

Green Files

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GREEN FILES

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

EDITORIAL

Green Files, a quarterly newsletter published by iCED features glimpses of recent environment news, persons and environment projects in focus. Emerging trends in innovation, initiatives and efforts of different environment organizations to protect the environment also find occasional reflection in this newsletter. Court judgements on environment issues as well as recent national and international audit reports on environment and sustainable development, are also included in this issue for knowledge sharing among the auditors.

In yet another eventful quarter ending September 2018, iCED organized three National Training Programmes on audit of important environmental and sustainable development issues such as conservation of lakes and wetlands, implementation of Sustainable Development Goals and implementation of Air and Water Pollution regulations. These trainings symbolize continuation of our efforts towards alignment of training programmes with audit issues taken up by field offices of SAI India.

A six day training programme on environment audit for IA&AS officer trainees was organised during this quarter for capacity building on environmental and sustainable development issues. A two day mid-term workshop on Performance Audit on Ground Water Management and Regulation was also held at iCED during the quarter.

iCED also organised a first of its kind training programme on “Greening of Offices: Environment Management in Government Establishments” for Indian Revenue Service officers of Central Board of Indirect Taxes and Customs. This was the first time, iCED organised a full-fledged training programme for a department other than IA&AD. An article on Environmental Management in Government Residential Colonies: Possibilities in CBIC prepared by a group of IRS officers who attended this training is also included in this issue. We at iCED, 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. iCED News

iCED News

During the second quarter (July – September) for the year 2018 – 19, iCED organised three National Training Programmes (NTPs) on:

- i. Audit of efforts for conservation of lakes and other wetlands (30 July – 03 August, 2018)
- ii. Audit of implementation of Sustainable Development Goals (06 August – 10 August, 2018)
- iii. Audit of implementation of Air and Water Pollution regulations (including transport issues) (17 September – 21 September, 2018)

These NTPs were held based on inputs received from Training Needs Analysis conducted by iCED as well as Annual Audit Plan 2018-19. Audits on these issues are being conducted by various field offices.

A six day Training Programme on Environment Audit for IA&AS Officer Trainees (2017 Batch) was also held from 16 – 21 July, 2018 at



IA&AS Officer Trainees with Principal Director, iCED

iCED. A total of 22 IA&AS Officer Trainees (2017 Batch) including 4 lady officers along with 2 officers from Royal Audit Authority, Bhutan participated in the training programme. This training programme aimed at capacity building of officer trainees on issues relating to environment including conservation of biodiversity, water issues, waste management, aspects of sustainable development, climate change, etc. It had elements of learning through

interaction with accomplished persons and also visits to places where significant work to conserve environment is on. A study tour to Arid Forest Research Institute (AFRI), Jodhpur was organised on 20 July 2018 to demonstrate scientific research in forestry for increasing the vegetation and conserving biodiversity in the



IA&AS Officer Trainees participating in lake cleaning

hot arid region of Rajasthan. OTs also visited Udaipur to understand the role of civil society in conservation of lakes of Udaipur and interacted with Jheel Sanrakshan Samiti, an NGO actively working for conservation and cleaning of lakes of Udaipur. Officer Trainees voluntarily participated in “Shramdan” conducted by Jheel Sanrakshan Samiti.

A two day Mid-term Workshop on Performance Audit on Ground Water Management and Regulation was also held at iCED from 06 – 07 August, 2018. Workshop was chaired by Ms. Subhashini Srinivasan, Dy. CAG (RC). A total of 30 participants from various field offices participated in workshop.



Ms. Subhashini Srinivasan, Dy. CAG (RC) with Participants of Workshop on Groundwater

On Day 1 i.e. 06th August, 2018, presentations were made about the audit work done in Delhi, Gujarat, Uttar Pradesh, Haryana, Jammu & Kashmir, Punjab. On Day 2 Dr. Himanshu Kulkarni, Advanced Center for Water Resources Development and Management (ACWADAM); Shri Sujit Kumar Sinha, Central Ground Water Board (CGWB); and Dr. Anshuman, The Energy and Research Institute (TERI) interacted with participants about Ground Water Management and Regulation and share their knowledge and expertise on the subject.

iCED also organised a Training Programme on “Greening of Offices: Environment Management in Government Establishments” for Indian Revenue Service officers of Central Board of Indirect Taxes and Customs (CBIC) from 27 – 31 August, 2018. This was the first time, iCED organised a full-fledged training programme for a department other than IAAD in Government of India. Training Programme was attended by 25 in-service IRS officers of various ranks from Assistant Commissioner to Additional Commissioner. Chairman, CBIC Shri S. Ramesh inaugurated training programme through Video Conference on 27 August 2018. Participants profusely appreciated the infrastructure of iCED including the residential and recreation facilities along-with the hospitality of iCED staff. This training programme provided iCED with a proud feeling that initiatives taken at iCED are leading to growing acceptance of the idea of green buildings and better environmental management within the government.

iCED also organised two Training Programmes for teams which are assigned audit of UNPKO, UNICEF and UNOPS from 13 – 18 August, 2018 and 17 – 22 September, 2018 during the quarter. Besides this, iCED also hosted UNPKO Audit teams conducting Remote Access Audit from 20 – 24 August, 2018.

