

174_SAINI_Conceptualizing_guidelines_to_monitor

Title: Conceptualizing guidelines to monitor environmental data involving locals

Abstract: The pandemic disrupted the regular environment impact assessment practices all over. Digital platforms were widely used to carry on with activities as scrutiny of the EIA reports by authorities including conducting public hearings during the pandemic. The collection of primary environmental data for air, noise, soil and water quality in the core or buffer zone took a back seat under the circumstances. Demand has been raised since long to rely on secondary data along with primary data from the perspective of reducing the costs of EIA. However, conceptualizing monitoring of environmental data by local populations can help EIA consultants a lot in years to come not only in situations like pandemic but otherwise also it can be a radical change in the prevalent mindset. By building capacity of citizen groups, local educational institutions etc. and involving them for the collection of primary data will improve transparency and accountability as well as more bring more acceptability of the project. As standard making bodies are also working on developing standards for low cost monitoring instruments (sensor based equipment's or kits) making acceptability of data easy for public consumption, it's the right time to start in this direction. The presentation will discuss the work being done and obstacles to be overcome in this area.

Summary Statement: Demystifying technical jargons by leveraging environmental monitoring to locals

Introduction:

Environment impact assessments are primarily conducted in large number of countries due to regularly requirements. In India these are driven from Environment Impact Assessment Notification, 2006. A list of projects is provided that require prior environmental clearance (EC) before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity. The projects are divided into two categories namely 'A' and 'B' regulated by Central Government in the Ministry of Environment and Forests and State Environment Impact Assessment Authority (SEIAA) respectively.

Two key activities in environmental clearance process are (I) project appraisal made by Expert Appraisal Committee (EAC) of anticipated environmental impact & mitigation measures given in EIA report cornerstone on Terms of Reference (ToR) given for the purpose including baseline environmental scenario in core and buffer zone (10 KM around project site) of air, noise, soil and water quality (II) 'Public Consultation,' the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate.

Once the environmental clearance has been given monitoring of the conditions imposed again have a substantial reliance on monitoring of air, noise, soil and water quality. The EIA also have a substantial focus on issues related to biodiversity, ecology, socio-economic aspects but the same are not the focus of current paper.

The EIA reports are to be prepared by environmental consultants who must be accredited by National Accreditation Board for Education and Training (NABET) a constituent Board of

Quality Council of India. The monitoring of air, noise, water and wastewater is to be done engaging laboratories recognized by Central Pollution Control Board (CPCB) under Environment (Protection) Act, 1986 and accredited by National Accreditation Board for Testing and Calibration of laboratories (NABL)

Monitoring of air, noise, soil and water quality data for EIA purpose

In India, the baseline data is monitored as laid in EIA Manuals drawn from a publication by Ministry of Environment, Forest and Climate Change (MoEF&CC) of 2001.

MoEF&CC in 2022 in order to avert irregularities and bring uniformity in baseline data for project appraisal stated that the baseline data used for preparation of EIA/EMP reports may be collected at any stage of the EC process or even before the grant of ToR. The baseline data and Public Hearing shall not be more than three years old at the time of submission of application for consideration of EC. Public consultation shall be conducted after the grant of ToR and completed before its expiry

In spite of all this regulated mechanism in place, a review of minutes of environment clearances by EAC over last 4 years shows question marks on the quality of air, noise, soil and water quality data generated by accredited consultants from time to time. In as recent as Minutes of EAC for Industry-2 dated 29.3.2023 it was recorded that sampling for air, noise and water was not done properly and accredited consultant was asked to do the same again.

A review of minutes of EAC at random from 2018 - 2023 which covers pre covid, covid and post covid period also shows that the results of the baseline monitoring particularly in case of ambient air quality, are always below the National Ambient Air Quality Standards (NAAQS) 2009, for example, "Ambient air quality monitoring was carried out at 8 locations during March, 2017 to May, 2017 and the baseline data indicates the ranges of concentrations as: PM10 (72.5-81.2 $\mu\text{g}/\text{m}^3$), PM2.5 (40.65-45.99 $\mu\text{g}/\text{m}^3$), SO₂ (11.97-17.29 $\mu\text{g}/\text{m}^3$) and NO₂ (14.06-18.36 $\mu\text{g}/\text{m}^3$) respectively. AAQ modelling study for point source emissions indicates that the maximum incremental GLCs after the proposed project would be 0.33 $\mu\text{g}/\text{m}^3$, 0.98 $\mu\text{g}/\text{m}^3$ and 0.05 $\mu\text{g}/\text{m}^3$ with respect to PM10, SO_x and NO_x. The resultant concentrations are within the NAAQS."

The monitoring done under National Ambient Air Quality Monitoring Programme (NAMP) Data run by CPCB that is a network of 1257 monitoring stations (Manual monitoring is conducted at 883 stations covering 378 cities/towns in 28 States & 7 Union Territories and Continuous monitoring at 374 stations in 190 cities/towns in 27 States and 4 Union Territories), however, shows that PM10 and PM2.5 levels are regularly exceeded.

A review also shows that during covid and post covid, the environment clearance process continued and minutes specifically mention that meetings for environment clearance were done through video conferencing or hybrid mode, the minutes are, however silent on, how baseline monitoring or public hearings were done during this period and whether any difficulties were faced or not. Capturing of this information would have been of great use in developing guidelines for doing baseline studies or public hearings in future in case of pandemic situations.

