

Green Files

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INTERNATIONAL CENTRE FOR ENVIRONMENT
AUDIT AND SUSTAINABLE DEVELOPMENT
(iCED), JAIPUR



GREEN FILES

Newsletter on Environment Audit and Sustainable Development issues
**International Centre for Environment Audit and Sustainable
Development (iCED)**

EDITORIAL

Green Files, a newsletter brought out by iCED every quarter, highlights contemporary environmental issues, environmental law, status of environment in Indian provinces, national – international events about environment and sustainable development, comments on national – international environmental audits, etc.

iCED for the first time organized a National Training Programme on Environment Management in Government Establishments. Comptroller and Auditor General of India chaired valediction ceremony of this training programme on 20th January, 2017. He remarked that this training would trigger thinking regarding sustainability issues amongst our offices. There were five more National Training Programs conducted in the last quarter of the year 2016-17. Delegations from SAI Bhutan and SAI Zambia visited iCED during this quarter.

We end the year 2016-17 with the visit of Chairperson of the Commission on Audit, Philippines (heading a three member delegation). Showcasing our work progress and potential in the course of such high profile visits is indeed a satisfying experience.

We look forward for comments and suggestions on content and presentation of our Newsletter. We also look forward to your suggestions to make Green Files more useful and appealing. Contributions in any form within the broad scope of the newsletter are encouraged. These may be mailed to iced@cag.gov.in

With regards,

Sunil Dadhe
Director General, iCED

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I.XXII INCOSAI Meeting Held In Abu Dhabi, UAE

➤ About INCOSAI

The Congress is the supreme organ of INTOSAI and is composed of all Members. Regular meetings hold once every three years.

Congress offers an opportunity to share experiences, discuss issues, and pass resolutions and recommendations to improve government accountability worldwide to all INTOSAI members.

The Participants include delegations of member SAIs as well as representatives of the United Nations, the World Bank and other international and professional organizations.

The XXII-INCOSAI held in Abu Dhabi, United Arab Emirates from 05th- 11th December, 2016.

About 700 participants from 192 countries and 15 international organization participated in the XXII- INCOSAI Meeting.

The context of Abu Dhabi Declaration was as follows:

- INTOSAI's comprehensive strategic planning process which resulted in a new strategic plan for 2017-2022, aiming to increase the contribution SAIs make to improving accountability and transparency in public management around the globe;
- INTOSAI's revision of the statutes to align them more closely with the current structure, strategy and objectives in order to help it better meet the needs of its members and stakeholders;



- Endorsement by the UN of the 17 Sustainable Development Goals (SDGs) at the heart of the 2030 Agenda for Sustainable Development, which reinforces the need and demand for effective public audit and scrutiny and the action already taken by INTOSAI entities relating to auditing the implementation of the SDGs;
- the establishment by the Knowledge Sharing Committee of a Community Portal to facilitate the sharing of knowledge; and
- Adoption by INTOSAI of the new framework for professional pronouncements as part of the ongoing efforts to improve INTOSAI's standards and standard-setting process as well as all the ISSAIs and other INTOSAI professional pronouncements endorsed to date.

➤ The Strategic Plan 2017-2022

This Strategic Plan was adopted in December 2016 at the INTOSAI Congress. The discussion and resulting decisions at that Congress centred on two themes:

- I. **Sustainable Development Goals:** INTOSAI contribution towards 2030 Agenda for Sustainable Development including good governance in order to strengthen the fight against corruption.
 - II. **Professionalization:** Promote INTOSAI's credibility to become a more prominent international organization.
- **A roadmap for Sustainable Development Goal under Strategic Plan 2017-22**

INTOSAI's strategic plan a roadmap for INTOSAI and its member SAIs to support the implementation and assist in the follow-up and review of the SDGs and related national sustainable development initiatives—consistent with individual SAI mandates, capacities, and national priorities.

INTOSAI's efforts are centred on assisting SAIs in four broad categories where SAIs can expect to make valuable contributions to the national, regional, and global follow-up and review efforts of the SDGs, and foster implementation on issues such as improved government accounting and auditing that are consistent with SAI mandates:

- Assessing the readiness of national systems to report on progress toward the achievement of the SDGs, and subsequently to audit their operation and the reliability of the data they produce;
 - Undertaking performance audits that examine the economy, efficiency, and effectiveness of key government programs that contribute to specific aspects of the SDGs;
 - Assessing and supporting, as appropriate, the implementation of SDG 16 which relates in part to transparent, efficient, and accountable institutions; and
 - Being models of transparency and accountability in their own operations, including auditing and reporting.
- **How individual SAIs can contribute to the follow-up and review of the SDGs.**
- Advocate improvements in public financial management systems through, for example, improved governmental accounting and auditing practices.
 - Review national transparency, risk management, anti-fraud protections, and internal control processes to contribute to corruption prevention efforts consistent with the United Nations Convention against Corruption.
 - Audit the capacity of national statistical and vital records systems to produce the data needed to ensure that no individual or social issue is “invisible” from a data standpoint and assess national preparations to report progress on implementation of the national sustainable development goals.
 - Assess the validity of the chosen national targets and performance measures, the availability of baseline performance data, and the sufficiency of the overall performance measurement system.
 - Evaluate the economy, efficiency and effectiveness of the key government programs for addressing a national sustainable development goal in a specific topical area (e.g., education, infrastructure, public health, etc.) and what needs to be done to better meet the goal.
 - Review and engage in the “data revolution” by assessing government’s ability to harness Big Data for decision-making and use data analytics to pinpoint improvement opportunities.
 - Examine national Open Data and civic engagement strategies as they relate to the achievement of the SDGs.
 - Report on the nation’s overall progress in meeting the SDGs and/or providing data and insight for the country report to be

developed as part of the global follow-up and review processes.

➤ INTOSAI Efforts towards Agenda 2030

During the Congress it recognizes that work related to the 2030 Agenda for Sustainable Development will require even greater levels of coordination and leadership— both within INTOSAI as well as with key external stakeholders.

INTOSAI plans to provide regular feedback to our own community on SDG-related audit issues, such as approaches, methodologies and results, in order to engage with, inform and encourage SAIs to do effective work in this area. In addition, INTOSAI will provide analysis and insight on a periodic basis to the international stakeholders on audit and accountability issues related to the SDGs, informed by the collective experience and work of SAIs. These initiatives aim to be an effective demonstration of the importance and utility of the role of INTOSAI and the output of its member organizations.

To follow through on ambitions for the 2030 Agenda for Sustainable Development, INTOSAI will form an expert group to be led by the INTOSAI Chair, and reporting to the Supervisory Committee on Emerging Issues (SCEI). This group, which will comprise internal and external experts acting as a community of practice, will oversee the development and application of the frameworks. It will adopt agile and responsive ways of working, and will involve INTOSAI's working bodies and other resources as appropriate and effective. The Meeting of XXIII-INCOSAI will held in year 2019 in Russia.

Source:

<http://www.intosai.org/events/congresses-incosai.html>
http://www.incosai2016.ae/uae_candidature.aspx?newsId=20064&l=menu,News,NewsList.aspx&lang=en

http://www.incosai2016.ae/uae_candidature.aspx?newsId=20064&l=menu,News,NewsList.aspx&lang=en
[Draft STRATEGIC PLAN 2017-2022 April 2016](#)
[The Abu Dhabi Declaration](#)
[Pocket guide INCOSAI Abu Dhabi](#)
[Previous INCOSAI Congresses](#) [INCOSAI](#)

- **Bhoopendra Kumar**

II. Hazardous waste management in India and Hazardous And Other Wastes (Management & Transboundary Movement) Rules, 2016.

As per the information furnished by CPCB in the year 2015, the total hazardous waste generation in the country is 7.46 million metric tonnes per annum from about 44,000 industries.

The Government of India in exercise of the powers conferred by sections 6, 8 and 25 of the Environment (Protection) Act, 1986, and in supersession of the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 have notified the Hazardous and Other Wastes (Management and transboundary Movement) Rules, 2016 on 4th April 2016. The government in recent years have revised Waste Management Rules pertaining to Solid Waste, E-Waste as well as Biomedical Waste. With this new set of rules most of the waste management related rules are now more contemporary and can be expected to bring in better compliance of waste related regulations and protection of our environment.

A consultation process was initiated for revision of Hazardous Waste Rules and Draft Hazardous and Other Wastes (Management and Transboundary Movement) Rules were published in July, 2015 inviting suggestions and objections. 473 suggestions / objections were received from Government organisations, institutions and private individuals. Draft rules were shared with

industry associations, Central Government ministries and State Governments. Stakeholders' consultation meetings were organised in Delhi, Mumbai, Kolkata and Bengaluru. A working group comprising technical and subject experts examined all the suggestions. Based on the recommendations of the Working Group, the Ministry has published the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.

The new Rules distinguish between Hazardous Waste and other wastes. Other wastes include: waste tyre, paper waste, metal scrap, used electronic items, etc. and are recognized as a resource for recycling and reuse. These resources supplement the industrial processes and reduce the load on the virgin resource of the country. The government has claimed that these rules are environment and industry- friendly and the provisions of the new Rules are in line with priority for Ease of Doing Business and Make in India, but with responsible concerns for sustainable development.

The basic definition of the hazardous waste has been the same according to which hazardous waste means any waste, which by reason of characteristics, such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger to health, or environment. This is an annexure based definition and the entries in these annexures have been further increased and elaborated.

The salient features of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 include the following:

1. The ambit of the Rules has been expanded by including 'Other Waste'.
2. Waste Management hierarchy in the sequence of priority of prevention, minimization, reuse, recycling, recovery, co- processing; and safe disposal has been incorporated.
3. All the forms under the rules for permission, import/export, filing of annual returns, transportation, etc. have been revised significantly, indicating the stringent approach for management of such hazardous and other wastes with simultaneous simplification of procedure.
4. The basic necessity of infrastructure to safeguard the health and environment from waste processing industry has been prescribed as Standard Operating Procedure (SOPs), specific to waste type, which has to be complied by the stakeholders and ensured by SPCB/PCC while granting such authorisation has been defined.
5. Procedure has been simplified to merge all the approvals as a single window clearance for setting up of hazardous waste disposal facility and import of other wastes.
6. Co- processing as preferential mechanism over disposal for use of waste as supplementary resource, or for recovery of energy has been provided.
7. The approval process for co- processing of hazardous waste to recover energy has been streamlined and put on emission norms basis rather than on trial basis.
8. The process of import/export of waste under the Rules has been streamlined by simplifying the document based procedure and by revising the list of waste regulated for import/export.

