally alarming. A research study on Mahanadi Coalfield Odisha sponsored by NITI Aayog, among other findings, notes that "villager's health condition has deteriorated due to direct inhaling of air pollutants which has asthma attacks, respiratory infections, or changes in lung function. The cases of suffering from asthma and respiratory toxicities have increased. Around 93.77% households contended that they have suffered from some serious diseases in last 3 years."[21]

Similarly, a study conducted on the socio-economic impact of mining and mining policies on the livelihood of the local population in the Vindhyan region of Uttar Pradesh notes that mining "alienated the people from their traditional agro-based livelihoods, artisan, handicraft and customary rural health vitalisation practices. Mining is a very short lived industry. The alternative means to sustain a secure livelihood is a matter of concern after the closure of mining."[22] Independent media reports have noted that in an area of large-scale mining, respiratory ailments have topped the charts among the patients.[23]

The NGT and JC findings examined in this study reaffirm these environmental and human costs, showing how coal operations continue to impact air and water quality, destroy ecosystems, and severely disrupt the lives of affected communities. In this study, the impacts have been categorised based on three primary causes of action: coal handling, transport and storage, fly ash mismanagement, and other coal-related operations. This categorisation has been undertaken to facilitate an analytical flow throughout the report in presenting and understanding the impacts. It is important to note that while this presentation has been adopted in the report for clarity and ease of understanding, in reality, multiple causes of action and different impacts are often interlinked and result in cumulative effects on the environment and affected communities.

The following sections provide a detailed examination of these impacts, drawing examples directly from NGT and JC observations.

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19 Comprehensive Environmental Assessment of Industrial Clusters, Central Pollution Control Board Ministry of Environment and Forests. Dec 2009. Page 24-26

20 Central Pollution Control Board, the Comprehensive Environmental Pollution Index (CEPI) of industrial clusters 2018 http://www.cepi.cpcb.gov.in/cpcb_cepi/doc/CEPI2018scoresinascendingorderupload.pdf

21 Dr. Niharranjan Mishra, Research Study on Coal Mining, Displacement and Rural Livelihoods: A Study in Mahanadi Coalfield Odisha https://www.niti.gov.in/sites/default/files/2019-01/Report%20on%20Coal%20Mining,%20Displacement%20and%20Rural%20Livelihoods%20A%20Study%20in%20Mahanadi%20Coalfield%20Odisha.pdf pg 15

22 Dr. Kumud Dubey, Socio Economic Impact Study of Mining and Mining Polices on the Livelihoods of Local Population in the Vindhyan Region of Uttar Pradesh https://www.niti.gov.in/sites/default/files/2019-01/Socio-Economic-Impact-Study-of-Mining-and-Mining-Polices.pdf pg 134

23 Aritra Bhattacharya, Environmental degradation in India's oldest coal mining belt leaves locals gasping for relief https://india.mongabay.com/2021/03/environmental-degradation-in-indias-oldest-coal-mining-belt-leaves-locals-gasping-for-relief/

3.1. Observations on Impacts of Coal Handling, Transport and Storage

The handling, transportation and storage of coal have caused severe environmental and health impacts, particularly in villages along coal transport routes and areas near coal storage sites. These impacts stem from unscientific coal dumping, poor road conditions, fugitive dust emissions, and water contamination, as documented in multiple NGT and JC reports.

The JC in the suo moto *Kulda case*, explicitly noted that coal transport through villages from Kulda to Tamnar was taking place on roads that were "not in motorable condition and had an impact on the environment, health, and safety of local villagers."[24] The problem gets aggravated by heavy traffic, with more than 1,400 loaded and unloaded coal trucks passing through villages every day, making it difficult for villagers to use these roads for basic needs. Furthermore, the JC noted that the road had been damaged for over five years, causing prolonged suffering due to fugitive dust pollution and noise from coal-laden trucks. The Committee suggested that an alternate route which does not pass through villages should be found "so that the impact of transportation of vehicles is reduced on the community residing in the villages."[25] The Tribunal accepting these findings directed for an expeditious construction of road.[26] In the same case, the Member Secretary of the CPCB acknowledged that "villagers may have suffered from ailments as a result of pollution from the transportation of coal."[27]

The lack of proper transport infrastructure for coal movement has exacerbated pollution and road safety issues. In the case of *Pankaj Kumar Mishra v Union of India*, the JC observed that residential areas along coal transportation routes were heavily affected by coal dust accumulation, with fine black coal dust visibly covering houses, vehicles, and roadsides. It further noted that delays in road construction and poor road maintenance had led to coal trucks spilling coal and fly ash onto the roads during transportation, worsening air quality and creating safety hazards. The Committee stressed the urgent need for a traffic management plan with an emphasis on road safety to decongest coal transport routes and minimise the risk of accidents.[28] During site inspection, the Committee also observed that "the quality of the truck/tipper's covers were found not of good quality and were also found damaged, short in length and width to fully cover the loaded material or to properly cover the loaded material on the trucks." This led to dropping at bumps or pot holes on the road and resulted in dust and mud on the road.[29]

The adverse impacts of coal transportation were also noted by the JC in *Shivpal Bhagat's case* during its site inspection of the Gharghoda and Tamnar areas in Raigarh. It noted:

> "Most of the coal mined is being transported to nearby areas in Chhattisgarh and other states. Hence road condition of Raigarh plays an important role in deterioration of ambient air quality. In order to ensure better ambient air quality an statistical balance (sic) is to be developed between road transport and rail transport."[30]

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24 In re: News report published in the Newspaper named Indian Express, Daily News Paper dated : 4th February, 2022, Kolkata, Late City Edition titled "Non compliance of EC conditions by Kulda coal mine, Odisha & Tamnar Therman Plant, Chattisgarh"- Original Application No 236 of 2022 (Principal Bench) Order 15.07.2022, pg 8.

25 Original Application No 236 of 2022 (Principal Bench) Order 15.07.2022, pg 2-8.

26 Original Application No 236 of 2022 (Principal Bench) Order 15.07.2022, pg 8-9.

27 Original Application No 236 of 2022 (Principal Bench), JC Action taken report 16.08.22.

28 Pankaj Kumar Mishra v UOI & Ors.- Original Application No 862 of 2022 (Principal Bench) JC Report dated 21.04.23, pgs 30-31 and 91.

29 Original Application No 862 of 2022 (Principal Bench) JC Report dated 21.04.23, pg 28

30 Shivpal Bhagat & Ors. Vs. Union of India & Ors.- Original Application No. 104 of 2018, Oversight Committee report dated 16.04.2021, pg 46

Unregulated coal storage and spontaneous combustion were identified as major contributors to local air pollution in the *Suo Motu Action in Illegal Dumping of Coal at Railway Siding at Krishnashila, Sonbhadra* (hereinafter Sonbhadra case). The JC reported that significant quantities of coal were dumped in open areas, leading to spontaneous combustion and releasing pollutants that severely degraded air quality. The report noted that heavy dust emissions near the dumping site, which operated since 2018 without any precautionary measures like height of bunds, led to PM10 levels reaching 460 Ng/m^3 of pollutants—approximately five times higher than the permissible limit of 100 Ng/m^3—posing serious health and ecological risks.[31]

Fig 1. Photo from Pankaj Kumar Mishra- JC Report dated 21.04.23 page 146

The Tribunal, noting three lakh tonnes of coal was dumped, observed that "the damage by such unscientific storing of coal has resulted in not only air pollution but also contamination of ground water and surface water. There is obvious adverse impact on public health also."[32] Further, The JC constituted in the *Madhusudan Roongta vs State of Maharashtra & Ors* (hereinafter the Chandrapur case), while inspecting the environmental compliance of the Chandrapur Super Thermal Power Station, had found that runoff from coal reject storage areas was entering surrounding natural drain.[33]

3.2. Observations on Impacts of Flyash Mismanagement

The unscientific disposal of fly ash, frequent ash-dyke breaches, and inadequate containment measures have caused severe environmental damage, public health risks, and socio-economic losses. The NGT and JCs have repeatedly highlighted the long-term consequences of fly ash mismanagement, particularly in coastal regions, on agricultural lands, and on water bodies.