➤ **Vijendra Tanwar**

II. ASOSAI/INTOSAI NEWS

The 14th ASOSAI Assembly

This assembly is held once in every three years and is hosted by the incoming Chair of the ASOSAI. It is the venue for all heads of ASOSAI member supreme audit agencies to discuss and decide on major issues, policies to achieve the association’s objectives and further its development. The 14th ASOSAI Assembly was held in Hanoi, Vietnam from 19-22 September 2018. SAI Vietnam took over the Chair from the SAI of Malaysia at this Assembly and will hold office for next three years (2018-2021).

At the Assembly, the members adopted the Hanoi Declaration which consists of two broad recommendations: 1) To promote knowledge sharing and capacity development in ASOSAI community in the field of environmental auditing for sustainable development; and 2) To implement SDGs and address global environmental challenges.

The second day of the 14th ASOSAI Assembly held from 19-22 September 2018 in Hanoi, Vietnam was dedicated to 7th Symposium of the ASOSAI on the theme: “Environmental auditing for sustainable development”. The symposium comprised of three sessions, namely the 1st plenary session, a group discussion session and 2nd plenary session.

IDI was invited as one of the speakers to lead the discussion session on the topic; ‘Role of SAIs in SDGs’. Archana Shirsat, Deputy Director General of the IDI made a brief presentation on ‘SAIs making a difference by engaging with SDGs’ before engaging into a discussion on the topic. She touched upon three basic questions on auditing SDGs: 1) Why does auditing SDGs matter? 2) What is different about auditing SDGs? and 3) How can SAIs make a difference?

A total of 15 SAIs registered the country papers for the symposium on environmental auditing and the role of SAIs in SDGs. SAIs of Vietnam, Malaysia, Indonesia, China, Nepal and Australia presented their papers at the symposium, while some of them participated in

the plenary discussion to share their perspective. Jimmy Greer, Head of Sustainability of ACCA who was also leading the discussion session shared ACCA's perspective of Environmental Audit and SDGs and emphasised the greater role of SAIs in dealing with national development plan issues linked to SDGs.

Source: <http://www.idi.no/en/all-news/idi-news/item/276-14th-assembly-of-asosai>

<http://www.idi.no/en/all-news/idi-news/item/278-7th-asosai-symposium>

INTOSAI Side Event and "SAI Leadership and Stakeholder Meeting" in New York

On 18 July 2018, the INTOSAI General Secretariat, in cooperation with the United Nations (UN) and the Permanent Representations of Austria and Canada to the UN, organized a side event in the framework of the High-level Political Forum on Sustainable Development (HLPF). The event focused on the results achieved in the framework of auditing the preparedness of national governments to implement the Sustainable Government Goals (SDGs). The stimulating discussions provided vital insights into the various approaches of SAIs in auditing the implementation of the SDGs.

This event aimed at the exchange of knowledge and experiences of SAIs from all INTOSAI regions against the backdrop of the "Auditing the SDGs" programme of IDI and the INTOSAI Knowledge Sharing Committee. The "Auditing the SDGs" programme supports more than 70 SAIs around the world in carrying out SDG-related performance audits. In concrete terms, the participating SAIs that had already carried out SDG audits presented their experiences. Furthermore, different approaches were taken into account in this regard, such as policy coherence and inclusion, possibilities of building capacities for SAIs with regard to the conduct of SDG audits, or the expectations of different stakeholders towards SAIs in this regard.

➤ **Manoj Kumar**

III. State in Focus: Nagaland

The State of Nagaland was formally inaugurated on December 1st, 1963, as the 16th State of the Indian Union. It is bounded by Assam in the West, Myanmar on the east, Arunachal Pradesh and part of Assam on the North and Manipur in the South. The State consists of seven Administrative Districts, inhabited by 16 major tribes along with other sub-tribes. Each tribe is distinct in character from the other in terms of customs, language and dress.



Angami Tribe of Nagaland

Source: <http://tourismnagaland.com>

Nagaland, sometimes referred to as the Switzerland of the East; the exquisitely picturesque landscapes, the vibrantly colourful sunrise and sunset, lush and verdant flora, this is a land that represents unimaginable beauty, moulded perfectly for a breath taking experience.

Source: <https://www.nagaland.gov.in>

(a) Forests

As per Government of India's Forest Survey Report 2015, total recorded forest area in the state is 9222 sq. km. (Reserved forest-86 sq. km., protected forest - 508 sq. km. and unclassified forest- 8628 sq. km.); thus constituting 55.62% of the geographical area of the state and 1.21% of India's forest area.



Dzüikou Valley in Nagaland

Source: <http://tourismnagaland.com>

The main reasons for decrease in forest cover are shifting cultivation and other biotic pressure on forests lands.