9. The import of metal scrap, paper waste and various categories of electrical and electronic equipment for re-use purpose has been exempted from the need of obtaining Ministry's permission.
10. The basic necessity of infrastructure to safeguard the health and environment from waste processing industry has been prescribed as Standard Operating Procedure (SOPs) specific to waste type.
11. Responsibilities of State Government for environmentally sound management of hazardous and other wastes have been introduced as follows:
 - To set up/ allot industrial space or sheds for recycling, pre-processing and other utilization of hazardous or other waste
 - To register the workers involved in recycling, pre-processing and other utilization activities.
 - To form groups of workers to facilitate setting up such facilities;
 - To undertake industrial skill development activities and ensure safety and health of workers.
12. A more elaborate 'List of processes' generating hazardous wastes has been reviewed taking into account technological evolution in the industries.
13. A more elaborate 'List of Waste Constituents with Concentration Limits' has been revised as per international standard and drinking water standard.
14. The following items have been prohibited for import:
 - Waste edible fats and oil of animals, or vegetable origin;
 - Household waste;
 - Critical Care Medical equipment;
 - Tyres for direct re-use purpose;
 - Solid Plastic wastes including Pet bottles;
 - Waste electrical and electronic assemblies' scrap;
 - Other chemical wastes especially in solvent form.
15. State Government is authorized to prepare integrated plan for effective implementation of these provisions, and have to submit annual report to Ministry of Environment, Forest and Climate Change.
16. State Pollution Control Board is mandated to prepare an annual inventory of the waste generated; waste recycled, recovered, utilised including co-processed; waste re-exported and waste disposed and submit to the Central Pollution Control Board by the 30th day of September every year.

➤ **Significance**

The principles of hierarchy of waste management from prevention to safe disposal has been introduced which is a positive sign. The responsibilities of the state governments have been defined and the provision of space / sheds for recycling, pre-processing and other utilization of hazardous or other waste in the industrial estates would also have a positive impact. The concern towards to health issues of workers engaged in hazardous waste and the provision for their registration is also an important provision. With these changes in the rules there is lot of scope for the environmental auditors to look into the issue of hazardous waste and compliance of various provisions under the rules. The integrated plan for effective implementation of these provisions by the state governments and submission of annual report to the Ministry of Environment, Forest and Climate Change, in the Central

Government would be an interesting document which can be referred by the auditors. These are one set of the rules where the revenue audit teams / offices responsible for audit of customs has lot of role and they need to be cautious about this area.

Source: [Hazardous and Other Wastes \(Management and transboundary Movement\) Rules, 2016](#)

➤ **S. Prabhakar Rao**

III. Environmental Case Law: Lalit Miglani Vs State of Uttarakhand

The Uttarakhand High Court gave a unique judgment on the River Ganga on 2nd December 2016. The HC has stated that all the rivers have the basic right to maintain their purity and to maintain free and natural flow. We have polluted the soul of India which is the Ganga by permitting the pollutants to be discharged into it without treatment. We have to change our rituals with the passage of time in order to maintain the purity of water of river Ganga. One or two generations cannot be permitted to pollute the rivers and to destroy their free and natural flow. The rivers must exist in their pristine glory for coming generations. The HC has further asserted the need for clean Ganga. It has also directed the Comptroller and Auditor General to conduct a special audit of all the Centrally Financed Schemes launched to rejuvenate river Ganga as well as the amount spent by the State Governments for rejuvenation of river Ganga, within a period of six months.

➤ **Background of the Case**

A Writ Petition was filed in the Uttarakhand High Court based on study conducted by Uttarakhand Environment Protection and Pollution Control Board (UEPPCB) according

to which level of coliform in river Ganga has reached 5500 mpn/100 ml. The water with these levels of coliform was not considered suitable even for agricultural purpose. Sewage of 89 million litres per day (mld) is released into river Ganga from 12 municipal towns that fall along its route. The untreated wastewater and effluents from various units are also discharged directly into the river.

It was reported that even the Sewage Treatment Plant (STP) like the one at Jagjeetpur alone released 129 million litres daily in the Ganga with a faecal coliform concentration of about 34 million/100 ml causing serious threats to the quality of river water as well as health hazards to millions of devotees and the people who are dependent on the river. The flora and fauna dependent on the river is also adversely affected.

Uttarakhand Environment Protection & Pollution Control Board, Dehradun admitted that the water of Ganga is not fit for drinking at Haridwar. A Joint Inspection Team at Haridwar and Rishikesh, it was found that the existing STPS are under-capacity in comparison to the sewage load that is received from two towns. The matter has been taken up with Uttarakhand Peyjal Nigam and Uttarakhand Jal Sansthan to take appropriate measures for treatment of the sewage generated / collected from Haridwar and Rishikesh. In Uttarakhand, the total pollution caused by 42 industries is 224 MLD and Waste Water Generation is 127 MLD. Wastewater generation is nearly 45% in terms of total water consumption. In terms of water consumption, maximum water is consumed and generated by Pulp and Paper industries. The consumption is followed by sugar industries while generation is followed by chemical industries.

➤ **Judgement**

The High Court considering the petition and on the basis of submissions of the respondents and referring to number of previous judgements about cleaning of Ganga issued the following directions: -

1. The Union of India is directed to establish the inter-State Council under Article 263 of the Constitution of India for all five riparian States through which river Ganga flows within a period of three months. The inter-State Council shall make recommendations to the Central Government, within a period of three months after its constitution, to the Central Government.
2. National Mission for Clean Ganga is directed to accord sanction of ₹ 266.09 crores, as per the DPR sent to it by the State Programme Management Group (SPMG), within a period of six weeks. The State Government is directed to enhance the capacity of Sewage Treatment Plants at Haridwar and Rishikesh, within a period of three months, taking into consideration the sewage load in these two towns.
3. Bharat Heavy Electricals Ltd. (BHEL) is directed to install Sewage Treatment Plant of having capacity of 11 MLD within six months, if not already installed.
4. All the 21 Hydroelectric Projects located in the mainstream of River Ganga are directed to install STPs of appropriate capacity during construction phase and thereafter, at operational phases, within a period of six months. NMCG, is directed to install the 40 MLD STP at Jagjeetpur, sanctioned earlier by completing the process within three months.
5. UEPPCB is directed to take action against those 180 Industries, to whom the Show Cause Notices have been issued in the year 2015-16 and to complete the same within three months.
6. Industries mentioned to whom Closure Notices have already been issued in the year 2014-15, are hereby ordered to be closed / shut forthwith by the concerned District Magistrate.
7. The Union of India is also directed to issue necessary directions to - Board to strictly implement the environmental laws in order to protect and preserve River Ganga and in case, if fails to comply with the directions and a grave emergency arises due to further degradation of water quality in Ganga, the Central Government may order the Central Pollution Board to perform the functions of the State Board in the entire stretch of area covering River Ganga and its other tributaries in the State of Uttarakhand. The competent authorities are also directed to initiate criminal proceedings against the defaulters for contravention of the provisions of Water (Prevention and Control of Pollution) Act, 1974 as well as the Environment (Protection) Act, 1986 within three months.
8. Ashrams at Haridwar would be ordered to be sealed and closed down where these Ashrams are located, in case the untreated sewage is permitted by them to flow in the Ganga directly without treatment.
9. No industry / hotel / commercial establishment / educational institution shall discharge untreated sewage/ industrial effluents in River Ganga without its treatment. In case of failure, the competent authority is directed to take

- stern action against these commercial establishments. All the drains opening into the river Ganga shall be sealed and closed after three months.
10. No person shall litter / defecate / urinate, in open, within a radius of 500 meters on both sides of river Ganga. The State Government is directed to make suitable amendments in the municipal laws by imposing stringent fines including imprisonment. All the Ghats and religious places, falling in their territorial jurisdiction, about these directions. The Sub Divisional Magistrates are permitted to take cognizance of the matter till the municipal laws are suitably amended.
 11. It is further directed that there shall be a total ban of sale, use and storage of plastic carry bags throughout the State of Uttarakhand w.e.f. 01.01.2017. No person shall be permitted to bring carry bags in the State of Uttarakhand by any means of transport, including the bus, trains and air. The State Government shall launch a special campaign to make the people aware to use paper or Jute bags to save the environment.
 12. The State Government is directed to ensure that the people should not use soap, oil and shampoo while taking a bath in river Ganga. Bathing of cattle in river Ganga is also banned forthwith. Begging is also prohibited in all the holy places in the State of Uttarakhand.
 13. The State Government is directed to provide Skimmers in sufficient numbers to clean Ganga at Haridwar, Rishikesh and downstream. The Forest Research Institute is directed to prepare the fresh D.P.R. for afforestation for the basin and banks of river Ganga.
 14. The Municipal Bodies, throughout the State of Uttarakhand, are directed to dispose of the garbage in scientific lines by setting up Treatment Plants, as provided under the Municipal Solid Wastes (Management & Handling) Rules, 2000 within six months.
 15. There shall also be a direction not to permit new industries based on water like Sugarcane, Pulp/Paper Industries, Distilleries, and Textile Industries etc. within a radius of two kilometres from the banks of river Ganga. No new commercial establishment employing more than 50 persons including the hotels, having capacity of more than 50 guests, shall be permitted to operate henceforth, without setting up Effluent Treatment Plant or Sewage Treatment Plan. This direction shall also be applicable for big Ashrams housing more than 100 devotees.
 16. We recommend/suggest the Union of India to frame the law exclusively for River Ganga to save it from extinction.
 17. The Municipal Corporation, Haridwar as well as the Municipal Council, Rishikesh are directed to construct sufficient number of toilets, based on the technology employed in the toilets used in aeroplanes in order to maintain hygiene in the religious places.
 18. The State Government should declare "River Conservation Zones" where no construction activity should be permitted on the banks of river Ganga from the highest flood plain by private as well as governmental agencies.
 19. The Comptroller and Auditor General is directed to conduct a special audit of all the Centrally Financed Schemes launched to rejuvenate river Ganga as well as the amount spent by the State Governments

for rejuvenation of river Ganga, within a period of six months and to place the same before His Excellency, the President of India.