Dumping flyash in water bodies and wetlands has resulted in toxic contamination, loss of aquatic biodiversity, and severe disruptions to local ecosystems. The JC in the case of *Legal Aid Services, West Bengal vs Union of India & Ors.* (hereinafter the Mejia case) found that an ash-dyke breach had severely

31 Suo Motu Action in Illegal Dumping of Coal at Railway Siding at Krishnashila, Sonbhadra v UOI and Ors- Original Application No 817/2022 (Principal Bench), Order dated 02.05.23 pgs 3-6.

32 Original Application No 817/2022 (Principal Bench), order dated 02.05.2023 page 8.

33 Madhusudan Roongta vs State of Maharashtra & Ors.- Original Application No. 74/2020 (Western Zone), JC report March 2021, page 27.

impacted agricultural lands, canal water (Nityanandapur Canal), lake water (Nityanandapur Lake), and nearby ponds. Even a year after the incident, adverse impacts from the breach were visible in the surrounding environment.[34] This deposition of fly ash on agricultural lands has led to soil contamination, loss of soil fertility, and disruptions to farming activities. The JC observed "laboratory test reports of soil analysis indicate reduction in the concentration of various macro- and micro-nutrients of the soil, reflecting the absorption by the dumped fly ash. Reduction in nutrient concentration is supposed to affect the soil fertility in the long run". [35]

The NGT, in the case of *Dakshinbanga Matsyajibi Forum Vs Inland Waterways Authority of India & Ors* (hereinafter the Flyash Barge Matter), noted the "patent environmental damage" caused by the capsizing of vessels carrying hazardous fly ash on the Indo-Bangladesh route, which posed a direct threat to fish populations and water quality. [36]

In the case of *Shivpal Bhagat & Ors. Vs. Union of India & Ors.* (hereinafter Shivpal Bhagat case), the JC report noted that fly ash had been dumped in low-lying agricultural lands in a highly unscientific manner, resulting in leaking of ash into nearby streams and nallas. [37]

Fig 2. Leakage of fly ash slurry from JPL ash dyke- Photo from Shivpal Bhagat JC Report dated 16.04.2021- page 41

34 Legal Aid Services, West Bengal vs Union of India & Ors.- Original Application No. 152/2017/EZ, order dated 14.02.23 pgs 19-20.

35 Original Application No. 152/2017 EZ, Order 14.02.2023, pages 19-22

36 Dakshinbanga Matsyajibi Forum Vs Inland Waterways Authority of India & Ors- Original Application No. 64/2020(EZ), Order dated 20.03.23, pgs 14-15.

37 Original Application No. 104 of 2018 (Principal Bench), JC report dated 16.04.2021 pgs 42-43.

The JC in the case of *Shivpal Bhagat* noted that due to limited fly ash utilisation options, thermal power plants resorted to dumping ash in low-lying areas, including agricultural lands, leading to erosion and contamination of nearby streams.[38] Further, despite this observation by the JC, it is important to flag that the Tribunal, in all the cases, has refused to accept any justifications by project authorities/operators for mismanagement of flyash. For instance, in the *Shivpal Bhagat case*, the Tribunal has noted that 'extending time limit for disposal of fly ash could not be interpreted to mean that there is no accountability for scientific handling of such fly ash till its disposal'. [39]

Similarly, the JC in the case of *R. Ravimaran Vs. Union of India and Ors* (hereinafter the Ennore case) reported that the North Chennai Thermal Power Station causes water pollution through multiple pathways, including leaky ash pipelines, spills from fly ash dykes, and intentional dumping of ash.[40] The Committee went on to note that "the spread of flyash has altered the topography and hydrology of the area by silting up low lying-areas and water courses. The flyash ponds too have blocked eastward drainage of rainwater leading to changes in land-cover and habitat types in the local region". [41] Water samples (both surface and groundwater) collected during site inspection showed elevated presence of several toxic metals in excess of Indian drinking water standards. The JC noted that the presence of these metals in the groundwater 'indicates that contamination has already resulted due to seepage from the flyash pond.'[42]

The Committee also noted that the floodplains of the Kosasthalaiyar River and Buckingham Canal had become heavily aggraded with fly ash deposits, significantly reducing their flood-carrying capacity and threatening nearby communities with waterlogging and flooding risks.[43] A subsequent JC also documented similar findings in the same case, which took note of the adverse impacts of flyash on tidal fluctuations. It noted that "tidal fluctuation is considerably damped due to the fly ash deposits," which has serious ecological implications for the region's flora and fauna.[44]

Frequent ash-dyke breaches have resulted in massive environmental and socio-economic damage, affecting agricultural land, fisheries, and human settlements. In the *Mejia case*, the JC found that multiple past incidents of ash-dyke breaches have occurred since 2007 and noted 'mismanagement of ash pond have resulted in reoccurrence of the incident.' The Committee concluded that the agricultural lands had been severely affected due to the breach. It recommended appropriate and immediate compensation for the owners of the affected agricultural lands/farmers for their livelihood. During the site inspection, the Committee concluded that "the effect of the ash-dyke breach was significantly visible even after one year of the incident".[45]

Similarly, in the *Shivpal Bhagat case*, the JC, while inspecting the Gharghoda and Tamnar areas, documented physical evidence of breached mud walls of TRN Power's ash-dyke, leading to fly ash flowing into adjacent fields and human habitations. Further, the JC also noted that the legacy dump from the power project was unscientifically stored and was visibly eroding due to rainfall, with ash runoff entering nearby water streams and contaminating surrounding areas.[46]

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38 Original Application No. 104 of 2018 (Principal Bench) JC report dated 14.10.2019 pages 18-21.

39 Original Application No. 104 of 2018 (Principal Bench), Order dated 15.02.2022 pg 60.

40 R. Ravimaran Vs. Union of India and Ors - Original Application No. 08 of 2016 (Southern Zone), Report 13.12.2017, pgs- 4-5.

41 Original Application No. 08 of 2016 (Southern Zone), Report 13.12.2017, pg 8.

42 Original Application No. 08 of 2016 (Southern Zone), Report 13.12.2017, pg 8-12.

43 Original Application No. 08 of 2016 (Southern Zone), Report 13.12.2017, pg 20.

44 Original Application No. 08 of 2016 (Southern Zone), Order dated 05.07.2022 pg 149.

45 Original Application No. 104 of 2018 (Principal Bench), Order 14.02.2023 pgs 19-22.

46 Original Application No. 104 of 2018 (Principal Bench), JC report dated 16.04.2021 pgs 42-43.

In the *Chandrapur case*, the Tribunal observed that fly ash had been dumped in the bund, causing pollution in violation of multiple environmental laws, that required immediate accountability and remedial measures. The Tribunal also directed a health impact assessment study to evaluate the effects of pollution on local communities and to prepare a relief and improvement plan for affected individuals.[47]

Fig 3. Fly ash from ash pond of Chandrapur Super Thermal Power Station flowing into a local nallah. (Photo does not necessarily represent current status). Photo Credit: Shripad Dharmadhikary

In the *Ennore case*, the JC explicitly stated that "fly ash has physically and chemically altered the ecosystem. This has had an impact on biodiversity, water and soil quality, fisheries, and the livelihoods dependent on the system."[48] While the fisherfolk were exposed to toxins due to prolonged contact with contaminated waters, the health impacts of pollution in Ennore extended beyond such occupational exposure. The JC found that chemicals in contaminated water could affect the brain, kidneys, and foetus development of nearby residents. Further, fish consumers also faced health risks from high contamination levels in aquatic species like crabs, mussels, and prawns.[49]

The JC further highlighted the dangers of airborne fly ash, stating that "besides toxic chemicals, fly ash contains silica, which can cause a lethal disease called silicosis, often misdiagnosed as tuberculosis." The Committee also observed that fly ash transport workers were unprotected from exposure, increasing their risk of severe respiratory illnesses.[50] A subsequent Committee in the same case, during its site inspection, noted that the adults and children faced high cancer and non-cancer risks due to cadmium and lead exposure. This risk calculation was without factoring exposure due to consumption of contaminated aquatic food.[51] The harsh living conditions near fly ash-affected areas were captured starkly by the JC, which described their field visit experience:

47 Original Application No. 74/2020 (Western Zone), Order 19.01.2022 pgs 11-15

48 Original Application No. 08 of 2016 (Southern Zone), Report 13.12.2017 pg 10.

49 Original Application No. 08 of 2016 (Southern Zone), Report 13.12.2017 pg 18.

50 Original Application No. 08 of 2016 (Southern Zone), Report 13.12.2017 pg 20, 24.

51 Original Application No. 08 of 2016 (Southern Zone), Report March 2022 pg 23.

> "The visit brought home to all committee members the harsh reality of the life of local residents. The committee's exposure to ash-choked neighbourhood, though brief was distressful. Visibility was poor due to the dust in the air. Many committee members experienced breathing difficulty after some time there and eye irritation. The sheer physical discomfort in the brief period the committee spent there deeply impacted us as it made us realise that this is a 24/7 phenomenon for people living here." [52]

The economic burden of fly ash pollution on affected communities was also emphasised:

> "The impacts of pollution on livelihoods and health have eroded the economic status of affected people due to lost income, lost workdays, and increased health care expenditure."[53]

3.3. Observations on Impacts of other Coal Operations

Beyond coal transportation, storage, and fly ash mismanagement, various other activities, including thermal power plant operations, mining, and reclamation work, have significantly contributed to environmental degradation, biodiversity loss, and adverse socio-economic impacts. Reports from the NGT and JCs highlight severe violations of environmental regulations, inadequate monitoring, and lack of accountability in ensuring compliance.