Though Nagaland is a small state but as far as types of forests are concerned it has been endowed with a wide variety of forest types. This is mainly due to the fact that though it is mainly in tropics, Nagaland has land elevation ranging from a few hundred meters up to about four thousand meters.

(i) Northern Tropical Wet Evergreen Forests -

These forests once covered the Namsa-Tizit area but now only a small vestige is found in the Zankam area. It is found only in Mon District. The dominant species in this type of forest are Hollong (*Dipterocarpus macrocarpus*), Makai (*Shorea assamica*), Nahor (*Mesua ferae*) etc.

(ii) Northern Tropical Semi Evergreen Forests -

This type of forests are found in the foothills of Assam-Nagaland border in Mokokchung, Wokha and Kohima Districts. The Species that make up these forests are similar to those of the Northern Tropical Wet Evergreen Forests. The only difference is that in the former case the evergreen species dominate though there are deciduous species like *Bhelu*, *Paroli*, *Jutuli* etc, whereas in the present case, the number of evergreen species decreases and the deciduous species are dominant.

(iii) Northern Sub-tropical Broad Leaved Wet Hill Forests -

This type of forests are found in the hill areas below 1800 m and above 500 m in all the districts of Nagaland. The wet evergreen species are conspicuous by their absence and the dominant species are mostly semi-deciduous. Some of the important timber species in this type are - *Koroi*, *Pomas*, *Sopas*, *Gamari*, *Gogra*, *Khokan*, *Hollok*, *Sam*, *Am*, *Badam*, *Betula* etc.

(iv) Northern Sub-tropical Pine Forests -

This types of forests are found in hill elevation of 1000 meter to 1500 meter in parts of Phek and Tuensang Districts of Nagaland. Pine is the dominant species and is found mixed with *Quercus*, *Schima*, *Prunus*, *Betula* and *Rhododendron*.

(v) Northern Montane Wet- temperate Forests -

This type of forests are found on the higher reaches of the tallest mountains in Nagaland above 2000 meter in - Japfu, Saramati, Satoi, Chentang ranges. The species are typically evergreen with *Quercus*, *Michelia*, *Magnolia*, *Prunus*, *Schima*, *Alnus* and *Betula*.

(vi) Temperate Forests -

This type of forests are found in peaks of the tallest mountains (above 2500 meter) like Saramati and Dzukou area. The species that dominate are *Rhododendron*, Patches of *Juniperus* and *Birch*.

Source:

<http://www.nagaforest.nic.in/Forest%20Types.htm>

(b) Biodiversity

The whole state of Nagaland is rich in Biodiversity. Nagaland comes under the Indo-Burma (Myanmar) Biodiversity hotspots of the world. It lies between 25°06' and 27°04' latitude, north of equator and between the longitudinal lines 93°20' E and 95°15' E. The area of the State is 16,579 sq.kms. Though, small in surface area the geographical location with varied climatic condition ranging from tropical to temperate conditions have greatly

influenced the rich floristic and faunal diversity in the state.

The flora of Nagaland shows great affinities with flora of Indo-Malaya and Indo-China. The angiospermic flora is represented by about 2,431 species belonging to 963 genera and 186 families. In this, the share of dicots is 1,688 species, 724 genera from 158 families and monocots by 743 species under 239 genera from 28 families. Gymnosperms also register their presence with 9 species, under 6 genera from 5 families. There are over a thousand species of orchids in India and Nagaland alone has about 360 orchid species. There are about 71 bamboo species, 12 cane species and 41 allied species, 346 lichens and 103 Red Data Plants. The faunal diversity includes about 67 common wild animals, 519 bird species and 149 fish species and a number of reptiles and amphibians.

The great Indian hornbill is one of the most famous birds found in the State. Blyth's tragopan, a vulnerable species of pheasant, is the State bird of Nagaland. It is sighted on Mount Japfü and Dzükou valley of Kohima district, Satoi range in Zunheboto district and Pfütsero in Phek district. The world's biggest and tallest Rhododendron tree discovered in 1993 featured in the Guinness Book of World Records, measuring up to 108 feet and can be found at the base of Japfü Peak. Rhododendron and Mithun is the State flower and animal of Nagaland respectively. The state is also known as "Falcon Capital of the World." It is the primary stopover roosting site for Amur falcons in places like Wokha, Longleng, Peren, Dimapur, Phek etc.