➤ Significance

Almost three decades have passed since Ganga Action Plan the first programme dedicated to cleaning of Ganga was taken up but the problem of quality of water have worsened over the years. The Courts have increasingly resorted to interpreting the right to clean water as right to life as defined in Fundamental Rights in the Constitution of India. There is a growing need to control and prevent the pollution into river Ganga and restoration of quality of river water.

There are number of statues and agencies responsible for river management and abatement of pollution but quality of river Ganga is deteriorating rapidly everyday. The water is not fit for drinking even at Haridwar. This is one more judgement where the High Court has gone into passing orders which are to be complied by different stakeholders within prescribed timelines which seems to be ambitious considering the historical pace of execution of the projects for clean Ganga. There are some directions which seem to be very stringent and the implementation and monitoring the compliance of the same would be a huge task for the governments. There would be a total ban of sale, use and storage of plastic carry bags throughout the State of Uttarakhand w.e.f. 01.01.2017. No person shall be permitted to bring carry bags in the State of Uttarakhand by any means of transport, including the bus, trains and air. The HC has indicated that there should be ban on use of soap, oil etc. while bathing in the river. There would also be ban on begging in

the state and bathing the cattle in the river. There would be a challenge in implementation of these orders. It has to be noted that the HC has stated that the Central Government may order the Central Pollution Board to perform the functions of the State Board in the entire stretch of area covering River Ganga and its other tributaries in the State of Uttarakhand in case the State Board is not effective enough.

The HC has directed the Municipal Bodies, throughout the State of Uttarakhand to dispose of the garbage in scientific lines by setting up Treatment Plants, as provided under the Municipal Solid Wastes (Management & Handling) Rules, 2000 within six months. It has to be understood that the Municipal Solid Wastes (Management & Handling) Rules, 2016 would be applicable.

The number of statutes and this kind of court orders give lot of scope for the audit to be conducted by environmental auditors.

Source: Uttarakhand High Court Lalit Miglani vs State Of Uttarakhand And Others on 2 December, 2016 Reserved Judgment Writ Petition (PIL) No.140 of 2015

• **S Prabhakar Rao**

IV. Environment News, Events and Snapshots

International Events: 17th Assembly Meeting of INTOSAI WGEA

The 17th Assembly Meeting of International Organization of Supreme Audit Institutions (INTOSAI), Working Group on Environmental Auditing (WGEA) was hosted by The Audit Board of the Republic of Indonesia (BPK RI) from 24th to 27th October, 2016 at Jakarta, Indonesia.

115 participants from 48 Supreme Audit Institutions (SAIs) all over the world participated in the meeting.

Participants from various other organizations viz. European Court of Auditors (ECA), INTOSAI Working Group on Extractive Industries (WGEI), Australian National University (ANU), Convention on Biological Diversity (CBD), UN Department of Economic and Social Affairs (UN DESA), UN Environment Programme (UNEP) and UN Framework Convention on Climate Change (UN FCCC) also participated in the meeting.

The meeting was inaugurated by *Mr. Joko Widodo*, the President of the Republic of Indonesia. Mr. Harry Azhar Azis the Chairman of INTOSAI WGEA highlighted the issue of environmental damages and SAIs strategic role in maintaining environment quality and promoting sustainable development in his opening address.

Agenda of the meeting was focused on enriching and exchanging knowledge as well as defining strategic step to face further challenges and problems related with the environmental audit. Achievement of Sustainable Development Goals (SDGs) was also discussed in the meeting.

Source: <http://content.intosaicommunity.org>
INTOSAI International Journal of Government Auditing, Volume Spring 2016
<http://www.environmental auditing.org/Home/WGEAActivities/WorkPlans/tabid/112/Default.aspx>
[Draft Work Plan 2017-19.](#)
[Sustainable Development Goals: UN Report](#)

Environment News

• Impact of Hydel Projects on Ganga Rejuvenation

Government of India has released ₹ 4321.05 crore till February 2017 to National Mission for Clean Ganga (NMCG). 143 projects have been sanctioned under Namami Gange Programme (including the existing projects sanctioned under National Ganga River Basin Authority (NGRBA) Programme) till January 2017, for cleaning of river Ganga. NGRBA has

resolved that by year 2020 no untreated municipal sewage and industrial effluent will be discharged into River Ganga

• Pilot Project for improving Water Table

A pilot scheme, the National Groundwater Management Improvement Scheme (NGMIS), supported by the World Bank, is under active consideration of the Government. The Scheme envisages sustainable ground water management through suitable supply / demand side interventions with stakeholder participation in identified priority areas of seven States viz. Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh. The estimated cost of the Scheme is ₹ 6,000 crore and it will be implemented over a period of six years.

• Projects worth ₹ 1050 Crore Awarded to arrest sewage pollution in Ganga from Patna

In a major step taken to develop adequate sewage treatment infrastructure in Patna to keep Ganga clean, projects worth ₹ 1,050 crore have been awarded under Namami Gange programme. Contracts to build STP of 60 MLD capacity and laying of new underground sewage network of 227 kilometres in Saidpur zone of the city have been awarded at a total cost of ₹ 600 crore. Three other works have also been awarded in Beur zone of the city worth over ₹ 450 crore to build one STP of 23 MLD, renovate existing STP of 20 MLD and lay down new underground sewage network of about 180 kilometres. The scope of work also includes creation of main pumping stations of 83 MLD and 50 MLD capacity in Saidpur and Beur zones respectively. These projects not only aim to treat the current sewage generation in respective zones of Patna but also take into

account the sewage estimates of next one decade, considering the expected rise of population in the city.

- **Three Forest Research Institutes Develop High-Yielding Varieties of Plant Species**

Three institutes of Indian Council of Forestry Research and Education (ICFRE), Dehradun, have developed 20 high-yielding varieties of plant species. The Variety Releasing Committee (VRC) of ICFRE recently granted approval for the release of these varieties of plant species. Forest Research Institute, Dehradun, has worked, for more than a decade, on ten improved varieties of *Melia dubia* and three clones of *Eucalyptus tereticornis*, the timber of which is in high demand in the industry. The released cultivars of *Melia*, popularly known as Dreake, or Malabar Neem, not only have a high productivity per unit area, with an average of 34.57 cubic metre per hectare per annum, but also have an excellent bole form, which is a desirable characteristic for plywood industry.

- **Enhancement of capacity from 20,000 MW to 40,000 MW of the Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects**

The Cabinet Committee on Economic Affairs, approved the enhancement of capacity from 20,000 MW to 40,000 MW of the Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects. The enhanced capacity would ensure setting up of at least 50 solar parks each with a capacity of 500 MW and above in various parts of the country. Smaller parks in Himalayan and other hilly States where contiguous land may be difficult to acquire in view of the difficult terrain, will also be considered under the scheme. The

Solar Parks and Ultra Mega Solar Power Projects will be set up by 2019-20 with Central Government financial support of ₹ 8100 crore. The total capacity when operational will generate 64 billion units of electricity per year which will lead to abatement of around 55 million tonnes of CO₂ per year over its life cycle.

- **₹ 600 Crore Allocated for “Grid connected Rooftop and small Solar Power Plants Programme”**

An amount of ₹ 600 crore has been allocated for the projects under “Grid Connected Rooftop and Small Solar power Plants Programme” and ₹ 508.84 Crore has been released till January 2017.

The Ministry of New and Renewable Energy (MNRE) has been promoting “Grid Connected Rooftop and Small Solar Power Plants Programme” with a Central Financial Assistance (CFA) of up to 30% of benchmark cost in General category States and up to 70 % in Special Category States, North Eastern States, Lakshadweep, Andaman & Nicobar Islands. Residential, Institutional and Social sector are covered under this CFA pattern. For Government Sector, achievement linked incentive up to ₹ 18750/kWp in General Category States and ₹ 45000/kWp in Special Category States, North Eastern States and Andaman & Nicobar Islands and Lakshadweep is available under the Programme.

- **₹ 133.90 Crore Spent By all Major Ports Under Swachh Bharat Abhiyan**

Under the Green Port Initiative, the government has identified 12 activities to make the Major Ports more clean and green from the environment perspective. These initiatives include preparation of Environment

Management and Monitoring Plan (EMMP), provision of equipment to monitor environmental pollution, acquiring dust suppression system, setting up of sewage and waste water treatment plants and garbage disposal plants, setting up projects for energy generation from renewable energy sources, make up any shortfall of Tier-I Oil Spill Response facilities, control of sea garbage, improve quality of harbour waters etc. Major ports have taken up preparation of EMMP, acquisition of equipment required for monitoring of environmental pollution including monitoring of Air, Water and Noise quality, Tree Plantation drives, Rainwater harvesting, Beautification of Parks, Installation of Mechanical Dust Suppression System (MDSS), improved collection and disposal of sludge from the ships and Ballast Water Management, procurement of Fog Cannons, Mist Machines and mechanised road sweeping machines, promoted usage of Bio-Diesel, set up Bio-Gas plants and sewage / waste water treatment plants / garbage disposal plants; solar and wind power plants.

- **Major Ports to Go Green, to Save ₹ 75 Crore Annually**

The Ministry of Shipping, as a part of its 'Green Port Initiative' has been emphasizing on use of renewable sources of energy to power Major Ports across the nation. The Ministry aims to set up 91.50 MW of solar energy capacity at the twelve Major Ports and 45 MW of wind energy capacity by the two Major Ports of Kandla and V. O. Chidambaranar. Major Ports have started the process of setting-up renewable energy projects by investing ₹ 704.52 crores (Solar-₹ 412.02 Cr and Wind- ₹ 292.50 Cr) in these projects.