Operations in coal-rich regions have worsened ambient air quality, exceeding permissible pollution limits. During site inspection in the *Chandrapur case*, the JC reported that ambient air quality was found to exceed the National Ambient Air Quality Standards (NAAQS), indicating high levels of air pollution from activities of CSTPS.[54] A significant regulatory failure was the tampering of Online Continuous Emission Monitoring Systems (OCEMS) at thermal power plant in Ennore. The JC observed that data from OCEMS had been manipulated to prevent actual pollution levels from being transferred to CPCB and TNPCB. Despite this, recorded emissions still exceeded permissible limits for 481 days (Stage I) and 791 days (Stage II) out of 1071 days, highlighting prolonged and unchecked industrial pollution.[55]

Coal operations have also led to severe water contamination due to the discharge of untreated effluents into natural water bodies. In the *Chandrapur case*, the Tribunal, recognising the health risks faced by local populations, directed authorities to conduct a health impact assessment in the area and noted "health impact of air pollution in the area needs to be studied and remedied. Similarly, impact of water pollution also needs to be studied and remedied".[56] In the *Shivpal Bhagat case*, the JC reported that HINDALCO Industries was directly discharging untreated wastewater from its mines into a drain leading to agricultural fields. [57]

52 Original Application No. 08 of 2016 (Southern Zone), Report March 2022 pg 11.

53 Original Application No. 08 of 2016 (Southern Zone), Report March 2022 pg 23.

54 Original Application No. 74/2020 (Western Zone), Order 19.01.2022, page 2-3

55 Original Application No. 08 of 2016 (Southern Zone), Report Mar 2022 pg 20.

56 Original Application No. 74/2020 (Western Zone), Order 19.01.2022, pg 11.

57 Original Application No. 104 of 2018 (Principal Bench), JC report dated 16.04.2021 pg 44.

Fig 4. Abandoned hand pump near Gare Pelma IV/2, IV/3 mine in Raigarh, Chhatisgarh. Earlier, these hand pumps had water at hardly 30-40 feet below ground levels, but they had to be abandoned as the water levels fell sharply. (Photo does not necessarily represent current status). Photo Credit: Shripad Dharmadhikary

An earlier JC in the *Shivpal Bhagat case* reported that the presence of 12 power plants in Gharghoda and Tamnar blocks had resulted in multiple environmental and social challenges, including groundwater depletion and loss of drinking water sources, air and water pollution affecting local health, loss of agricultural fields and displacement of settlements, damage to homes due to blasting operations in coal mines.[58]

Coal-related industrial activities have resulted in large-scale destruction of natural habitats, particularly in ecologically sensitive areas. The JC in the *Ennore case* reported that reclamation activities by the Kamarajar Port (to undertake expansion work for an additional coal berth) and illegal dumping of 73,113 Cu.m of dredged materials in CRZ areas had significantly reduced mangrove populations. In the soil sampling, the JC found excessive concentrations of Magnesium, Aluminium, Iron, Potassium, Chromium, Lead, and Calcium across all dumpsites. The Committee noted "the concentration of these elements is found in high concentrations at a depth of 100cm below the ground indicating that the metals have leached from the dredged material dumpsite to a depth of 100cm below the ground level." The sampling results also found that high concentrations of pollutants were present both at the centre and boundaries of the dumpsites, "indicating that the area in the vicinity of the dumpsite are affected due to dumping of dredged material". The Committee further noted "the mangroves in the area may be lost due to dumping in the nine sites. Currently, the mangroves in the area are very thin. The port authority has not adopted any scientific methods to remediate the soil or to restore the soil / mangroves to regional conditions."[59]

A subsequent JC in the same case noted that pollution had impacted multiple livelihoods, stating that:

> "Important to highlight here that while fishers are the most visibly affected and most vocal about the effects, it is not merely wetlands and fisher livelihoods that are at stake. Farming, cattle grazing, salt production have also been affected, and the pollution is also likely to have affected the sustenance gathering activities (of fuelwood, medicinal herbs etc) of people from economically weaker sections of society. Finally, the deleterious health effects of air pollution and exposure to contaminated water and land will also have an economic impact in terms of lost workdays (and wages) and increased household expenditure for health care among every resident of the area. This will particularly affect power plant workers, other workers from the port and construction workers engaged in various infrastructure projects in the region who are more exposed."[60]

58 Original Application No. 104 of 2018 (Principal Bench), JC report dated 14.10.2019 pgs 07-12.

59 Original Application No. 08 of 2016 (Southern Zone), Order dated 27.10.2016, pg 2 and Order Dated 05.07.22 pgs 45-51.

60 Original Application No. 08 of 2016 (Southern Zone), JC report March 2022 pgs 7-8.

3.4. Comments and Analysis

We have presented above only some of the findings of the Tribunal and the JCs to give a sense of they have found. These findings of the Tribunal and its JCs reaffirm the environmental and social impacts documented in academic literature and independent reports. These cases provide concrete evidence that coal mining, transportation, and thermal power plant operations continue to degrade air, water, and soil quality, impacting the ecology, people's health and their livelihoods. Moreover, they highlight the persistent failures of regulatory mechanisms in controlling pollution, as seen in cases where air and water contamination have remained unchecked for years. Despite the intent of sustainable coal-related operations, these policy goals have essentially not translated into implementable solutions on the ground. Instead, the continued pollution and ecological degradation underscore the gap between regulatory intent and enforcement, raising concerns about the long-term sustainability of coal operations and the protection of the environment.

The environmental consequences of the violations—ranging from unchecked emissions, groundwater contamination, soil degradation, biodiversity loss, and large-scale habitat destruction—are deeply intertwined with the social and economic distress experienced by affected communities. The findings in these cases reveal a consistent pattern of coal-related operations severely affecting local communities, particularly those dependent on agriculture, fishing, and other traditional livelihoods. One of the most striking observations from the cases is the lack of systematic relief or redressal mechanisms for affected communities. Additionally, the cases show a complete lack of space and opportunity for involvement of the communities in any attempt to redress the pollution and environmental and social impacts, an aspect we will cover in more detail in the section on regulatory agencies.

The health risks posed by industrial pollution (including flyash mismanagement) have been acknowledged in multiple cases. The NGT also repeatedly directed health impact assessments, such as in the *Chandrapur case*, where it mandated a comprehensive health study and relief measures for affected communities. However, the lack of follow-through on these studies prevents them from contributing meaningfully to policy and compensation decisions. Furthermore, in cases like *Ennore*, where large-scale livelihood losses were reported among fisherfolk, farmers, and salt producers, the JC recommended further studies to assess the historical and ongoing economic damages. However, these studies were either not initiated/completed or their findings were not made public, leaving affected communities without proper acknowledgement or support.

The failure to conduct long-term environmental and health impact assessments has broader implications for policy-making, compensation frameworks, and the recognition of cumulative damages. Without proper studies, the full extent of harm remains undocumented, limiting legal and policy responses to surface-level mitigation measures rather than structural reforms.

4. Environmental Compensation

One of the fundamental principles of international environmental law and in India is the "polluter pays principle." This principle holds that the polluter, being the source of environmental damage, should bear the costs of remedying the harm caused. Compensation, therefore, finds its genesis in this principle, ensuring that those responsible for pollution contribute to the cleanup, compensate the affected community, and restore environmental quality.[61] In this context, compensation serves as a legal and proactive remedy to ameliorate the suffering of individuals and communities adversely impacted by pollution and ecological degradation.