Thus though there is a huge dependency shown on primary data and it's a major factor for the costing part of the environment impact assessments by the consultants, the utility of the

exercise does not reflect out, except that it is a requirement for the process and therefore be undertaken.

Future of environmental monitoring for EIA purpose

The general guidelines in EIA Manuals by MoEF&CC for sampling, frequency & method of baseline environment monitoring are stipulated as below:

Attributes	Sampling (Network Frequency) Measurement Method
Air Environment	
Meteorological Wind speed, Wind direction, Maximum temperature, Minimum temperature, Relative humidity, Rainfall, Solar radiation, Cloud cover, Environmental Lapse Rate	1 site in the project area, 1 hourly continuous Mechanical/automatic weather station; Max/Min Thermometer Hygrometer Rain gauge; as per IMD specifications; Mini Sonde/SODAR IS 5182 Part 1-20; Site specific primary data is essential; Secondary data from IMD; CPCB guidelines
Pollutants PM (10) PM (2.5) 24 hourly twice a week SO ₂ , NO _x @4 hourly. Twice a week, Lead in PM 8 hourly, twice a week.	Nos. of sampling location to be decided- 24 hourly twice a week One non monsoon season Minimum one location in upwind side, two sites in downwind site/impact zone All the sensitive receptors need to be covered for core zone and buffer zone
Noise Hourly equivalent noise levels Peak particle velocity	Identified study area; Once in season, Noise level meter, IS:4954-1968 as adopted by CPCB 150-200m from blast site Once PPV meter
Water	
pH, temperature, turbidity, magnesium, hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium potassium, salinity, Total nitrogen, total, phosphorous, DO, BOD, COD Heavy metals Total coliforms, faecal coliforms, Phyto plankton	Set of grab samples for ground and surface water Samples for water quality should be collected and analyzed as per: IS: 2488 (Part 1-5) methods for sampling and testing of industrial effluents Standard methods for examination of water and wastewater analysis published by American Public Health Association
Land Environment- Soil	
Organic Matter; Texture; pH; Electrical conductivity; Permeability Water holding capacity; Porosity	Samples from villages (soil samples be collected as per BIS specifications One season Collected and analyzed as per soil analysis reference. Analysis be done as per BIS specifications

These guidelines were drawn in 2001, a number of methods referred have become obsolete. Its high time, that the guidelines are revised considering the situations like pandemic on one hand and involvement of community on the other.

The actions are happening in this regard, but they are not coherent. The CPCB since long back has developed a Water Testing Kit (WTK) to assess the water quality of surface, ground and potable water bodies in field condition. The kit designed and developed by a team of scientists of the Board is intended for students, NGOs and public. This WTK has been fabricated as a portable laboratory provided with the apparatus and reagents needed for the field testing to assess the quality of water under field conditions. The water testing field kit enables the user to assess the physical, chemical, bacteriological and biological quality of water in the field. The main objectives of this WTK are to create mass awareness and to provide low-cost Water Testing facility. It can be used by even person with little or no knowledge of analytical techniques by following the instruction mentioned in the manual. The kit will definitely provide the information whether pollutants are above or below the permissible limit based on quantitative as well as qualitative analysis. Many such kits are available in the market. However, once distributed, over the years the purpose has been lost.

Its also time to note that there is increased interest in exploring the use of lower-cost air sensors for supplemental air quality monitoring and in merging these observations with measurements made by existing high-quality regulatory networks and satellite observations. In this regard Bureau of Indian Standards is developing specifications of sensor based instruments for measurement of particulate matter in outdoor and indoor environment. The low cost of these instruments makes it possible to use these in dense networks, which in turn give better spatial and temporal data. The fact that people from non-scientific community can use these instruments in their daily lives to monitor the air quality in their surroundings. The results from these equipment's may not be comparable to regulatory grade instruments in terms of accuracy and precision but they provide enough information to become a vital complementary technology to the regulatory monitoring.

CPCB has also recently in Jan 2023 notified new specifications for manual PM2.5 samplers. It provides for current/last logged data should be displayed. Logged data should have cloud connectivity and data of last sampling ten days must be available for cross checking. Thus the concept of remote monitoring the data generated is introduced.

However, these all developments over the years shall be meaningful only If EIA regulations lay down that data from NGOs or local communities using kits or sensor based equipment's shall be a part of the EIA reports. The consultants are asked to use equipment's that log data and remote monitoring of data is possible. More emphasis is laid on secondary data available and primary data is only used as a tool to corroborate it. The development of guidelines to monitor baseline data on these lines can strengthen the entire EIA process in a meaningful manner.

Conclusion:

Baseline data used for preparation of EIA/EMP provides an understanding of environment quality, enables the assessment of trends and impacts of pollutants viz. a viz project activity and helps in monitoring changes in air, noise, soil and water quality past development to evaluate effectiveness of EMP. Over the years there have been great strides in pollutant monitoring systems, however, there are still significant data gaps and capacity challenges due to lack of relevant changes in regulations. There is opportunity to address these challenges by supplementing current baseline data monitoring approaches by involving local communities

using kits or sensor based equipment's as well as by use of rapidly evolving technologies including remote monitoring of data generated by doing relevant changes in EIA regulations.

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