When completed, these renewable energy projects will help in the reduction of carbon dioxide emission by 136,500 MT annually. These projects will also help to reduce cost of power purchased by utilization of renewable energy for power generation, resulting in estimated saving of ₹ 75 crores annually, when fully commissioned.

- **Green Train Corridors**

The Government has commissioned the following three sections as Green train corridors free from human waste discharge from trains: -

Section	Zonal Railway	Route Length (kms)
Rameswaram- anamadurai	Southern Railway	114
Okha - Kanalus	Western Railway	141
Porbandar -Wansjaliya	Western Railway	34

The government has identified the following route to be included under this scheme: -

Section	Zonal Railway	Route Length (kms)
Jammu Tawi - Shri Mata Vaishno Devi Katra	Northern Railway	78

- **1,639,265 Street Lights Replaced with LED Bulbs**

1,639,265 street bulbs have been replaced with LED Lights throughout the country under Street Lighting National Programme (SLNP). The scheme is being implemented by Energy Efficiency Services Limited (EESL), a joint venture company of four Public Sector Undertakings under the Ministry of Power. Programme highlights are as follows:

- No of LED bulbs distributed / street lights to be replaced in 3 years-3.5 crore

- Expected annual energy savings-9 billion KWh (Approx)
- Expected reduction in installed load-1500 MW (Approx)
- Estimated capital investment (excluding O&M cost) (Approx)- ₹ 35,000 crore
- Annual estimated GHG emission reductions (Approx)-6.2 million tonnes of CO2
- Estimated quantum of energy saved so far as a result of implementation (billion KWh per year)-0.42

Source <http://pib.nic.in/newsite>

➤ **Pawan Kumar Meena**

V. iCED News

➤ **Delegation from SAI Zambia visits iCED**

4 member delegation from SAI Zambia visited iCED from 15th to 17th January, 2017 to understand the working of the Institution,



Mr. Sunil Dadhe, DG, iCED with delegation from SAI Zambia

learn development of the training modules and management of capacity building programme and training infrastructure. Shri Sunil Dadhe, Director General, iCED interacted with the delegation. Shri Jahangir Inamdar, Director (T&R), iCED provided a detailed information about functioning of IA&AD including capacity building with focus on iCED, Jaipur.

➤ **Delegation from SAI Bhutan visits iCED**

Delegation from SAI, Bhutan visited iCED from 23rd to 25th February, 2017 for getting first-hand information about functioning of training institution in IA&AD including development of training modules. iCED shared its experience in capacity building at length with the delegation. Delegation from SAI, Bhutan thanked all the personnel of iCED for the experience sharing and acknowledged that this would help them a lot in capacity building of officers at newly set up training facility in Bhutan.

➤ **National Training Programme on Environment Management in Government Establishments from 16th to 20th January, 2017.**

During the quarter January to March, 2017, iCED for the first time organized a National Training Programme on Environment



Participants of ITP Programme with Sh. Shashi Kant Sharma, CAG of India

Management in Government Establishments from 16th to 20th January, 2017. This training programme was organized taking inspiration from Research Project on “Greening SAIs” which was led and completed by iCED on behalf of SAI, India as part of INTOSAI WGEA Work Plan 2014 – 16. As auditors of environment and sustainable development, our responsibility towards environmental issues is even greater than other organisations and offices. As auditors, not

only do we need to demonstrate our commitment towards sustainability issues and towards the environment, but we also need to be greener than other organisations / offices before we judge them through our audits. In this backdrop, 30 participants



Sh. Shashi Kant Sharma, CAG of India addressing to the participants

including 12 Group “A” officers were provided training on issues such as ecological and carbon footprint in an office setting; green procurement, energy efficiency and conservation; waste management; water conservation; environment management system and green rating etc. Shri Shashi Kant Sharma, Comptroller & Auditor General of India chaired valediction ceremony held on 20th January, 2017. The CAG of India while addressing to the participants stated that *“this training has triggered thinking regarding sustainability issues amongst our officers and I hope to see some good initiatives when you return. I wish you all the best for your future initiatives towards environment management in our own establishments and audit of similar initiatives taken up by our audited entities”*

iCED also conducted following NTPs during the quarter:

- i. NTP on “Industrial Pollution” from 30th January 2017 to 3rd February 2017;
- ii. NTP on “Integrated Environment Management of Cities and Audit of Urban Planning and Management Practices” from 6th to 10th February 2017;

- iii. NTP on “Environmental Audit of Initiatives for Clean Ganga” from 27th February to 3rd March 2017;
- iv. NTP on “Introduction to Environment Audit Sustainable Development and emerging environment issues” from 6th to 10th March, 2017; and
- v. NTP on “Environmental audit of infrastructure projects” from 27th to 31st March, 2017)

VI. State in Focus: Mizoram

Mizoram is a small north eastern state with 21081 sq. km area. The name is derived from Mi (people), Zo (lofty place, such as a hill) and Ram (land), and thus Mizoram implies "land of the hill people". The state also shares a 722 kilometre border with the neighbouring countries of Bangladesh and Myanmar. There are about 830 villages in the state and the total population of the state is 10,91,014 as per census 2011.

Mizoram was previously part of Assam until 1972, when it was carved out as a Union Territory. It became the 23rd state of India, a step above Union Territory, on 20 February 1987 with 8 districts.

Mizoram is a land of rolling hills, rivers and lakes. As many as 21 major hills ranges or peaks of different heights run through the length and breadth of the state with the highest peak 'Phawngpui (Blue Mountain) towering 2,065 metres above the sea level. The terrain has, perhaps, the most variegated topography among all hilly areas in this part of the country. The hills are extremely rugged and steep and the ranges and leaving some plains scattered occasionally here and there.

Although many rivers and streamlets drain the hill ranges the most important and useful

rivers are the *Tlawng* (also known as *Dhaleswari* or *Katakhal*), *Tut (Gutur)*, *Tuirial (Sonai)* and *Tuivawl* which flow through the northern territory and eventually join river Barak in *Cachar*.

The *Koldoyne (Chhimtuipui)* which originates in Myanmar, is an important river in the south Mizoram. It has four tributaries and the river is in patches. The Western part is drained by *Karnaphuli (Khawthlang tuipui)* and its tributaries. A number of important towns including Chittagong in Bangladesh are situated at the mouth of the river.

Lakes are scattered all over the state. But the most important of them are *Palak*, *Tamdil*, *Rungdil*; and *Rengdil*. The *Palak* lake is situated in *Chhimtuipui* District in southern Mizoram and covers an area of 30 Ha. It is believed the lake was created as a result of an earthquake or a flood.

<http://www.mizoram.nic.in/>

<http://www.mizoram.nic.in/about/physiography.htm>

• Environment Scenario

➤ Forests

As per Government of India's Forest Survey Report 2015, total recorded forest area in the state is 5641 sq. km., of which 4483 sq. km. is reserved forest and 1158 sq. km. is unclassified forest, thus constituting 26.76% of the geographical area of the state and 0.74% of India's forest area.

Forest of Mizoram may be classified into various types viz. *Tropical Wet Evergreen and Semi-Evergreen Forests*, *Montane Subtropical Forest*, *Temperate Forests*, *Bamboo Forests*, *Quercus Forests* and *Jhumlands*.

Jhumland are very common in Mizoram. *Jhumlands* are more prevalent in eastern part of the State where extensive and intensive

jhumming is practiced. Similarly, the areas in western side in *Lunglei* district towards Bangladesh also have *Jhumlands*. *Chhimtuipui* is the most effected district as far as *jhum* cultivation is concerned. The main reasons of decrease in forest cover are shifting cultivation and other biotic pressure on forest lands.

Source: <http://fsi.nic.in/isfr-2015/isfr-2015-forest-and-tree-resources-in-states-and-union-territories.pdf>,
http://mizervis.nic.in/Database/Forest_894.aspx

• Biodiversity

Mizoram is one of the biodiversity hotspots located in the North Eastern part of India. A total of 2,358 species of plants have been recorded from Mizoram. Out of the total species 2,141 belong to Angiosperms distributed over 176 families and 905 genera. Out of this, 1641 species belong to dicots and the remaining 500 are monocots. The number of gymnosperms is quite less i.e. only six species belonging to 6 genera and 4 families, while the number of *pteridophytes* is quite high i.e. 211 species distributed over 35 families and 66 genera. Some of the important floral components of the state are mentioned below:

Timber species: There are about 125 good timber yielding species reported from the state (Singh et al., 2002).

Orchids: Orchids are very common and about 251 species have been reported from the state.

Wild Relatives of Cultivated Crop Plants:

There are many wild relatives of the cultivated crops, which have been preserved since long by the society. These species might be very useful in evolving the new varieties of desired characters.

Medicinal and ethnobotanical Plants: The state has rich diversity of medicinal and ethnobotanical plants. So far, about 500 species under 383 genera have been recorded from the state, which have medicinal and ethno-botanical uses.

Bamboos: Recently 35 species of bamboos have been reported from the state, out of them, 20 species are indigenous to the state, while 14 species have been introduced from outside. Approximately 80% of the total bamboo area is occupied by *Melocanna baccifera*.

Fungi: Mizo people are very fond of eating wild fungi. Recently Bisht (2011) has reported 52 species of wood decaying fungi from the state. This study does not include mushrooms and other groups of fungi and it is assumed that at least 200 species of mushrooms can easily be reported from the state.

Fauna: Owing to its strategic location, it has a very rich diversity of faunal species, for example, out of the 15 primates; Mizoram harbours as many as 8 species. Among these, except rhesus macaque, all species are endemic to the region. Of the five big cats in India, Mizoram have 3 of them sans Asiatic Lion and Snow leopard. Out of the 11 smaller cats, the state harbours as many as 5 species, of which Golden Cat and Marbled Cat are endemic to this region and are extremely rare. Malayan Sun Bear, which was thought to be extinct in the wild from Indian sub-continent is recently recorded and photographed through camera trap at Dampa Tiger Reserve. The bird diversity is also quite high and 215 species have been reported from Dampa Tiger Reserve alone and possibly much more can be recorded if proper research is strengthened.