Victims often face multifaceted hardships, including health, social, and economic challenges, which these compensatory measures aim to address. The NGT has the power to impose compensation on polluters, thereby providing expedited justice to affected victims.[62] Through its legal mandate, the NGT has adjudicated numerous cases involving environmental damage and has levied compensation on the violators.

In addition to the NGT, various regulatory authorities have been vested with similar powers under specific statutory provisions such as the Air and Water Acts. These Acts empower the respective authorities to levy fines and mandate compensation based on the severity and extent of the environmental harm caused by pollutants discharged into air and water bodies. Furthermore, the CPCB has laid down guidelines for calculating environmental compensation. These guidelines provide a framework that takes into account multiple factors, such as the extent of environmental damage, the nature and severity of the pollutants involved and the affected geographical area.[63]

The following parts highlight how the compensation has been calculated and awarded in the cases we studied, and the relevant observations by the Tribunal, JCs and regulatory authorities.

4.1. Observations by the NGT and JCs

The calculation of environmental compensation in analysed cases has followed multiple approaches with varying methodologies and considerations. The polluter pays principle has remained a key guiding factor, but the compensation amounts have often been revised or disputed based on the adequacy of the assessments.

In several cases, compensation has been imposed using the formula developed by the Central Pollution Control Board (CPCB), which considers factors such as the pollution index (PI), duration of the violation (N), financial penalty factor (R), scale of operation (S), and location factor (LF).[64] For example, using this formula in the *Shivpal Bhagat case*, the JC assessed compensation against two government departments and seven industries. However, the NGT later ruled that this assessment was inadequate, as it did not account for the cost of remediation, the financial capacity of the polluting party, and deterrent measures. The Tribunal directed that the assessed compensation be

61 CPCB, General Framework For Imposing Environmental Damage Compensation 2022 https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMTQ5NV8xNjcxNzkyNjg5X21IZGlhcGhvdG8yOTM4LnBkZg== (page 4)

62 Sec 15 of the NGT Act

63 CPCB, General Framework For Imposing Environmental Damage Compensation 2022 https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMTQ5NV8xNjcxNzkyNjg5X21IZGlhcGhvdG8yOTM4LnBkZg==

64 CPCB Formula used for calculation of compensation is EC=PI x N x R x S x LF

deposited as an interim amount while the JC determined the final compensation.[65] An appeal was filed against this order of the Tribunal before the Supreme Court, which was still pending at the time of preparation of this report in April 2025.[66]

Similarly, in the *Mejia case*, the JC calculated a compensation of Rs. 16.1 crores using the CPCB formula. This amount was multiplied by eight to ensure a deterrent effect by the JC, bringing the total to Rs. 128.56 crores. However, the Tribunal rejected this multiplication factor, stating that while Rs. 16 crores might be inadequate to address the environmental pollution and compensation to the victims, multiplying it by eight was not justified.[67] The NGT kept the issue of final compensation pending, signalling the Tribunal's approach of ensuring that the deterrent factor is neither too lenient nor excessive.

In addition to this, in the *Mejia Case*, NGT imposed an interim compensation of Rs. 20 crore for damage caused by an ash-dyke breach, of which Rs. 7.92 crore was to compensate the affected farmers and Rs. 12.08 crore was to implement the restoration measure suggested by the JC.[68] However, the order did not specify how this amount was calculated. Three thousand six hundred ninety-eight farmers were awarded Rs. 5.91 crores as compensation for damage to agricultural lands out of this interim compensation.[69] However, the documents assessed for the preparation of this report did not specify the methodology used to calculate individual payouts.

In the *Chandrapur case*, the NGT directed the deposit of an interim compensation of Rs. 5 crores and an additional Rs. 1 crore per month for continued non-compliance. The Tribunal also granted the JC the authority to increase this penalty progressively and take legal action if violations persisted.[70] This direction was challenged before the Supreme Court, which stayed the order.

In the *Kulda case*, a representative from the CPCB in the JC acknowledged that villagers had suffered losses due to coal transportation, stating that the project proponent was responsible for mitigation measures.[71] However, there was no mention of direct financial compensation for the affected communities in the documents referred.

For cases involving sensitive ecological zones, there have been observations and recommendations for more detailed assessments before determining compensation amounts. In the *Flyash Barge case*, the JC recommended that a detailed environmental damage-cost evaluation was needed before imposing compensation for pollution in the Sundarbans waterways in the Hooghly River.[72] Similarly, in the *Ennore case*, the NGT noted that the JC failed to account for the ecological sensitivity of the affected area, particularly the destruction of mangrove forests. The Tribunal accordingly directed the JC to submit a consolidated and cumulative report assessing the extent of environmental damage, necessary remediation measures, and a timeline for flyash removal. Additionally, the JC was asked to propose a mechanism for calculating environmental compensation in cases where pollution (particularly water contamination) has long-term, ongoing effects. The Tribunal also stressed that the presence of carcinogenic metals such as Chromium and Arsenic in the dumpsite must be factored into compensation assessment.[73]

65 Original Application No. 104 of 2018 (Principal Bench), Order dated 15.02.2022

66 Hindalco Industries Limited v Shivpal Bhagat & Ors., Supreme Court of India Civil Appeal Diary No 11506/2022

67 Original Application No. 152/2017 (Eastern Zone), Order dated 14.02.2023 para 8, Pgs 22, 24.

68 Original Application No. 152/2017 (Eastern Zone), Order dated 14.02.2023 para 9, Pgs 22-24.

69 Original Application No. 152/2017 (Eastern Zone), Affidavit filed by the DM dated 09.08.2024.

70 Original Application No. 74/2020 (Western Zone), Order dated 19.01.2022 para 15.

71 Original Application No 236 of 2022 (Principal Bench), Action taken report of the JC 25.08.2022.

72 Original Application No. 64/2020 (Eastern Zone), Order dated 20.03.23 pgs 10-11.

73 Original Application No. 08 of 2016 (Southern Zone), Order dated 05.07.2022 pgs 65-67.

4.2. Comments and Analysis

The cases demonstrate that there is no fixed formula for calculating environmental compensation. While judicial precedents and CPCB guidelines provide frameworks, the actual determination of compensation remains ad-hoc, with significant variations between cases. In some instances, the methodology and procedure behind compensation calculations is not explicitly mentioned, raising concerns about transparency and principles of natural justice. This appears to be the main grounds for the appeals in the analysed cases filed before the Supreme Court to challenge the compensation amounts levied, highlighting the contested nature of environmental compensation in these cases.

The Tribunal has noted in some instances that victims are to be compensated based on the principle of *absolute liability*, meaning that polluters bear full responsibility for damages regardless of fault or the care taken.[74] However, discrepancies exist in how compensation is dispensed. In the *Mejia case*, affected farmers received financial compensation after the adverse impacts were established. In contrast, in the Kulda transportation case, no direct compensation was provided to affected communities despite documented losses of agricultural produce. These inconsistencies indicate a lack of uniformity in addressing victim compensation, underscoring the need for clearer, case-specific methodologies and protocols that prioritise both remediation and victim relief.

74 Original Application No. 64/2020 (Eastern Zone), Order dated 20.03.2023 para 19.

5. Environmental Remediation and Restoration

Environmental restoration plays a crucial role in addressing the damage, degradation and destruction caused by any polluting unit, as without removal of the pollutants and restoration of the environment, there is a risk that the pollutants will continue to cause damage and the health and economic impacts will persist. The NGT, while dealing with the case of polluted river stretches in the country, noted 'for enforcing legal right to clean environment, which is also a fundamental right, this Tribunal has to pass appropriate orders for relief to the victims of pollution and for restoration of the environment even in absence of an identified victim'.[75]

As mentioned above, environmental compensation finds its genesis in the 'polluter pays principle'. The CPCB Guidelines on the calculation of environmental compensation note that an important segment for calculating this compensation is the restoration obligation, which the polluter may be liable to pay. After completing a detailed site assessment, a remediation plan is prepared with site-specific targets for restoration.[76] The NGT has consistently emphasised the "Polluter Pays" principle, holding polluters accountable for environmental restoration. The following section deals with environmental restoration in the cases analysed.