Source: <http://nsbb.in/>

Wetlands

Nagaland has a largely monsoon climate with high humidity levels. Annual rainfall averages around 1,800– 2,500 mm, concentrated in the months of May to September. There is not a single completely dry month in a year. Temperatures range from 21 °C to 40 °C. In winter, temperatures do not generally drop below 4 °C, but frost is common at high elevations. The proximity to the Himalayan

foothills and the torrential monsoon rains has resulted in the prosperity of the mighty rivers in Nagaland. The mountain region is the source of several streams and rivulets. There are four major river systems in the state, viz. Dhansiri, Doyang, Dikhu and Tizu. One of the chief tributaries of the Brahmaputra River is Dhansiri which originates in the mountainous Laisang peak in Nagaland. The districts of Nagaland receive water from the Dhansiri river prior to its confluence with the Brahmaputra River. Doyang river originates in the northern part of Manipur State ie. in the SE of Kohima and it flows northwards, up to east of Wokha town and changes its direction thereafter to northwest. The rivers are not navigable in any season, deep valley navigation is also not possible due to the rocky terrain. The drainage pattern in Nagaland is mainly dendritic in nature with varying densities. Fine dendritic type of drainage is developed in the central part of the state between Mokokchung and Tuensang. A very fine dendritic pattern is noticed between Kohima and Mon. In other parts, the drainage pattern is coarse dendritic in nature.

Area estimates of various wetland categories for Nagaland have been carried out using GIS layers of wetland boundary, water-spread, aquatic vegetation and turbidity. The estimated wetland area of the state is 21544 ha area, that includes 267 small wetlands (< 2.25 ha). River/stream is the single most dominant wetland type of the state with 89.37% contribution. Among, other wetland types, reservoir/barrage is the major one. Two reservoirs are mapped with 1547 ha area (7.18%). Only one natural Lake/pond is mapped with 3 ha area. Aquatic vegetation in the wetlands is negligible during post monsoon, while it occupied 604 ha area during pre-monsoon. The open water spread of river/streams is almost same in both the seasons, indicating perennial condition. The open water in reservoir / barrage is slightly less during pre-monsoon than during post monsoon. The turbidity of water is mainly high in both the seasons.

Source: https://vedas.sac.gov.in/vedas/downloads/atlas/Wetlands/NWIA_Nagaland_Atlas.pdf

Water quality:

Kohima, the capital of Nagaland lies in the southern part of Nagaland covering an area of 3114 sq.km. with a population of 3,65,017 as per 2011 census and rapidly increasing. Water pollution in Kohima is not caused by major industries but through domestic waste that are dumped into the convenient “nullahs”. It is estimated that 75 to 80% of water pollution by volume is caused by domestic sewage within Kohima.

During monsoons, the rain water washes the dirt from the garbage and toxic fluids gather which gradually seeps into the soil or enter the local water sources through leakage or poor maintenance of water pipe lines etc.

Due to poor drainage, rain water floods the roads and takes along with the garbage and dirt from the roads, which further deteriorates the quality of water and as a result it becomes more hazardous to the people living around. The poor drainage system further damages the roads giving a chance to the automobiles to discharge oils and toxic chemicals where the water gets contaminated and gets easy access to the ground water through potholes as they seep through it and enter the ground water system.

Kohima is blessed with the presence of small water streams and water bodies travelling along different wards / colonies in the town. However, water quality and quantity is a cause of concern rather than pride.

The water is getting polluted due to:

- Mixing of untreated domestic sewage
- Disposal of non-biodegradable waste from home, markets etc
- Biomedical Sewage
- Agrochemicals used in the field
- Other sources like Hotels, Restaurants, etc.

We should take a note of quote of famous Bolivian socialist EVO MORALES, “Sooner or later, we will have to recognize that the earth has rights, too, to live without pollution. What mankind must know is that human beings cannot live without mother earth, but the planet can live without humans”.

Source: <http://morungexpress.com/micro-level-study-water-pollution-kohima/>

(d) Municipal Solid Waste management

In Kohima, the responsibility of the waste management lies with the Kohima Municipal Council (KMC). KMC is still in its nascent & transitional stage and is yet to be a full-fledged Municipality (powers & functions). The Nagaland Municipal Act 2001 was enacted, and notified on the 18 of October, 2001. However, concerned line departments are yet to comply in transferring its powers and functions to the ULBs. Kohima City comprises of 19 wards, which generates about 60- 70 metric tons of Solid Waste per day (Data of 2016).

The daily generation of wastes are generated mainly from the major sources, such as residential (57%), commercial (19%), and institutional (15.50%), industrial (3%), biomedical wastes (0.50%) and construction and demolition (5%). The composition of MSW varies from place to place, on the basis of factors such as population, source, average income, social behaviour, industrial production and market for waste materials.

Source: <http://www.bioline.org.br/pdf?se10020>, <http://kmc.nagaland.gov.in/>

➤ *Virendra Jakhar*

IV. Environmental News

1. India's National REDD+ Strategy released

Complying with the UNFCCC decisions on “Reducing Emissions from Deforestation and forest Degradation (REDD+)”, India has released its National REDD+ Strategy in August 2018. In accordance with the requirements of UNFCCC, to be eligible to get result based financial incentives for REDD+, Government of India has prepared its National REDD+ Strategy. The Strategy builds upon existing national circumstances which have been updated in line with India's National Action Plan on Climate Change, Green India Mission and India's Nationally Determined Contribution (NDC) to UNFCCC.