Source:

<http://mizennis.nic.in/Database/Biodiversity1444.aspx>

- **Wetlands**

The state is blessed with number of perennial rivers and the major rivers run either in Northward or in Southward direction. The rivers flowing in northward direction drain into Barak river of Assam, whereas, the rivers flowing towards the south fall into the Myanmar plain and those rivers in the western part fall into the Bangladesh plain. Aizawl, the capital of Mizoram is bounded by two major rivers, Tuirial River in the east and Tlawng River in the west.

The major rivers of the state are *Serlui, Tuirial, Tuivai, Langkaih, Tlawng, Teirei, Tuivawl, Tut, Khawthlangtuipui, Tiau, Tuichang, Tuipui, Mat, Mar, De, Kau, Kawrpui, Tuichawng, Phairuang, Chhimtuipui* and *Mengpui*, etc. Chhimtuipui River is the largest river in Mizoram by volume and is navigable by small boat from *Akyap* (Myanmar) up to a considerable distance within the state. Tlawng River is the longest river of the state and is also navigable by small boat throughout the year and hence it provides water transport route with the neighbouring state Assam. Mizoram has the lowest proportion of area under wetlands in the country.

Source: [http://envfor.nic.in/downloads/public-](http://envfor.nic.in/downloads/public-information/NWIA_Mizoram_Atlas.pdf)

[information/NWIA Mizoram Atlas.pdf,](http://envfor.nic.in/downloads/public-information/NWIA_Mizoram_Atlas.pdf)

<http://www.indiawaterportal.org/articles/indian-wetlands-under-threat>

- **Municipal Solid Waste management**

As per CPCB Annual Review Report 2013-14, only 2 ULBs exist in the state responsible for MSW management. However, there are total 33 towns including 3 class-I towns, 5 Class II towns and 12 Class III towns. Two departments viz. Urban Development, Trade

and Commerce are responsible for MSW management in the state. "Mizoram Municipality Bill 2007" has been passed in the Assembly. Waste processing and disposal facilities are yet to be adopted in the state. Improvement of existing landfill sites are carried on by SIMPIU and one landfill site has been identified on 3rd September, 2002 at Tuirial. NOC is issued for trench landfilling at Lengte, Mamit. Segregation of waste is not followed in the state. Aizwal town generates 240.39 TPD of MSW.

No sanitary landfill exists in the state and hence, follows open dumping of garbage. The Urban Development Department has identified disposal site at Tuirial for Aizwal town and started developing. The Trade & Commerce Department also identified separate landfill site (i.e. Landfill Trench method) at Lengte, Mamit District.

The Union Ministry of Environment, Forests and Climate Change (MoEF&CC) recently notified the new Solid Waste Management Rules (SWM), 2016. These will replace the Municipal Solid Wastes (Management and Handling) Rules, 2000, which have been in place for the past 16 years.

These rules are the sixth category of waste management rules brought out by the ministry, as it has earlier notified plastic, e-waste, biomedical, hazardous and construction and demolition waste management rules.

The SWM Rules, 2016 diminish hopes in pushing for adoption of a decentralised mechanism for solid waste management. However, it would be challenging to see how segregation at source shall work on the ground. A massive awareness campaign in association with communities, NGOs,

students and other stakeholders needs to be planned to push for better implementation of these rules. The Rules need to focus on making solid waste management a people's movement by taking the issues, concerns and management of solid waste to citizens and grass-roots.

Source: <http://www.downtoearth.org.in/news/solid-waste-management-rules-2016-53443>, http://cpcb.nic.in/upload/Latest/Latest_98_Annual_Rep_MS_W_2013_14.pdf

• Biomedical Waste Management

Mizoram Pollution Control Board enforces the Bio Medical Waste (Management and Handling) Rules, 1996 / 2000. As per the provision of the rules it is mandatory for all HCEs to treat BMWs generated by them either on their own or through some authorized Common BMW Treatment Facility (CBWTF).

According to a CPCB report, in 2009, against 631 kg/day (2009) of biomedical waste generated, 560 kg/day was properly treated. There were approximately 94 health care facilities in the state with 1607 beds.

Source: http://mizervis.nic.in/Database/BMW_1283.aspx <http://www.cpcb.nic.in/wast/bioimediawast/StatusBioMediawaste2009.pdf>

• Hazardous waste Management

Mizoram State Pollution Control Board have provided list of units and the quantities of wastes generated, which are likely to fall under the hazardous waste generating units category. In 2006 Mizoram reported 'NIL' hazardous waste generating units.

The State Pollution Control Board of Assam held meeting with the North-eastern state Pollution Control Boards in the month of September 2006 for development of a TSDF for the purpose of disposal of hazardous

wastes generated from all the North–Eastern States.

Source:

[http://cpcb.nic.in/Highlights/2006/HAZARDOUSWASTEMANAGEMENT1\[1\].pdf](http://cpcb.nic.in/Highlights/2006/HAZARDOUSWASTEMANAGEMENT1[1].pdf)

• **Ground Water:**

Mizoram is an abode of springs. These springs are widely utilized by people for domestic needs. Recent study suggests that there is good scope of tapping ground water in the riverbeds with sumps connected to infiltration galleries.

As per CGWB report (2013) of Aizwal District, it is found that the water sample collected from springs indicates the pH values range between 6.9 and 8.3. In general, the chemical quality of ground water in the district is fresh and potable and is suitable for domestic and industrial purposes. Ground water is used mainly for drinking purpose as there is no major industry in the district. Ground water utilization for irrigation may be considered as negligible. Due to hilly terrain, spatial variation of rainfall, nature of soil, non-availability of irrigation facilities, people practice *jhum* cultivation.

In the major part of the district, tapping perennial springs and rainwater harvesting would remain the main source for water supply to the local populace. It has been recommended that the springs should be properly developed, conserved and protected wherever they are used for domestic purposes. Some of the spring waters in lower altitudes may be impounded in some structures and pumped again for water supply.

Source:http://www.cgwb.gov.in/gw_profiles/st_mizoram.html,http://www.cgwb.gov.in/District_Profile/Mizoram/AIZWAL.pdf

• **Air Pollution**

The National Ambient Air Quality Monitoring (NAAQM) programme started in Mizoram with opening of three stations within Aizawl during June, 2005. In the year 2011 eight more air monitoring stations were opened. As of now a total number of 11 stations are available within the state.

Sl. No.	District	Sampling Location
1	Aizawl	Khatla
		Laiputlang
		Bawngkawn
		Dawrpui
		Lengpui Airport
2	Lunglei	Farm Veng
		Chanmari-I
3	Kolasib	Diakkawn
		Project Veng
4	Champhai	Kahrawt
		Vengthar

At present four parameters i.e. Respirable Suspended Particulate Matters (RSPM), Suspended Particulate Matters (SPM), Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) are measured for 24 hours twice a week. Monthly data is furnished regularly to Central Pollution Control Board.

As per Air Quality Index data of above four cities during January to July 2016, it was noticed that the NO_x, SPM and PM₁₀ levels at sites mainly remained within permissible limits and in few cases exceeded the prescribed limits as stipulated by CPCB and AQI was in the range of “moderate” to “Poor” levels in few cases (Khatla, Dawrpuri).

Source:

http://mizervis.nic.in/Database/Pollution_1124.aspx

• **Laws and Polices**

Mizoram Pollution Control Board is entrusted to control, prevent and abate pollution of

streams, wells, land and atmosphere in the state so as to protect the environment from any degradation by effective monitoring and implementation of pollution control legislations.

- **Environment Sustainability Index (ESI) 2011**

- ESI is constructed as a composite index from 41 key environmental indicators selected using the Driving Force-Pressure-State-Impact-Response (DPSIR) framework.
- Based on the aggregate ESI, states are categorized into five groups where Mizoram falls in the group with 80-100 percentile. This means State is most likely to remain sustainable.

➤ *Virendra Jakhar*

VII. International Audit Report: 'Actions of the State In directing the Use of Oil Shale' National Audit Office, Estonia

➤ **Oil shale mining in Estonia an overview**

Oil shale has been mined in Estonia for more than 100 years. Oil shale mining had dropped by the end of the 1990s however the same has been on the rise again since then, reaching ca 15 million tons in 2012. Oil shale is used mainly for electricity generation (70 per cent). The second important area of use is the production of shale oil and retort gas (27 per cent) while remaining is used for production of thermal energy, cement and chemical products. Oil shale must be used by valorising it to the maximum extent, and as economically and efficiently as possible in such a manner that all of the related negative impact (incl. on nature, the economic environment and health) is reduced to a minimum.

No other industry in Estonia has a bigger environmental impact than oil shale mining and use. The air pollution caused by the oil shale sector comprises more than 70% of all emissions into the air in Estonia and oil shale waste comprises ca 70% of non-hazardous and 82% of hazardous waste. The confluence of oil shale mining and processing has reduced the ground water resources in Ida-Viru County and spoilt the quality of ground and surface water. The oil shale industry has the biggest impact on the quality and quantity of ground water.

The Purpose of assessing whether the state guarantees the sustainable planning and economical extraction of oil shale and a fair revenue for the use of a mineral resource of national importance, the audit of 'actions of the state in directing the use of oil shale' was carried out from August 2012 to September 2013 by National Audit Office, Estonia in 2014. The audited period was predominantly from 2007 to 2012 and was focused on two main issues (audit objectives):

1. Are the state's goals in the extraction and use of oil shale reserves clear and relevant, and do they take account of significant impact?
2. Do the actions and requirements established by the state for the achievement of the goals lead to the reduction of negative environmental impact and guarantee the state a fair royalty for the use of oil shale?