5.1. Observations by NGT and JCs

The NGT has primarily directed regulatory authorities and JCs to prepare remediation plans and oversee their implementation, ensuring that polluting entities are held responsible for environmental restoration. In the *Sonbhadra case*, the Tribunal directed the JC, comprising CPCB, State PCB, the District Magistrate, and the Forest Department, to formulate a restoration plan to address the environmental damage caused by stocking/handling of coal and taking measures to control dust emissions.[77]

Similarly, in the *Shivpal Bhagat case*, the NGT directed the SPCB to identify areas where unscientific fly ash disposal had taken place and to generate data on the total quantity of coal mined, used in industries, and available for thermal power plants. The JC was tasked with overseeing the implementation of remedial measures issued in the course of proceedings.[78]

The *Mejia case* also saw the Tribunal emphasising restoration efforts following an ash-dyke breach. It noted, "in view of serious violations in failure to timely dispose of flyash which have continued affecting the lives and property of the inhabitants, the Project Proponent needs to take remedial measures to prevent any further pollution and is also liable to pay compensation on 'Polluter Pays' principle, to be utilised for restoration of environment and public health".[79] The Tribunal ordered an interim compensation of Rs 12.08 crores for restoration purposes, and the JC was specifically tasked with preparing a restoration plan, calculating the final cost of restoration, and engaging with stakeholders to ensure an effective remediation process.[80]

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75 News item published in "The Hindu"authored by Shri Jacob Koshy titled "More river stretches are nowcritically polluted : CPCB- Original Application No.673/2018 (Principal Bench), Order dated 08.04.2019 para 35.

76 CPCB, General Framework For Imposing Environmental Damage Compensation 2022 https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMTQ5NV8xNjcxNzkyNjg5X21IZGlhcGhvdG8yOTM4LnBkZg== pg 13-14.

77 Original Application No 817/2022 (Principal Bench), Order dated 02.05.2023 pgs 8-9.

78 Original Application No. 104 of 2018 (Principal Bench), Order 24.06.2021 pgs 32-33.

79 Original Application No. 152/2017/EZ, Order dated 09.05.2022 pg 3.

80 Original Application No. 152/2017/EZ, Order 14.02.2023, pages 24-25.

A similar approach was taken in the *Chandrapur case*, where the Tribunal directed the deposit of an interim compensation of Rs. 5 crores while instructing a new JC (comprising MoEF&CC, CPCB, and the State PCB) to assess compensation for past violations and overseeing restoration efforts.[81] In the *Kulda case*, the NGT upheld the findings of the JC and ordered remedial action in line with the recommendations to stop further pollution. The Tribunal also reinforced the "Polluter Pays" principle, ensuring liability was fixed for past violations.[82]

One important point to note here is that remediation and restoration are critical because it is only when remediation and restoration are done that we can say the problem of pollution and environmental damage has been addressed. Compensation is only the cash payment that tries to address some of the losses people suffer. So, the real and only way to address the problem is twofold - on one side, stop the pollution and other impacts, and on the other side, remedy and restore what has already been damaged.

A significant aspect of the observations in the remediation processes has been the inclusion of impacted communities in planning and decision-making. The JC in the *Ennore case* emphasised the importance of public participation, stating that environmental restitution should be guided by "sound science, polluter pays and public participation."[83]

A subsequent JC in the same case further noted that traditional knowledge and local expertise should be integrated into restoration plans, as these communities have intimate knowledge of their environment and ecosystems.[84] To facilitate this, the JC recommended forming a Local Area Environmental Committee, which would include representatives from affected communities to oversee the remediation process.[85] Additionally, the NGT in Ennore directed the preparation of a Detailed Project Report (DPR) for remediation and called for the formation of a permanent grievance committee to hear grievances from affected communities. [86]

5.2. Comments and Analysis

In almost all the matters analysed in this study, the Tribunal has ordered preparation and implementation of plans for remediation and restoration of environmentally damaged areas. This shows that the Tribunal accords high significance to this. We share this feeling, as it is clear that the problem of contamination and degradation of natural resources cannot be considered fully addressed until the impacted areas are restored. We urge that this approach of undertaking remediation, clean-up and restoration should be undertaken in a proactive manner by the regulatory agencies in all areas with significant coal operations.

The NGT's approach to environmental remediation has primarily been to direct regulatory authorities and JCs to prepare and oversee restoration plans rather than taking direct oversight of the remediation process. In most cases, the Tribunal has disposed of matters after issuing restoration directives, placing the implementation burden on regulatory agencies. While this approach aligns with the roles and responsibilities assigned to these agencies, in practice, this often results in weak enforcement and delayed action, where even the remediation direction by the Tribunal has resulted in no significant on-ground improvements.

81 Original Application No. 74/2020 (Western Zone), Order 19.01.2022 para 14-15.

82 Original Application No 236 of 2022 (Principal Bench), Order dated 15.07.2022 para 4.

83 Original Application No. 08 of 2016 (Southern Zone), JC report dated 13.12.2017, pg 20.

84 Original Application No. 08 of 2016 (Southern Zone), Report March 2022, pg 15.

85 Original Application No. 08 of 2016 (Southern Zone), Report March 2022, pg 25.

86 Original Application No. 08 of 2016 (Southern Zone), Order dated 05.07.2022, pgs 160-162, 165.

In the *Ennore case*, the NGT expressed strong reservations about the failure to develop an action plan for estimating environmental damage costs and implementing restoration efforts. The Tribunal noted that neither the polluting units nor the regulatory authorities had initiated concrete remediation steps despite the visible and long-standing pollution in the area.[87] The *Ennore case* is a key example of *legacy pollution*, where the JC has also highlighted severe environmental degradation around the power plant. We use the term "legacy pollution" here to mean pollution which has been existing and continuing beyond the time in which it could be reasonably addressed, and remains to be adequately resolved. Thus, this adds to the burden of addressing the pollution which is being currently generated. We can consider this the equivalent of the "legacy fly ash" as described in the Fly Ash Notification 2021. Legacy fly ash is fly ash that has been accumulated before the date of the Notification, and rightfully, should not have been there in the first place as there is a requirement of 100% utilisation of ash. The Notification, therefore, requires the legacy fly ash also to be utilised to the full extent along with the current fly ash. Similarly, pollution from earlier days, which has not been addressed and which has now accumulated and continues to contaminate natural resources, needs to be eliminated through a process of restoration and remediation.

However, the committee in the *Ennore case* also stressed that remediation would only be meaningful if further damage could be prevented, underscoring the need for stricter regulatory enforcement.[88]

While the Tribunal has ordered for restoration of the contaminated areas in many of the cases studied, the actual implementation of this has been highly inadequate. Though the case proceedings do not document the follow-up as the matters are mostly disposed off while directing restoration, our understanding regarding the status of this comes from information on the ground from some of these areas. It would be important to ensure that there is proper follow-up.

One way to ensure this could be for the Tribunal to continue to maintain oversight on the restoration process. The trade-off of this will be to create additional load on the Tribunal and probably push it into a role that it was not supposed to play. However, doing this in selected cases may help achieve the balance of ensuring follow-up with not too much additional burden.

An important shortcoming of the Tribunal's various orders for restoration has been the lack of any deadline. This can allow laxity to creep into the implementation. If the Tribunal can direct timelines for the restoration process even while disposing off the matters, it would help in ensuring that there is proper follow up.

Restoration will be a critical element in the concerns being articulated in the discussions on energy transitions right now. One major part of energy transitions is the shift from coal-based electricity generation to generation from energy sources like solar, wind etc. There is a lot of emphasis that this transition needs to be planned as a Just Transition, so that no one suffers excessively as a result of this shift. However, if restoration is not carried out properly and in time, these areas will be left as toxic legacies of coal operations. So, even from the perspective of Just Transitions, remediation and restoration is very important.

Lastly, the importance of impacted communities in environmental remediation cannot be overstated. The JC in Ennore highlighted that local knowledge should be incorporated into restoration efforts. Sustainable restoration efforts must integrate public participation, transparent oversight, and enforceable accountability mechanisms to ensure long-term ecological and social recovery.

87 Original Application No. 08 of 2016 (Southern Zone), Order dated 05.07.2022, para 44.

88 Original Application No. 08 of 2016 (Southern Zone), Report March 2022, pg 18.

6. Role of Regulatory Authorities

Under the ambit of environmental protection legislation, various authorities have been mandated to ensure compliance with the regulatory framework. The Central Pollution Control Board (CPCB), along with the State Pollution Control Boards (SPCBs), serve as primary regulators in this domain. Under the Air Act, these boards oversee monitoring, authorisation, and enforcement of ambient air quality standards, ensuring that industrial emissions are kept within permissible limits. Similarly, under the Water Act, the boards are tasked with monitoring water quality, regulating effluent discharge, and enforcing compliance with the prescribed norms to safeguard aquatic life and overall water health.