Developing country Parties, in accordance with their respective capabilities and national circumstances are encouraged to contribute to mitigation actions in the forest sector by undertaking the following activities, as deemed appropriate by each Party:

- I. Reducing emissions from deforestation;
- II. Reducing emissions from forest degradation;
- III. Conservation of forest carbon stocks;
- IV. Sustainable management of forest; and
- V. Enhancement of forest carbon stocks

In accordance with the COP decision the national REDD+ strategy or action plans, should address, inter alia, the drivers of deforestation and forest degradation, land tenure issues, forest governance issues, gender considerations and the safeguards identified, ensuring the full and effective participation of relevant stakeholders, inter alia indigenous peoples and local communities.

Source:

<http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1544484>

2. Compensatory Afforestation Rules notified

The Government of India has notified the rules for utilisation of the money by states and Union Territories, and for setting up authorities to monitor its use for afforestation and conservation. The rules have been framed two years after a law to this effect was enacted. This has resulted in unlocking a fund of more than Rs 66,000 crore to increase the country's green cover which is accumulated amount of money which user agencies have been depositing as compensation for diverting forest land for non-forest purposes, including industries and infrastructure, over the last 10 years.

The rules, notified on 10 August 2018, specify that 80% of the compensatory afforestation amount will be utilised by states for plantations, assisted natural regeneration of forests, forest fire prevention, pest and disease control in forest, soil and moisture conservation works and improvement of wildlife habitat, among

others, in the list of 13 permissible activities. The remaining 20% will be used for 11 listed works to strengthen forest and wildlife protection related infrastructure.

Source: <https://timesofindia.indiatimes.com/india/2-years-after-enacting-law-centre-unlocks-rs-66000-crore-green-fund/articleshow/65380016.cms>

3. "PARIVESH" – an environmental single window hub for Environment, Forest, Wildlife and CRZ clearances launched

The Prime Minister of India launched **PARIVESH** (Pro-Active and Responsive facilitation by Interactive, Virtuous and Environmental Single-window Hub) on the occasion of World Biofuel Day on 10 August 2018. PARIVESH is a Single-Window Integrated Environmental Management System, developed in pursuance of the spirit of 'Digital India'.

PARIVESH automates the entire process of submitting the application and tracking the status of such proposals at each stage of processing. The main highlights of PARIVESH include - single registration and single sign-in for all types of clearances (i.e. Environment, Forest, Wildlife and CRZ), unique-ID for all types of clearances required for a particular project and a single Window interface for the proponent to submit applications for getting all types of clearances (i.e. Environment, Forests, Wildlife and CRZ clearances).

Source:

<http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1542607>

4. Khangchendzonga Biosphere Reserve Becomes 11th Biosphere Reserve from India to be Included in the World Network of Biosphere Reserves

The Khangchendzonga Biosphere Reserve has become the 11th Biosphere Reserve from India that has been included in the UNESCO designated World Network of Biosphere Reserves (WNBR). The decision to include Khangchendzonga Biosphere Reserve in WNBR was taken at the 30th Session of International Coordinating Council (ICC) of Man and Biosphere (MAB) Programme of

UNESCO held at Palembang, Indonesia, from July 23-27, 2018. India has 18 Biosphere Reserves and with the inclusion of Khangchendzonga, the number of internationally designated WNBs has become 11, with 7 Biosphere Reserves being domestic Biosphere Reserves.

Khangchendzonga Biosphere Reserve in Sikkim is one of the highest ecosystems in the world, reaching elevations of 1, 220 metres above sea-level. It includes a range of ecoregions, varying from sub-tropic to Arctic, as well as natural forests in different biomes that support an immensely rich diversity of forest types and habitats.

Source: <http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1542150>

5. Swachh Survekshan Grameen 2018 launched

The Ministry of Drinking Water and Sanitation launches the Swachh Survekshan Grameen 2018 (SSG 2018) in the capital on 13 July 2018. An independent survey agency will conduct the survey in all districts in August 2018, and the results will be announced in the form of a ranking of all districts and states on the basis of quantitative and qualitative sanitation (Swachhata) parameters. The top performing states and districts are expected to be awarded on 2nd October 2018.

As part of Swachh Survekshan Grameen 6980 villages in 698 districts across India were to be covered. 34,000 public places namely schools, anganwadis, public health centres, haat / bazaars / religious places in these 6980 villages were to be visited for survey. Citizens' feedback was also to be collected from over 50 lakh citizens on SBM related issues through direct interaction as well as online feedback.

Source: <http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1538610>

6. WHO lauds India's Commitment to Accelerated Sanitation Coverage

WHO lauds India's commitment to accelerated coverage of safe sanitation services which,

assuming 100% coverage is achieved by October 2019, could avert up to 300 000 deaths due to diarrheal disease and protein-energy malnutrition (PEM) since the country launched the Swachh Bharat Mission in 2014.

As the initial results of a WHO modelling study on the health impact of the Swachh Bharat Mission-Gramin (SBM-G) outline, India's accelerated coverage of safe sanitation services, and its determination to end open defecation, will have a substantial effect on the burden of diarrheal disease and PEM by reducing mortality and accumulative Disability Adjusted Life Years (DALYs) – the sum of the years of life lost due to premature mortality and years lost due to disability or ill-health.