The purpose of the audit was to assess whether the state guarantees the sustainable planning and Economical extraction of oil shale and a fair revenue for the use of a mineral resource of national importance. The NAO was to assess whether the state

guarantee that oil shale reserves are used sustainably. The audited agencies were the Ministry of the Environment, the Environmental Board, the Land Board and the Environmental Inspectorate. The audit objectives identified were:

➤ **Assessment / Audit criteria:**

The extraction and use of oil shale is touched upon in several national and sectoral development plans. The most important of these are:

1. National Development Plan for the Use of Oil Shale 2008-2015 (the Oil Shale Development Plan);
2. National Development Plan of the Energy Sector until 2020 (the Energy Sector Development Plan);
3. Development Plan of the Estonian Electricity Sector until 2018;
4. Action Programme of the Government of the Republic 2011-2015

The general opinion of Audit was given on the basis of the following criteria:

1. The state has established clear, measurable and relevant objectives for oil shale extraction.
2. The state is aware of the total volume of oil shale reserves, the volume of active reserves, the quality of the reserves and how long the reserves will last.
3. The objectives of oil shale use guarantee the greatest possible benefits from such use.
4. The annual oil shale extraction limit is expressly and clearly understandable.
5. The state assesses and considers environmental, health and socio-economic impact when planning oil shale extraction.

6. Local authorities are involved in planning the use of oil shale reserves.
7. Money, responsible persons and completion deadlines are planned for the activities determined in development plans and other documents.
8. The activities determined in development plans and other documents make it possible to achieve the established goals; the activities will be carried out and their impact will be assessed.
9. Conditions for reducing environmental impact, not damaging the surrounding environment (infrastructure and housing) and requirements for the technology to be used are set in environmental permits.
10. Those who issue environmental permits inspect the performance of the requirements set out in the permits.
11. Negative environmental impact has decreased as a result of the performance of environmental requirements and the implementation of environmental charges
12. Differentiation of oil shale resource charges or taxation of shale guarantee that the state receives a fair royalty for oil shale use.

➤ **Audit Methodology:**

The NAO reviewed and analysed following documents:

1. Legislation and strategic planning documents, their explanatory memoranda and annexes;
2. National Development Plans for Oil Shale Use, implementation plan (related research, analyses etc.);
3. Environmental permits (extraction permits, permits for special use of water, waste permits, ambient air pollution permits, materials of applications for permits,

environmental memoranda and environmental impact assessment reports);

4. Consolidated mineral reserve balance sheets of the Land Board, mineral resource reassessment certificates;
5. Combinability of the monitoring data of groundwater and surface water monitoring by the state and by companies;
6. Supervision reports of the Land Board, Environmental Inspectorate and Technical Surveillance Authority;
7. Annual reports of companies;
8. Report on the competitive situation in the oil shale sector prepared by the Estonian Competition Authority.

The NAO also made Database searches and queries on following datasets:

1. Database of the structural funds (SFOS), database of environmental permits and environmental charges (KLIS), annual reports of water use (VEKA);
2. Queries to the Environmental Information Centre (Environment Agency), the Environmental Board, the Ministry of the Environment, the Environmental Investment Centre, the Health Board and Statistics Estonia.

➤ **Key observations of the National Audit Office**

- The state has not achieved the goals set in the National Development Plan for Oil Shale Use, which are to reduce the environmental impact of oil shale mining and use and to increase the efficiency of mining and use.
- The main goal of national development plans, including the oil shale development plan – to guarantee

Estonia's energy independence with oil shale energy – is no longer relevant.

- The second important goal of the oil shale development plan – to mine and use oil shale more efficiently – has not been achieved.
 - The state has not carried out a comprehensive assessment of the environmental, health or socioeconomic impact of the use of new oil shale reserves in the preparation of the new development plan.
 - The environmental charges applied to oil shale do not meet their purpose of motivating companies to prevent or reduce potential damage related to the use of natural resources, emission of pollutants into the environment and disposal of waste.
 - The state does not earn enough from oil shale mining and use.
 - The Ministry of the Environment has not prepared the research required for the preparation of the new oil shale development plan to help assess the impact of mining the annual volume of oil shale and the use of new reserves on people, nature and the economy.
 - Supervision of the mined quantities of oil shale must be improved, as there is no reassurance that the state has received the correct amount of charges from companies for their extraction rights.
- **Recommendations of the National Audit Office**
- Before the new National Development Plan for Oil Shale Use (2016-2030) is completed, the Ministry of the Environment has to do some research to ascertain:

- What kind of complex (health, environmental and socioeconomic) impact is associated with the use of new oil shale reserves as well as with existing and closed mines? and enable the state to decide on the permitted annual volume of extracted oil shale;
- How great the actual environmental damage caused by oil shale mining and use is and how much money the state will have to spend to eliminate such damage? Thereafter, to calculate environmental charges that will motivate companies to prevent environmental damage and use natural resources more sustainably.
- Continue analysing the royalty for oil shale use whilst considering the fact that oil production will have increased significantly by 2016.
- In order to achieve the goals related to oil shale use, it was necessary to clearly determine the principles of oil shale taxation and the bases for amending the taxes in the new Energy Sector Development Plan and Oil Shale Development Plan.
- Specific actions that will result in more efficient extraction and use of oil shale and a reduction in environmental impact are set forth in the new Oil Shale Development Plan (2016-2030) are to be ensured.
- Abandonment of the goal of guaranteeing the energy supply of Estonian consumers with electricity generated from oil shale in the Energy Sector Development Plan and the Oil Shale Development Plan that were currently being prepared as there was no reason to prefer electricity generation to other uses when oil shale reserves are used.
- The state should develop measures that guarantee the quantity of oil shale required for electricity generation.
- The relevant goals and actions must be included in both the Oil Shale Development Plan and the Energy Sector Development Plan.
- The specific actions that will result in the more efficient extraction and use of oil shale are set forth in the new Oil Shale Development Plan.
- Use of research to identify technology and equipment that allow for extraction in underground mines in a manner that harms the environment as little as possible and results in the smallest possible mining losses to be encouraged actions for the implementation of such technology and equipment to be determined in the development plan.
- Collecting the monitoring data of sources of pollution in the oil shale sector and analyse them. Identifying the total quantity of pollutants generated by all sources of pollution and how dangerous these pollutants are;
- collect the health data and surveys of the residents of Ida-Viru County and analyse them; and on the basis of the pollutant monitoring data and the health surveys of Ida-Viru County residents, measures for assessing and mitigating the health impact of oil shale extraction and agreement on sources of financing before the new

Oil Shale Development Plan (2016-2030) and its implementation plan are to be adopted.

➤ **Significance**

The Oil Shale is an important energy resource of Estonia and its extraction, utilisation and export ensures Estonia's energy security, international obligations and has high importance in that country's economy. There are lot of environmental issues associated with the energy resources at all levels of their processing. Some of these issues needs research so as to ascertain their environmental significance. One of the recommendations in this audit report mentions about the need of research. India also has Oil Shale resources though the same are not yet exploited. The environmental auditors need to keep themselves aware about the environmental concerns being brought out in this area in other parts of world so that they can do infirmed audits on this issue.

Source: [Audit Report on Actions of the state in directing the use of oil shale- Report of the National Audit Office to the Riigikogu, Tallinn, ESTONIA, 19, November 2014](#)

• **S. Prabhakar Rao**

VIII. CAG Audit Report No. 39 of year 2016 on Environmental Clearance and Post Clearance Monitoring.

➤ **Introduction**

Environment Impact Assessment (EIA) is a process used to identify the environmental impacts of a project prior to its approval. It is a planning tool to integrate environment concerns into developmental process from the initial stage of planning. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensures that the environmental impact and

the mitigation measures are taken into account during the project design. The process of granting Environmental Clearance (EC) for the projects comprises of four stages namely Screening, Scoping, Public Consultation and Appraisal.

MoEF&CC made EIA and EC mandatory for certain development projects through its notification of January 1994, which was revised in September 2006. The Environment Impact Assessment (EIA) notification issued by MoEF&CC in 2006 identified 39 different types of developmental projects and activities, grouped into eight sectors. These eight sectors are (1) River Valley and Hydroelectric Projects, (2) Nuclear Power Projects, (3) Thermal Power Projects, (4) Coal Mining, (5) Non coal Mining, (6) Infrastructure, (7) Construction and (8) Industry.

➤ **Audit objectives:**

Performance Audit on "Environmental Clearance and Post Environmental Clearance Monitoring" sought to examine:

1. The process of grant of EC is in compliance with the laid down procedure, is adequate, fair and transparent; and
2. There is adequate Post Environmental Clearance Monitoring to ensure that the project proponents comply with all the conditions laid down in the EC letter and commitments made in the EIA report.

➤ **Audit criteria:**

The audit criteria were derived from the Environment (Protection) Act 1986, EIA Notification 2006, its amendments and other related circulars, office memoranda (OM), instructions and guidelines issued by MoEF&CC and other Regulatory Authorities.

➤ **Scope and methodology of audit:**

With reference to Audit Objective (i), 216 projects were selected that were granted EC by MoEF&CC between January 2011 and July 2015 in all sectors, except Nuclear Power Projects were examined.

With reference to Audit Objective (ii), 352 projects that were granted EC by MoEF&CC between calendar years 2008-2012 in all sectors except Nuclear Power were selected year wise, State/UT wise and sector wise based on stratified judgement sampling.

The field audits covered MoEF&CC, 33 selected States / UTs leaving only Nagaland, Arunachal Pradesh and Lakshadweep. Records in MoEF&CC including its 10 Regional Offices (ROs), Central Pollution Control Board (CPCB) and 33 State Pollution Control Boards (SPCBs) / Union Territory Pollution Control Committees (UTPCCs) were examined along with compliance reports submitted by the Project Proponents (PPs) to MoEF&CC and the ROs of MoEF&CC. Joint site visits were carried out along with officials of SPCBs/UTPCCs wherein the records furnished by the PPs in relation to EIA and compliance to EC we test checked.

➤ **Major findings:**

A. Environment Impact Assessment process

1. Mismatch in database received from the National informatics Centre (NIC) cell and MoEF&CC for the projects granted Environmental Clearance by the MoEF&CC: There were discrepancies such as inclusion of Category B projects (to be cleared by States) along with Category A projects (to be cleared by MoEF&CC), sectoral misclassification, wrong depiction of location of projects. The database did

not contain the time taken at each stage of EIA process.