Furthermore, under the EIA Notification, 2006, the appraisal of projects involving significant environmental impacts is conducted through established expert committees based on which the Environmental Clearances are accorded. The compliance of the conditions under which environmental clearances are given is monitored by the regional offices of the Ministry of Environment, Forests and Climate Change.

These agencies have several powers to ensure compliance with various environmental laws and regulations, including the power to levy fines, defer/reject projects (expansion or greenfield) for environmental clearance, order the shutting of water and electricity supplies, order the closure of defaulting units and even prosecute those violating environmental laws.

The NGT has consistently highlighted the critical role of regulatory authorities in monitoring compliance, imposing penalties, and ensuring environmental restoration. However, across multiple cases, the NGT and JCs have repeatedly pointed out the failure of these authorities to prevent and halt continued environmental damage and a reluctance to use their powers, resulting in impunity for polluters.

6.1. Observations by the NGT and JCs

The NGT has noted the important role of regulatory authorities in providing remedies for environmental impacts. In the *Shivpal Bhagat case*, the Tribunal elaborated on the procedural aspects of a complaint and the role of regulatory authorities in acknowledging community grievances and taking necessary actions against violators. It directed that an aggrieved person should approach concerned regulatory authorities before filing an application before the Tribunal. Thereafter, the authorities should respond to the complaint within 15 days. Such a procedure may provide a quicker remedy and also indicates the stand of Authorities when the case comes before the Tribunal.[89]

The Tribunal has also elaborated on the broader role that the regulatory authorities are expected to play, apart from taking direct action in protecting the environment. In the *Ennore matter*, noting that regulatory authorities are vested with powers to impose stringent action under the Air and Water Act, the Tribunal has observed:

> "Though they are the machineries under the Government as far as the pollution is concerned, they are the protector of the environment and they should not be afraid of exercising their power in discharging their duties in this regard. As per the Pollution Control legislation, the Pollution Control Boards are expected to act as advisers to the Government as to how the environment will have to be protected and there is a duty cast on the Government under Article 48-A of the Constitution of India to protect the environment".[90]

89 Original Application No. 104 of 2018 (Principal Bench), Order dated 19.07.2018, para 3.

90 Original Application No. 08 of 2016 (Southern Zone), Order dated 05.07.2022, pg 67

In the cases analysed, the NGT has also expressed dissatisfaction with the inaction and complacency of regulatory bodies, noting that their failure to act allowed polluters to operate with impunity. For instance, in the *Ennore case*, the SPCB assessed a compensation of Rs 16.461 crores against violating units but refused to impose the penalty themselves, instead approaching the Tribunal for enforcement. The NGT criticised this approach, stating:

> "(It is) The responsibility of the regulating authority to take action against the erring units in accordance with law, which includes imposition of environmental compensation, must take note of the cost required for restoration of the damage caused to the environment and prosecution in appropriate cases."

The NGT further condemned the "lethargic attitude" of the SPCB, noting that despite earlier directions, violations were still continuing, and most of the remedial measures were not complied with.[91]

In the *Shivpal Bhagat case*, the NGT rejected the plea of lack of budget by the PWD to prevent dust pollution, stating that a clean environment is a fundamental right under Article 21 of the Constitution. The Tribunal directed that if budgetary constraints exist, the costs must be recovered from the polluter or otherwise arranged by the State, as "for lack of budget, environment and public health cannot be damaged."[92]

Similarly, in the *Ennore case*, the JC observed that despite the visibility of pollution and the presence of multiple regulatory agencies, no lasting change was visible on the ground. The JC noted that polluters continued to pollute with impunity, while affected communities expressed cynicism towards the committee during the site inspection, fearing it would be "just another eyewash."[93]

The failure of regulatory authorities to act proactively is a recurring issue. In the *Ennore case*, the NGT strongly criticised authorities for not taking any concrete steps to mitigate environmental damage despite long-standing pollution concerns. Similarly, the *Shivpal Bhagat* JC report highlighted severe regulatory lapses where authorities failed to prevent unscientific fly ash dumping and coal storage violations, allowing pollution to continue unchecked.

Though not a part of the eight cases analysed in this study, there are other matters in which the Tribunal has raised questions on the pollution control boards and has even fined them.

For example, in the case of *Krishi Vigyan Arogya Sanstha & Ors Vs. Maharashtra State Power Generation Company Ltd. & Ors*, this is what the Tribunal observed:

> "It is very pertinent to point at this juncture that this Tribunal had come across in very many cases in which the statutory authority namely the Maharashtra Pollution Control Board, for the reasons best known to them, is not taking necessary and appropriate action against the State Govt. entities against whom, allegations were levelled for violating the environmental norms and the present case is also a one such case. As rightly pointed out by the learned Counsel appearing for the Original Applicant, the 4th Respondent [MPCB] in paragraph No.4, made an averment as to the issuance of Notice dated 19.06.2019 under Section 31A of the Air (Prevention and Control of Pollution) Act, 1981 to the 1st Respondent and however, it is silent as to the further action taken in pursuant to the said Notice. The Tribunal is totally dissatisfied as to the said lackadaisical attitude exhibited by the 4th Respondent."[94]

91 Original Application No. 08 of 2016 (Southern Zone), Order 05.07.2022, para 44.

92 Original Application No. 104 of 2018 (Principal Bench), Order 15.02.2022, para 11.

93 Original Application No. 08 of 2016 (Southern Zone), Report Mar 2022, pgs 12-13.

94 Krishi Vigyan Arogya Sanstha & Ors Vs. Maharashtra State Power Generation Company Ltd. & Ors- O.A. No 62/2021(WZ), Order dated 15 Dec 2021, para 6.

In another case, *Sanjay Chauhan Vs. Central Coalfiled*, the Tribunal Ordered:

> "In view of above, it appears that Mr. xxxx, C.E., RO, Ranchi, and Mr. xxx, Regional Officer, Ranchi, [names deleted by us while using this quote] who have signed the Action Taken Report are either thoroughly incompetent and do not know what observations were recorded by the Committee and what action was required to be taken with regard to those observations or they are deliberately suppressing crucial material from the Tribunal. We, therefore, impose a cost of Rs. 10,000 (Rupees Ten Thousand), each, on Mr. xxxx C.E., RO, Ranchi, and Mr. xxxx Regional Officer, Ranchi, which shall be deposited by them with the Registrar, National Green Tribunal within one week."[95]

One of the reasons why the Tribunal has been making sharp remarks about the lapses in the actions by the regulatory authorities, we feel, is that the Tribunal has high expectations from these agencies. The Tribunal sees them, and rightfully so, as the key agencies with a major role and responsibility in ensuring compliance with environmental laws and regulations and protecting the environment from contamination and destruction. This is also clear from the many responsibilities the Tribunal has put on them.

In most cases, regulatory authorities such as the CPCB and SPCBs have been part of the JCs tasked with fact-finding, assessing compensation, preparing restoration plans and overseeing the implementation of these measures. They have been asked by the Tribunal to ensure the follow-up of its directions after matters have been disposed of. For instance, in the *Kulda case*, the JC was tasked with overseeing the construction of a dedicated coal transport road to reduce dust pollution, which adversely affected local villagers.[96]

It is almost axiomatic that the directly affected communities need to be at the centre of any efforts to address the impacts of coal operations. The law and regulatory framework also recognises the communities as important stakeholders. For instance, in accordance with the EIA process, it is essential that affected communities are to be given a meaningful opportunity to participate in the clearance process. Similarly, draft regulations under the EPA 1986 are opened for public input before finalisation. Keeping aside the effectiveness of these provisions, the point stands that communities are important stakeholders, which has been recognised in different judicial orders by the Supreme Court and the Tribunal.

However, despite being recognised as important stakeholders, the cases show a complete lack of space and opportunity for involvement of the communities in any attempt to redress the pollution and environmental and social impacts. Often, they are not heard when they complain about the issue, as highlighted by the scepticism of communities towards the JC in the *Ennore Case*, and they are not involved when any corrective actions, including those by PCBs or project promoters are ordered to be taken.