Source: <http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1541600>

7. Cabinet approves Umbrella scheme "Ocean Services, Technology, Observations, Resources Modelling and Science (O-SMART)"

The Cabinet Committee on Economic Affairs gave its approval for the umbrella scheme "Ocean Services, Technology, Observations, Resources Modelling and Science (O-SMART)", for implementation during the period from 2017-18 to 2019-20 at an overall cost of Rs.1623 crore. The scheme encompasses a total of 16 sub-projects addressing ocean development activities such as Services, Technology, Resources, Observations and Science.

The services rendered under the O-SMART will provide economic benefits to a number of user communities in the coastal and ocean sectors, namely, fisheries, offshore industry, coastal states, Defence, Shipping, Ports etc. Currently, five lakhs fishermen community are receiving this information daily through mobile which includes allocation of fish potential and local weather conditions in the coastal waters. This will help in reducing the search time for fishermen resulting savings in the fuel cost.

Implementation of O-SMART will help in addressing issues relating to Sustainable Development Goal-14, which aims to conserve

use of oceans, marine resources for sustainable development.

Source: <http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1544216>

8. India's only lab for conservation of endangered species established

The Laboratory for the Conservation of Endangered Species (LaCONES), a dedicated facility of CSIR's Centre for Cellular and Molecular Biology (CCMB) in Hyderabad was inaugurated in August 2018. It uses modern biotechnologies for conservation of endangered wildlife.

CCMB-LaCONES is the only laboratory in India that has developed methods for collection and cryopreservation of semen and oocytes from wildlife and successfully reproducing endangered blackbuck, spotted deer and Nicobar pigeons. Through this work, it has established Genetic Resource Bank for Indian wildlife. So far, genetic resources from 23 species of Indian wild animals have been collected and preserved. This facility would increase the collection of genetic resources from wildlife through collaboration with zoos in India.

Source: <http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1542834>

9. NMCG Organises "Ganga Vriksharopan Abhiyan

National Mission for Clean Ganga (NMCG) is running "Ganga Vriksharopan Abhiyan" (Plantation Drive) in five main stem Ganga basin states – Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal. The drive, launched on 9 July 2018, was observed as 'Shubharambh Saptah'. State Forest Departments of these states have been made the nodal agencies for the smooth and effective execution of the campaign. There was participation from Nehru Yuva Kendra Sangathan (NYKS), Ganga Vichar Manch (GVM), NGOs and educational institutions. The campaign, which has been initiated as part of the Forest Interventions in Ganga (FIG) component of Namami Gange Programme aims to bring greater awareness among people and

other stakeholders regarding the importance of afforestation for the task of Ganga Rejuvenation.

Source: <http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1539232>

10. NITI Aayog and United Nations in India sign Sustainable Development Framework for 2018-2022

NITI Aayog and United Nations in India signed the Sustainable Development Framework for 2018-2022 at a function in the capital on 28 September 2018. The agreement is a reflection of the commitment and efforts made by India towards attaining the Sustainable Development Goals. The *Government of India-United Nations Sustainable Development Framework (UNSDF)* for 2018-2022 was signed by the CEO, NITI Aayog, Amitabh Kant and United Nations Resident Coordinator in India Yuri Afanasiev, at a special signing ceremony presided over by Vice Chairperson, NITI Aayog, Dr. Rajiv Kumar. Members of NITI Aayog and Heads of UN agencies in India were present on this occasion.

The UNSDF outlines the development cooperation strategy between the Government of India and the United Nations Country Team in India, in support of the achievement of India's key national development priorities and the Sustainable Development Goals (SDGs).

The UNSDF is underpinned by the overarching principle of the SDGs to leave no one behind, echoing the Government of India's message of *Sabka Saath Sabka Vikas* (development for all). The programmatic work outlined in the UNSDF targets the seven low-income states (Bihar, Chhattisgarh, Jharkhand, MP, Odisha, Rajasthan, UP), the North-East region, and the aspirational districts identified earlier this year by the NITI Aayog. Work will focus on improving the lives of the most marginalized, poor, and vulnerable communities and people in the country, especially women and girls.

Source: <http://www.pib.nic.in/PressReleaseDetail.aspx?PRID=1547813>

11. Delhi pollution: Fine dust killed 15,000 prematurely in 2016, says study

Close to 15,000 people died prematurely in Delhi in 2016 from illnesses linked to fine particulate matter pollution, according to a new study by researchers from India, Singapore and Thailand that assessed pollution-related deaths in 13 megacities in south Asia and China. Heart disease, stroke, lung diseases, lung cancer among adults and upper respiratory tract illnesses in children are all related to particulate pollution exposure.

The study, accepted for publication in Elsevier's Process Safety and Environmental Protection journal, found that most deaths related to PM 2.5 (particulate matter 2.5 microns or less in diameter), were reported from Beijing (18,200), Shanghai (17,600) and Delhi.