- 2. Delays at each stage of the EC process namely granting of Terms of Reference (ToR), scrutiny of final EIA Report, appraisal of the application by the Expert Appraisal Committee (EAC) and grant of EC by the Ministry:** Out of 216 projects scrutinised only in 14% of the projects the ToR was granted within the prescribed time limit of 60 days, in others there were delays upto 365 days. In 11% cases, the EC was granted within the prescribed time limit of 105 days, in other projects there were delays at various stages like scrutiny of the Final EIA reports, appraisal of the application by the EAC, placing the recommendations of the EAC before the Competent Authority, conveying the recommendations of EAC and the decision of the Ministry to the Project Proponent (PP).
- 3. Non-compliance of EIA reports with Terms of Reference and with generic structure of the report as prescribed in the EIA Notification:** Cumulative impact studies before preparing the EIA reports was not made a mandatory requirement, thus the impact of a number of projects in a region on the ecosystem was not known. Ministry had not followed due process in issue of OM and the OM so issued had the effect of diluting the provisions of original notification.
- 4. Non-appointment of Regulator at the National level:** The Ministry has not yet appointed Regulator at the National level as observed by the Supreme Court (July 2011) to carry out an independent, objective and transparent appraisal and approval of the projects for ECs and to

monitor the implementation of the conditions laid down in the EC.

5. Non-uniformity in the terms and conditions of the EC: There was non-uniformity in the terms and conditions of the EC for similar kind of projects. The EIA reports were found prepared by non-accredited consultants.

6. Absence of provisions to ensure fulfilment of commitment by Project Proponents and inclusion of concerns of local people in EIA report/ EC letter: The public hearing process did not have quorum requirement and qualification of residency to participate in the public hearing process. Commitments made by Project Proponents (PPs) in EIA report during public hearing were also not monitored. Besides, the reservations expressed during the public hearings were not included in the EIA reports.

7. Non-compliance to General Conditions of Environment Clearance: There was shortfall of expenditure on Environment Management Plan (EMP) activities (26 per cent cases), Enterprise Social Responsibility (ESR) activities (20 per cent cases) and development of green belt (47 per cent cases). Time bound action plan for implementing the EMP was not made in 64 per cent of the cases. In 56 per cent of the cases approval of the Competent Authority was not obtained for the actual number of trees cut by the PPs. Ground water was used without permission of the Competent Authority in 19 per cent of the cases. The scope of work was changed after obtaining the EC in 10 per cent of the cases.

The annual environmental audit report was not submitted by PPs to SPCBs/ UTPCCs in 19 per cent of the cases and in seven per

cent of the cases construction/operations was commenced before grant of EC.

8. Non-compliance to Specific Conditions of Environment Clearance: There was absence of preparation and maintenance of action plan for conservation of flora and fauna in 57 per cent of the cases. Construction of Rain Water Harvesting structure was not done in 29 per cent of the cases. Shortfall in relief and rehabilitation measures for people affected by projects was observed in 22 per cent of the cases.

Improper storage of fly ash was noticed in 33 per cent of the cases. Non-utilization of fly ash generated was also noticed in 21 per cent of the cases.

Consolidation and compilation of muck in the designated muck dumping sites was not done in 33 per cent of the cases. Implementation of Catchment Area Treatment in Irrigation projects was not carried out in 56 per cent of the cases.

9. Poor monitoring of compliance of EC by Project Proponents: There were non-compliance in setting up of separate monitoring cell with adequate manpower in 98 projects. In 71 projects there were shortfalls in monitoring of environmental parameters by the PPs. There were inadequacies in monitoring by third party/agencies in 201 projects.

10. Action plan for Critically Polluted Areas: The Ministry did not carry out biennial environmental quality monitoring in Critically Polluted Areas through a third party for computing Comprehensive Environmental Pollution Index.

SPCBs of five States had not prepared action plans and eight States did not

monitor the implementation of action plans. The third party monitoring of implementation of action plan was not done by 10 SPCBs.

11. Monitoring of compliance of ECs by Regional Offices (ROs) of the Ministry:

There were only 15 scientists available for monitoring of EC conditions against sanctioned strength of 41. Regional Offices (ROs) have not been delegated the powers to take action against the defaulting PPs and they had to report the violations of the EC conditions to the Ministry.

The Ministry did not have a database of cases received by it where the violations were reported by ROs. No penalty was imposed by the Ministry for violating conditions of EC in the last two years.

12. Monitoring of compliance of EC by SPCBs/UTPCCs:

Clear cut responsibilities were not assigned to SPCBs/UTPCCs under EIA Notification 2006 regarding post EC monitoring.

SPCBs/UTPCCs were not able to ensure that projects were running with valid Consent to Establish in 11 cases and without Consent to operate in four cases.

24 SPCBs/UTPCCs did not have in place sufficient infrastructure and manpower for monitoring despite having sufficient funds.

➤ **Recommendations**

MOEF&CC has been recommended to:

1. Streamline the processes including adhering to the timelines as per the EIA Notification to increase transparency and fairness in grant of EC.
2. Ensure while scrutinising the EIA reports that they are as per the ToR, comply with the generic structure, baseline data is accurate and concerns raised during the

public hearing are adequately addressed, may.

3. Evaluate the entire process of EIA by involving all stakeholders, following legal processes and make suitable amendments in EIA Notification 2006 rather than resorting to Office Memorandums.
4. Grant fresh EC to the PPs only after verifying the compliance to the earlier EC conditions.
5. Adhere to its circular of 2010 on EC of coal linked mine for Thermal and Metallurgical projects so that firm coal linkage is available and the status of environment and forestry clearance of the coal sources i.e. the linked coal mine/coal block is known.
6. Take suitable action in consultation with NIC for revalidation of database and arrive at correct picture of the projects which have been granted EC by the Ministry.
7. Consider bringing conditions of EC compatible with the nature and type of project in order to avoid non-uniformity in similar kind of projects.
8. Ensure that EIA reports/EC letters should clearly mention cost of activities under EMP and ESR along with the timelines for their implementation.
9. Consider making EMP/EC condition(s) more specific for the area to be developed under green belt and species to be planted in consultation with Forest/Agriculture Department along with post EC Third Party evaluation.
10. Consider endorsing copy of EC letter issued to each project to the Central Ground Water Board/State Agencies to ensure monitoring of Ground Water extraction.
11. Work out strategies in co-ordination among ROs, CPCB, SPCBs/UTPCCs and

other Departments of State Governments to strictly monitor the compliance of conditions mentioned in the EC periodically.

12. May consider adopting risk based approach along with SPCBs to monitor the conditions stipulated in the ECs of the project and devise schedule for percentage check of six monthly compliance reports and environment statements.
13. Consider bringing suitable condition by mentioning the name and number of post/posts to be engaged by the proponent for implementation and monitoring of environmental parameters.
14. Consider bringing the mandatory EC conditions on installation of monitoring stations and frequency of monitoring of various environmental parameters in respect of air, surface water, ground water, noise, etc.
15. Introduce a system of surprise check by the SPCBs at premise of PPs to verify the third party testing of environmental parameters, in consultation with SPCBs,
16. Issue advisory to the State Government regarding implementation and monitoring of the action plan of critically polluted areas at regular intervals.
17. Put in place a mechanism to ensure that the compliance reports are regularly and timely received and uploaded by PPs and the Ministry on their websites.
18. Take expeditious measures to have the requisite number of scientists in place in the respective ROs.
19. Evolve a system by delegating powers to ROs for taking action against the defaulting PPs.
20. Have a system in place where the reports of violation received from ROs are

compiled and constantly monitored in coordination with the ROs for ensuring that the PPs comply with EC conditions and take action as per law.

21. Issue directive to the State Government to frame modalities clearly delegating responsibility of monitoring the compliance to EC letter and commitments made in the EIA reports.
22. Issue advisory to SPCBs/UTPCCs for periodical monitoring after grant of Consent to Establish and Consent to Operate to Project Proponents.
23. MoEF&CC may advise the State Governments to strengthen the infrastructure and manpower of SPCBs so that they properly monitor the EC conditions of the projects running in their jurisdictions.

➤ **Conclusion**

The existing processes for grant of EC suffered from various procedural deficiencies. There were delays at each stage of the EIA process. Each project is treated as a single project for EIA but cumulative EIA which is critical in evaluating impact on environment, was found to be lacking. There were variations in the database for the projects granted EC by the Ministry as initially received from the NIC and that provided by the Ministry. A National Regulator to oversee the entire process of grant of EC and monitoring is yet to be appointed despite directions of the Hon'ble Supreme Court. ECs were granted to the PPs without checking the compliance of the conditions mentioned in the previous ECs and recommendations of the Regional Office.

The Ministry did not compile information about closed / non-operational projects which indicated poor coordination among the

Ministry, SPCBs/UTPCCs and PPs. Mechanism to ensure redressal of the concerns of the public in the final EIA report/EC letter and implementation of the commitments made by the PP during public consultation in a time bound manner were also not firmly in place. Besides, shortcomings were noticed in the conduct of public hearings.

There were shortages in compliance of 13 general conditions prescribed in the EC by the PPs. The non-compliances noticed were non-fulfilment of the EMP commitments, maintaining sufficient greenbelt, activities under ESR, change in scope of the projects without requisite approvals and commencement of construction/operations before grant of EC.

There were shortages in compliance to 18 specific conditions prescribed in ECs by PPs. The non-compliances noticed were non-preparation and implementation of the Emergency Preparedness Plan, allocation of funds for action plan for conservation of flora and fauna, non-consultation with the State Forest and Wildlife Department, non-installation of Effluent Treatment Plants and Sewage Treatment Plants at project premises, non-implementation of Occupational Health Surveillance programme etc. In Thermal Power Plants, environmentally safe practices of storage of fly ash were not adhered to, coal of more than permitted ash content was being used, fugitive emission of fly ash was not properly controlled and the fly ash generated was not being fully utilized.