6.2. Comments and Analysis

The regulatory authorities have an important role in ensuring compliance with environmental protection norms and acting as means for impacted communities to access justice. However, NGT and JC's repeated observations across cases reveal a consistent pattern of regulatory failure and weak enforcement mechanisms. While pollution control boards and other regulatory bodies have statutory powers to impose penalties, conduct environmental monitoring, and oversee restoration,

95 Sanjay Chauhan Vs. Central Coalfiled- O.A. 27/2020 (EZ), Order dated 8 Dec 2021 para 12.

96 Original Application No 236 of 2022 (Principal Bench), Order 15.07.2022 pgs 8-9.

they have largely failed to exercise these powers independently and proactively. There is apparent reluctance on the part of SPCBs to impose environmental compensation, despite having the legal authority to do so.

The inaction of regulatory authorities often leads to prolonged environmental damage and suffering for affected communities. In cases like *Kulda*, *Shivpal Bhagat and Ennore*, there has been a systematic failure in addressing the environmental impacts and multiple complaints by the communities.

Like the Tribunal, the people, especially the directly affected communities, have high expectations from regulatory agencies. We too feel that they have a central role in ensuring environmental protection. It is imperative, therefore, that they need to be enabled to play this role to the best extent possible. Among other things, the capacity of regulatory bodies needs to be strengthened so that they can take proactive and independent actions. A framework is also needed to ensure accountability of these agencies, which could include some oversight by agencies like the NGT in specific cases. Along with this, another important measure would be to create mechanisms in which the directly impacted communities and their representatives, civil society organisations and independent experts can team up with the regulatory agencies to strengthen actions and their effectiveness to protect the environment and stop violations.

7. Discussions

Each of the eight cases documents serious and multiple violations of environmental laws and regulations with severe impacts on the environment – air, water, soil, biodiversity – and on local communities. The reasons for the persistence of this pollution, often for many years, have also been highlighted by these cases, and at the core, there is wilful neglect by the project owner/operators and the lack of effective oversight and action by the regulatory agencies.

An important question here is whether these problems of pollution and environmental impacts would be addressed fully if all the laws were followed properly? Or whether such pollution is intrinsic to coal operations, and is an inevitable fallout and an unavoidable trade-off for using coal-based electricity?

Whether a full implementation of the laws and regulations - in letter and spirit – can make coal completely clean, is a question that has not yet been answered in practice because we have never seen such a full and proper implementation of all laws and regulations! From the kinds of impacts that coal has, we feel that even with the best implementation of all laws and regulations, coal will have several impacts that are impossible to avoid, like deforestation, groundwater dewatering, generation of massive amounts of ash etc. So, in the long run, it is critical to shift to cleaner sources of electricity generation.

However, a proper implementation of these laws and regulations that provide preventive and mitigative measures can certainly ameliorate and cut down significant parts of these impacts. But let alone a full and proper implementation of the laws and regulations, what we have are systemic failures in environmental governance and widespread violations of environmental laws, as documented by these eight cases we have analysed.

Two important insights with broader implications emerge from the documentation of serious environmental impacts in these eight matters. One is that these cases most likely represent the typical picture of the impacts of coal operations all over the country, given that the reasons behind these impacts are systemic and not case-specific. Media reports, research papers, community voices and even several official documents also indicate that these eight cases are not isolated examples but rather are typical representations of the situation.

And two, a strict and stringent implementation of the laws and regulations is critical to ensure that the social, economic and environmental impacts of coal operations are at least minimised to the extent possible.

An important point related to the implementation of the extant laws is the failure of the regulatory agencies to ensure such proper implementation. Part of this comes from the inadequate capacity of these agencies – whether in terms of human resources, budgets or equipment. However, another aspect is the lack of effective action that is possible even within the available resources. The NGT cases do not explain the reasons for any of these, though they do make observations on this aspect. Given this, we feel that one of the most important issues to address is how to make the regulatory agencies more effective. On the one hand, measures are necessary to enable them and strengthen them, while on the other hand, mechanisms also need to be put in place to ensure the accountability of these agencies. This is a topic that needs a separate discussion. However, one significant learning related to ensuring the effective implementation of regulations that emerges from these eight cases is the need to involve the local, especially directly affected communities, in any efforts, including

those by regulatory agencies, to address environmental problems. We would urge that this involvement should be formal, should be done in a systematic and structured way, and be sustained over a long period.

Some of these eight cases also include the ordering of compensation for the environmental damage and impacts suffered. In some cases, the compensation has been awarded to individuals who have borne the brunt of some of the environmental impacts, and in some cases the compensation has been set for carrying out remediation and restoration of the environment. Compensation is an important part of addressing the impacts. It can both provide relief to those directly impacted and have a deterrent impact on future pollution. However, the award and amount of compensation is often challenged in the higher courts, where it gets stayed and remains pending for a long time, thus eroding its utility. In this regard, there are two things that need to be done. First, the NGT needs to ensure that in deciding the compensation, due process is followed to safeguard that it cannot be easily challenged in the higher courts on procedural grounds. The Supreme Court, when taking up appeals for hearing, should be sensitive to the fact that the compensation awarded is often the first and only relief to the victims of environmental impacts and see that compensation payments are not be stayed unless it is absolutely essential.

The second part of compensation, where the Tribunal has ordered compensation to be paid towards remediation or restoration of the environmental damage, leads us to one of the most important insights offered by the analysis of these eight cases. In almost every one of these eight cases, the Tribunal has ordered remediation and restoration of the damaged environment in some form or another. Such orders have two significant implications. One, this is a clear recognition by the Tribunal that unless the pollution is cleared and cleaned up, the problems for local communities, including health and economic impacts, will persist, as the contaminated areas will continue to pollute. Thus, there is no real or lasting solution to the pollution and impacts already created until complete remediation, clean-up and restoration is done. Given that situations in other coal-operations areas are very likely to be similar to the ones in these eight matters, we feel that remediation, clean-up and restoration should be taken up in a pro-active manner in all areas where coal operations have been undertaken or are ongoing. It should be a key mission for the MoEFCC and the regulatory agencies.

The second important implication of these orders for restoration is concerning energy transitions. Currently, there is a lot of discussion on energy transitions, which essentially means decarbonisation. One major part of the energy transitions is the shift from coal-based electricity generation to cleaner, zero or low carbon sources of power generation like solar and wind. The discussions around energy transitions are focussed on Just Transitions, the idea being that the shift that will occur should be done in a way that justice is served and no one is adversely impacted. One of the key concerns in any transition is the legacy, or what gets left behind -in this case, what is the legacy that coal operations will leave behind even as they make way for a transition to solar, wind and other energy sources? Given what these eight cases indicate, unless extensive restoration and remediation is carried out, coal operations are likely to leave behind a legacy of contaminated soils and waters, cratered landscapes, dumps of waste and overburden, communities whose health and livelihoods have been adversely impacted by this pollution, damaged bio-diversity, fragmented ecosystems, severed wildlife corridors and large areas dewatered of groundwater, to highlight some key aspects. This indicates how critically important the issues of remediation, clean-up, and restoration are for ensuring Just Energy Transitions.

Another element of these orders that has far-reaching implications is related to the health impacts of the pollution from coal operations. There is sufficient scientific literature regarding serious impacts of various pollutants that are a part of the emissions and effluents from coal operations. However, there is little study and documentation of the specific impacts in any given area. This gap is all the

more concerning when in many places, local communities complain of various health problems like respiratory diseases, skin problems, kidney ailments and many others, which they relate to coal operations. In several of the eight cases, the Tribunal has ordered comprehensive health impact studies to be carried out in the regions with an aim to understand and address how coal operations have impacted the health of local communities. We believe this is another suggestion that needs to be proactively implemented in all areas where there are significant coal operations.

One important lacuna in the entire process that our analysis has revealed is the absence of any effective follow-up once the Tribunal has disposed off a matter. In most cases, the Tribunal disposes off the matter after giving directions to various bodies, leaving post-disposal monitoring to the pollution control boards and district authorities. While this is in keeping with the current regulatory framework, it does not consider the fact that in many cases, the problems have been aggravated and have had to come to the Tribunal precisely because the regulatory agencies did not or could not address them. It is important to have in place a mechanism that will ensure the effective implementation of the Tribunal's orders regarding direct pollution or environmental impacts and the Tribunal's broader directions regarding remediation, clean-up, restoration, health studies, etc.