Mumbai, which was one of five megacities considered from India, reported the fourth highest number of deaths. This is the first time the disease burden associated with PM 2.5 has been calculated for Chennai and Bangalore, according to the authors.

In both Chennai and Bengaluru, almost 5,000 people died from PM 2.5 linked causes in 2016. Various reports have highlighted that air pollution is a problem across the country, and a growing monitoring network has only uncovered the extent of the problem.

Source:<https://www.hindustantimes.com/india-news/inhaling-fine-dust-in-delhi-air-killed-15-000-prematurely-in-2016-says-study/story-eDmXT0dCskwNnZFcKrfhxJ.html>

➤ **Gaurav Prajapat**

V. Ministerial declaration of the high-level segment of the 2018 session of the Economic and Social Council on the annual theme "From global to local: supporting sustainable and resilient societies in urban and rural communities"

More than 125 Heads and Deputy Heads of State and Government, Ministers, Vice-Ministers and other Ministerial level officials,

and over two thousand representatives from governments, UN system and other organizations, civil society, NGOs and the private sector participated in the annual 2018 High-level Political Forum (HLPF) on 9-18 July to take stock of progress on the Sustainable Development Goals (SDGs). They discussed progress, successes, challenges and lessons learned on the road to a fairer, more peaceful and prosperous world and a healthy planet by 2030.

More than 100 ministers, joined by mayors, business and civil society leaders and international organizations, are engaged in dialogue at the High-level Political Forum for Sustainable Development (HLPF) to consider how barriers to sustainable development can be overcome. Speaking at the opening of the three-day Ministerial Segment of HLPF today, UN Deputy Secretary-General commended countries for the progress they have made and called for both public and private sectors to do much more to deliver for people and planet.

"The HLPF has really lived up to its expectations. The Forum has gathered governments and actors from all walks of life with the "one heart" that guided the vision of the 2030 Agenda," said Liu Zhenmin, UN Under-Secretary-General of Economic and Social Affairs who also joined the opening. "The Forum has proved itself to be a vibrant place of convergence where commonalities and interlinkages are highlighted, policy coherence is underlined and the poorest and most vulnerable are on the top of the agenda."

This year's forum, under the theme "Transformation towards sustainable and resilient societies," concluded with the adoption of a Ministerial Declaration. Forty-six countries submitted their Voluntary National Reviews (VNRs) – a platform for sharing their experiences, including successes, challenges and lessons learnt, in implementing the sustainable development agenda. Since the adoption of the SDGs, more than 120 countries have submitted their VNRs.

The Forum also reviewed in depth six out of the 17 SDGs: Water and sanitation for all (SDG 6);

sustainable and modern energy for all (SDG 7); cities and human settlements (SDG 11); sustainable consumption and production patterns (SDG 12); sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss (SDG 15); and global partnership for sustainable development (SDG 17).

Progress and challenges on the road to 2030

Although the UN Secretary-General's recent report on SDG progress found that a fast changing climate, conflict, inequality, chronic poverty and hunger, and rapid urbanization are challenging countries' efforts to achieve the goals, more people are leading better lives today than they were just a decade ago and the under-five mortality rate dropped by almost 50 per cent in least developed countries.

"One of my takeaways from this week is that, at the national and local level, the most inspiring change is taking place," said Marie Chatardová, President of ECOSOC. "We were reminded that transformation toward sustainable and resilient societies is truly powered by citizens and their local authorities. "They can sometimes implement changes in policy and legislation more quickly and effectively than their national level counterparts," she added. "But change is not easy. And nothing can replace the impact of national policies and action."

Largest gathering on SDG progress

In addition to the ministers, more than 2000 non-state actors attended the Forum. Moreover, there have been some 600 applications for side events, showing immense support for the need to show and accelerate progress on the SDGs.

More than 100 mayors gathered at the first-ever Local and Regional Governments' Forum at the United Nations to discuss the importance of localizing the 2030 Agenda. On 17 July, the third SDG Business Forum brought together leaders from businesses, governments, UN agencies, key international organizations, and civil society to discuss the private sector's role in delivering the 2030 Agenda.

In one of the side events, the SDG Media Zone, organized by the UN Department of Public Information and its partners, UN Foundation and Public Foundation, featured two-days of live-streamed conversations with top-level executives, representatives from the non-governmental and public sectors, and young advocates rallying for positive change in the political and economic lives of countries everywhere.

Support for the bold 2030 Sustainable Development agenda remains very strong, but resource mobilization and policy development still need to be significantly scaled up to achieve the Sustainable Development Goals (SDGs), leaders told a major UN forum to promote sustainable development.

➤ **Manoj Kumar**

VI. Case Law - Supreme Court's stay on construction in some states and NGT on policy for Solid Waste Management

Municipal Solid Waste (MSW) remains one of the most serious challenges for environment protection. Deficiencies in proper management of solid waste have resulted in outbreak of serious diseases in the past and have such potential in future. The issue has been highlighted and considered at all concerned levels and has also been subject matter of decisions of Courts.