In spite of the conditions mentioned in the EC, the PPs showed poor monitoring of environmental parameters. The Ministry / CPCB did not undertake environmental quality monitoring in Critically Polluted Areas due to

non-finalization of the firms for the same. PPs were also not uploading half yearly compliance report on their website. There was wide gap between the sanctioned strength vis-a-vis men in position of scientists in all the ROs.

Regional Offices had not been delegated powers to take action against the defaulting PPs. No penalty was imposed by the Ministry for violating conditions of EC in the last two years. SPCBs/UTPCCs had not been carrying out post EC monitoring due to lack of clear cut responsibility assigned to them under EIA Notification 2006.

➤ **Significance**

This is the first comprehensive audit of its kind conducted at national level across various sectors keeping the environmental clearance process at the central level. This should succeed in providing important inputs to the Parliament and the governments so as to trigger necessary changes towards making the process of clearance effective and there should be strong steps taken towards post clearance monitoring. This audit report should be able to guide the auditors during their regular audits of projects, project proponents, state departments, SPCBs etc. so that the issues are also brought out during the audits of respective entities.

- **Vijender Singh Tanwar**

IX. Using Data Analytics in audit of State Pollution Control Boards

Abstract

This paper aims at identifying scope for data analytics of data sourced from State Pollution Control Boards and attempts preparation of template for data collection in selected areas. It also outlines potential outcomes of such data analytics for each of the selected area and illustrates the utilisation for audit planning as well as conduct of audit.

➤ Introduction

State Pollution Control Boards (SPCBs) are the nodal agencies in the states who are responsible for prevention and control of air and water pollution. The main objectives of SPCBs are derived from the provisions of the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981, etc. The enactment of the Environment (Protection) Act, 1986 has further widened the scope of the activities of the SPCBs. This Act being umbrella legislation, addresses the problems relating to pollution in various sectors and SPCBs are engaged in implementation of the rules made under the Environment Protection Act, 1986.

➤ Functioning of SPCBs

The primary objective of SPCBs is to plan a comprehensive programme for the prevention, control and abatement of water and air pollution. The SPCBs lay down and review standards for the sewage effluents and for the emission of air pollutants into the atmosphere from industrial plants and automobiles or any other source. They are also responsible for collection and dissemination of information relating to prevention and control of water and air pollution. They are vested with authority to inspect industries and evaluate working of effluent / emission treatment plants and provide guidance for corrective measures for the prevention and control of air pollution, water pollution, noise pollution, hazardous waste management, etc.,. The SPCBs also periodically collect samples of sewage effluents and emissions of air pollutants and analyze the same for specific parameters through its laboratories. Further, they collaborate with Central Pollution Control

Board in organizing the training of persons engaged to organise mass education programme to improve sensitization.

The following sections enlists the template that may be used for collection of data for each activity of the SPCB. The scope of the possible use of data analytics for audit planning and conduct and outcomes are also discussed.

➤ Template for data collection

➤ Inventories

The SPCBs are to maintain inventories or master data of many entities, such as inventory of polluting sources (air, water, hazardous waste, biomedical waste, municipal solid waste, e-waste, etc.). This data (as collected using the template in Table 1) would be the primary source for performing risk analysis of offices of SPCBs. The inherent risk for each of the office depends on the type of industries that is dealt by the office. This utilization is illustrated by taking the case of state of Tamil Nadu in Section 2. The completeness of inventory database could be determined by cross verification with third party data such as assessee database of Central Excise Department.

Table 1: Template for inventory of industries

Name of industry	Type of unit	Location of the unit	Jurisdictional office	Polluting source	Category of industry for consent (red, Orange, Green and white)

➤ Consent to establish and consent to operate

The SPCBs are responsible for providing consent to establish and operate to the different categories of industries. The data relating to consent to establish and operate

may be collected as detailed in Table 2. This data could be used to identify the consents which have expired during the period of conduct of air and could be followed up to ascertain whether the industries are being operated without consent or whether the industry had obtained consent to operate after establishment, delay in renewal of consent as the case may be.

Table 2: Template for consent to establish and consent to operate

Consent Order No. Water Act	Consent Order No. Air Act	Name and address of the Industry	Office / DEE	Date of issue of Consent Order	Valid up to

➤ **Monitoring of quality of air and water**

Through its laboratories, TNPCB collects and maintains the actual emissions in the air from the stack, chimneys, outlet of various industries located in the state viz. Suspended Particulate Matter (SPM), oxides of Sulphur (SOx) and Nitrogen (NOx), etc. Similarly, it collects and maintains various parameters from the water effluents let out by various industries, namely biological oxygen demand (BOD), Chemical oxygen demand (COD), Total Suspended solids (TSS), Total Dissolved Solids (TDS), coliform, etc.

The Continuous Online Ambient Air Quality Monitoring Stations are maintained by both SPCB and the industries. The data relating to compliance to the standards of air and water quality may be obtained in the template detailed in **Table 3**,

Table 4 and **Table 5**. This data could be utilised to identify the non-compliance of standards by the industries and follow up on the action taken by the SPCB regarding the same during the conduct of audit. Further, this data could also be analysed together with

data relating to inspections (as detailed in section 7). Further, the tax exemption data provided to such industries may be collected to ascertain their compliance to provisions relating to maintaining standards of emission / effluent. With regard to data relating to ambient air quality, the data could be cross verified with the Pollution Under Certificate data (that could be collected from Transport Department / Pollution Testing Centers), to ascertain adequacy and effectiveness of functioning of the pollution testing centers.

Table 3: Template for monitoring of emission by the industries

Date of measurement	Consent Order No. Air Act	Name and address of the Industry	SPM (µg/Nm³) Norm 60 (µg/Nm³)		SOx (µg/Nm³) Norm 50 (µg/Nm³)		NOx (µg/Nm³) Norm 40 µg/Nm³	
			Standard	Time average	Standard	Time average	Standard	Time average

Table 4: Template for monitoring quality of ambient air

Date of measurement	Name of City	Category of area (industrial/residential, etc.)	SPM (µg/Nm³) Norm 60 (µg/Nm³)		SOx (µg/Nm³) Norm 50 (µg/Nm³)		NOx (µg/Nm³) Norm 40 mg/M³	
			Standard	Time average	Standard	Time average	Standard	Time average

Table 5: Template for monitoring of quality of water

Date of measurement	Consent Order No. Water Act	Name and address of the Industry	BOD (mg/l)		COD (mg/l)		TSS (mg/l)		TDS (mg/l)		Coliform (mg/l)	
			Standard	Time average	Standard	Time average						

➤ **Inspection of industries**

The industries are to be periodically inspected by the SPCB to examine the manufacturing

process and any control equipment and to give directions to take steps for the prevention and control of pollution. The SPCB also examines the compliance of the industries to the standards. The periodicity of the inspection of industry depends on the category of the industry. For example, red category industries are to be inspected every month while orange are to be inspected every quarter. The details of data that is to be collected regarding inspection of industries is detailed in **Table 6**. The impact of inadequate inspections, if any detected, could be ascertained by cross utilizing data from quality relating to emission/effluent monitoring as detailed in section 7.

Table 6: Template relating to inspection of industries

Date of measurement	Consent Order No. Air Act	Name and address of the Industry	Category of the industry	Periodicity of inspection	Arrears in inspection

➤ SSI units

The Small Sector Industries (SSI) units include induction furnaces, lime kilns, stone crushers, brick kilns, DG sets which are wide spread geographically. The SPCB is responsible for ensuring that these SSIs are attached to Common Effluent Treatment Plants (CETPs). The data relating to the SSI units may be collected in the template detailed in **Table 7**. This data may be analysed to ascertain the action taken on SSI units which neither have joined CETP nor following any treatment scheme. In some states, electricity tax is levied on the DG sets and hence the data relating to electricity tax collection could be cross verified to identify completeness of inventory of DG sets and their compliance.

Table 7: Template for collection of data relating to SSI units

Name of the SSI unit	Type of activity	City in which located	Category of SSI unit (Red, Orange, Green and White)	Last inspected in	Whether SSI unit has joined CETP	If not joined CETP, treatment scheme followed

➤ Data analysis for audit planning

In the context of efficient utilization of audit resources, it is imperative to have a risk based approach to audit planning. The audit risk depends on the risk of non-compliance due to inherent nature of transactions dealt with by the audit unit, risk of inadequate and ineffective control in the audit unit to prevent, detect and control occurrences of non-compliance and risk of non-detection of non-compliance. This section illustrates one probable method of determining inherent risk score of district offices of SPCBs. The inherent risk score of SPCBs depend on the nature of the industries that are handled by them. The industries have been categorised as 'Red', 'Orange' and 'Green' for the purpose of authorizing consent to establish and operate and are further categorized as 'Large', 'Medium' and 'Small' based on turnover. In order to calculate the inherent risk score of offices of TNSPCB, a risk score was attached to each of the industry under the district offices as detailed in **Table 1**.

Table 8: Calculation of inherent risk of offices of SPCBs

	Large (50)	Medium (30)	Small (10)
Red (50)	100	80	60
Orange (30)	80	60	40
Green (10)	60	40	20

The risk scores of industry belonging to a specific district are geographically mapped to identify high risk district offices of TNPCB as illustrated in Figure 1. The individual risk areas relating to each of category viz. red, orange and green industries have been geographically mapped along with the cumulative risk. The district offices dealing with higher number of highly polluting industries (with darker shades in each category) poses higher audit risk and hence must be prioritized during planning.

Figure 1: Illustration of data analysis and visualization for audit planning



Thus, it could be seen that the data analysis and data visualization assists in predicting high risk district offices during the planning of audit of SPCB. This risk score may further be modified to include additional parameters such as arrears in inspection, arrears in internal audit, previous audit observations, etc.

➤ Conclusion

Thus it is seen that the technique of data analytics could be used in planning of audit and conduct of audit of SPCBs as detailed in the paper. However, it is pertinent to understand that the reliability of the results depends on the reliability of the data that is collected from the SPCBs.

- **Ms. R. Monica, IA&AS**