One suggestion to do this is to increase the capacities of the pollution control boards and create monitoring and follow-up mechanisms that include not only the PCBs but also representatives of directly impacted communities and civil society organisations and independent experts.

These are some of the key insights from the analysis of these eight matters. Even though we could look at only a limited number of cases, very rich insights have emerged as the Tribunal has been able to look at coal operation impacts through the dual framework of legal and technical aspects. It would be very useful indeed to extend this analysis to include more cases that the Tribunal has dealt with, especially to make them more comprehensive and representative. Based on our analysis, we offer the following recommendations.

8. Recommendations

1. The analysis we carried out needs to be extended by including more cases that the Tribunal has dealt with, especially to make them more comprehensive and representative.

2. There is a need to regularly monitor the situation in the coal operations areas after the NGT Orders, with an aim to track changes in air and water quality, soil health, bio-diversity and the well-being of impacted communities. This is necessary to assess how effectively the orders of the Tribunal have been implemented, as well as to provide insights into the capacity and accountability of regulatory authorities in ensuring long-term environmental solutions.

3. A suitable system needs to be put in place for such monitoring, and one suggestion is a mechanism with pollution control boards with enhanced capacities, along with representatives of directly impacted communities and civil society organisations and independent experts. Similar systems are needed for the post-clearance monitoring and environmental restoration process and other longer-term processes like health impact assessments. In particular, impacted communities should be included in restoration committees to ensure that traditional knowledge is incorporated and that the adverse impacts on their lives and livelihoods are effectively addressed. Civil society representatives and independent experts also need to be a part of this mechanism.

4. Another possibility is for the Tribunal not to dispose off the cases but to keep the matter pending so that the regulatory agencies can submit regular reports on the follow-up. This has the risk of overburdening the Tribunal with duties that it was not supposed to handle in the first place. But it can be an option that can be used selectively.

5. Impact assessments similar to those which the JCs have carried out at the behest of the Tribunal should be carried out in all major areas of coal operations, and remediation, clean-up and restoration should be taken up in a pro-active manner in all areas where coal operations have been undertaken or are ongoing. It should be a key mission for the MoEFCC and the regulatory agencies.

6. Similarly, health impact assessments should be carried out in all areas where there are significant coal operations.

7. The status of the environmental situation as well as the situation of local communities with respect to health, social, economic and livelihood impacts in areas with coal operations should be taken up as an important element in the Just Transitions discussions and plans, and it should be ensured that these issues are addressed properly and do not become an unwanted legacy in the Energy Transitions.

Annexures

Annexure 1 - List of Cases Studied

1. Dakshinbanga Matsyajibi Forum Vs Inland Waterways Authority of India & Ors -Original Application No. 64/2020 (Eastern Zone)
2. In re: News report published in the Newspaper named Indian Express, Daily News Paper dated : 4th February, 2022, Kolkata, Late City Edition titled "Non compliance of EC conditions by Kulda coal mine, Odisha & Tamnar Therman Plant, Chattisgarh"- Original Application No 236 of 2022 (Principal Bench)
3. Legal Aid Services, West Bengal vs Union of India & Ors.- Original Application No. 152/2017 (Eastern Zone)
4. Madhusudan Roongta vs State of Maharashtra & Ors.- Original Application No. 74/2020 (Western Zone)
5. Pankaj Kumar Mishra v UOI & Ors.- Original Application No 862 of 2022 (Principal Bench)
6. R. Ravimaran Vs. Union of India and Ors - Original Application No. 08 of 2016 (Southern Zone)
7. Shivpal Bhagat & Ors. Vs. Union of India & Ors.- Original Application No. 104 of 2018 (Principal Bench)
8. Suo Motu Action in Illegal Dumping of Coal at Railway Siding at Krishnashila, Sonbhadra v UOI and Ors- Original Application No 817/2022 (Principal Bench)

Annexure 2 - Key Issues, Observations and Dates of Cases Studied

While this table flags some important contested issues and directions/observations in the cases, it is important to note that this is for brief reference only and it is not exhaustive.

Name of Matter	Key Issues	NGT Observations & Directions	Important dates and status at the time of preparation of this report (30 April 2025)
Dakshinbanga Matsyajibi Forum vs IWAI & Ors	- Capsizing and accidents of fly ash barges in Hoogly and other rivers - Risk to highly eco-sensitive zones of the Sundarbans, riverine ecology fisher livelihoods	- Observed pertinent damage to the environment - Directed compensation to the victims based on absolute liability	Date of Application (DoA) before NGT- 05.08.2020 Current status (CS)- Disposed via order 20.03.2023
In re: Indian Express report on Kulda-Tamnar	- Large scale coal transport between Kulda (Odisha) & Tamnar (Chhattisgarh) - Dust, health, and water issues in 14 villages due this transport	- Applied polluter pays principle to fix liability - Ordered dedicated transport corridor	DoA- 28.03.2022 CS- Review application pending before the NGT [97]
Legal Aid Services, WB vs UOI & Ors	- Fly ash mismanagement by Mejia Plant in Bankura, West Bengal - Air, land, and water pollution affecting nearby villages	- Ordered monetary compensation to affected farmers - Directed JC to preparate restoration plan and undertake restoration measures	DoA- 12.09.2017 CS- Disposed via order 14.02.2023

97 Review Application No 16/2023 in OA No. 236/2022 (NGT Principal Bench)- Order Dated 19.07.2023

Name of Matter	Key Issues	NGT Observations & Directions	Important dates and status at the time of preparation of this report (30 April 2025)
Madhusudan Roongta vs State of Maharashtra	- Violation of environmental norms by Maharashtra State Power Generation Co. Ltd., Chandrapur Super Thermal Power Station and Western Coalfields Limited - Violation of norms leading to air and water pollution	- The Tribunal accepted the findings of the JC noting that there are violations of various norms including using of coal having high sulphur, run off from coal storage, ambient air quality exceeding the prescribed limits and dumping of fly ash in the bund which led to pollution - Directed for conducting health impact and undertaking remedial measures	DoA-16.10.2020 CS- Appeal pending before the SC[98] NGT Order stayed
Pankaj Kumar Mishra vs UOI & Ors	- Fly ash transport in in Singrauli and Sonbhadra areas - Pollution was taking place during transportation of fly ash by Thermal Power Stations in violation of CPCB Guidelines	- Found violations of safety standards - Ordered preventive measures and liability assessment	DoA- 16.11.2022 CS- Disposed via order dated 01.03.2024

98 Maharashtra State Power Generation Company & Anr. Vs Madhusudan Roongta & Ors-Civil Appeal No(s). 1337/2022, Supreme Court of India

Name of Matter	Key Issues	NGT Observations & Directions	Important dates and status at the time of preparation of this report (30 April 2025)
R. Ravimaran vs UOI & Ors	- Impacts of fly ash dumping by North Chennai Thermal Power Station (NCTPS) & port operations M/s Kamarajar Port in Ennore, Tamil Nadu - River & mangrove degradation	- Noted widespread violations and adverse environmental and social impacts - Ordered compensation and constituted oversight committee to undertake remediation measures	DoA- 18.01.2016 CS- Pending before NGT and SC (appeal)[99]
Shivpal Bhagat & Ors vs UOI & Ors	- Coal mining/washery pollution in Raigarh, Chhattisgarh - Decline in air & water quality, crop damage	- Directed remediation & compensation - Criticized lax enforcement by regulatory authorities; appointed monitoring judge	DoA- 28.02.2018 CS- Appeal pending before SC[100]
Suo Motu: Illegal Coal Dumping at Krishnashila	- Unauthorized coal storage in Sonbhadra, Uttar Pradesh - Air & water pollution affecting locals	- Noted obvious impacts on public health and environment - Directed cleanup & formulation of restoration plan	DoA- 07.11.2022 CS- Appeal pending before SC[101]

99 Kamarajar Port Limited (Erstwhile Ennore Port Limited) Vs Union Of India & Ors.- Civil Appeal No(S). 4238-4241/2020, Supreme Court of India

100 Hindalco Industries Limited Vs Shivpal Bhagat & Ors.-Civil Appeal No(S). 4301/2022, Supreme Court of India

101 Northern Coalfields Ltd Bina Project Vs. Union Of India- Civil Appeal 6066-6067 Of 2023, Supreme Court of India

Vikalp Social Organisation

May 2025