Mrs. Almitra H. Patel and another had filed a Public Interest Litigation (Writ Petition (C) No. 888 of 1996) under Article 32 of the Constitution of India before the Supreme Court of India at New Delhi. In this petition, the petitioner / applicant sought orders and directions for urgently taking steps to improve the practices presently adopted for collection, storage, transportation, disposal, treatment and recycling of Municipal Solid Waste (for short, "MSW").

The National Green Tribunal, in its order dated 22.12.2016 in the same issue on its transfer to it from Supreme Court, issued directions for implementation of the Solid Waste

Management (MSW) Rules, 2016. Direction was issued for the action plan to be prepared in terms of the Rules, 2016 within four weeks. Action under Rule 6(b) and 15 of the MSW Rules, 2016 was directed to be taken by January, 2017 which was to be complied by 01.07.2017. It was directed that failure would result in action under Section 15 of the Environment (Protection) Act, 1986 i.e. prosecution of the concerned authority. Directions were also issued for creating buffer zone around the plants and landfill sites.

The NGT has subsequently in O.A. No. **606/2018 about Compliance of Municipal Solid Waste Management Rules, 2016** stated that the revised Rules have been framed in the year 2016 but implementation remains a problem.

In another incident in the year 2015, a seven year old child named Avinash died of dengue after his parents spent hours trying to get him admitted to many hospitals in the city. Hours after they cremated him, Avinash's parents jumped to death from the terrace of a four-storey building in South Delhi. A Suo Moto action was taken by the Supreme Court on this case (SMW (C) No(s) 1/ 2015[In Re: Outrage as Parents End Life After Child's Dengue]) indicating the death due to dengue likely caused by an increase in vector-borne diseases because of the abysmal handling of solid waste in the country.

The Apex court gave the state governments repeated orders and many months to comply with its orders to frame state Solid Waste Management policies as required by the Solid Waste Management Rules, 2016.

During its hearing in November 2017, the court said that, various vector borne diseases are widespread in different parts of the country apparently due to an absence of solid waste management. Therefore, it appears that the crucial issue is really the management of solid waste.

Accordingly, the court limited the petition only to the issue of management of solid waste. As per court, the learned amicus curiae has brought to notice the SWM Rules, 2016 which are

enforceable with effect from 8 April, 2016. Rule 5 of the aforesaid Rules places the responsibility of overall monitoring and implementation of these Rules in the country on the Ministry of Environment, Forest and Climate Change. Rule 5 also provides for the constitution of a Central Monitoring Committee under the Chairmanship of the Secretary of the said Ministry comprising officers not below the rank of the Joint Secretary or Advisor from several Ministries and bodies. The Central Monitoring Committee is expected to meet at least once in a year to monitor and review the implementation of these Rules and to co-opt other experts. Since the Rules came into force with effect from 8 April, 2016, presumably, at least one meeting of the Central Monitoring Committee has been held.

Rules 6 to 10 indicate the duties of several Ministries of the Government of India and Rule 14 relates to the duties of the Central Pollution Control Board.

During the hearing of apex court on July 10, some States did not attend court. Hence, the Bench imposed ₹1 lakh each on the defaulting States and UTs whose lawyers were present in court. These included Bihar, Chhattisgarh, Goa, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Meghalaya, Punjab, West Bengal, etc. For the States / Union Territories, who were either not present or not represented by lawyers, the burden of costs went up to Rs. 2 lakh. The court stated that "The tragedy is that more than two-third of the States / Union Territories in the country have neither bothered to comply with the orders passed by the Court nor bothered to comply with the directions given by the Ministry of Environment and Forests, Government of India," the Supreme Court had observed then, calling it a "shocking state of affairs".

Thereafter, in its order dated August 31, 2018, the court imposed costs ranging from Rs 3 to 5 lakh on the defaulting states and imposed a blanket ban on construction in the states of Maharashtra, Madhya Pradesh, Uttarakhand and on the Union Territory of Chandigarh. Upon hearing the counsel on 31 August 2018,

the Court has termed it unfortunate that some States and Union Territories have not yet framed any Policy under the Solid Waste Management Rules, 2016. In case the States have the interest of the people in mind and cleanliness and sanitation, they should frame a Policy in terms of the Solid Waste Management Rules so that the States remain clean. The attitude of the States/Union Territories in not yet framing a Policy even after two years is pathetic, to say the least. Further constructions in the States/Union Territories are stayed until the Policy is framed. “

Justice Lokur also condemned the attitude of the authorities at one point, saying “if they want the people to live in dirt, filth and garbage, what can be done then.” The court ordered that further construction activities be stopped in some States and Union Territories that remained unmindful of the interests of their people to live in a clean environment. The next hearing was scheduled on October 9, 2018.

The NGT under **O.A. No. 606/2018** has **observed that as per** the MSW Rules, 2016, a report is compiled every year. In the recent annual report prepared in April, 2018, serious deficiencies have been found in the reports of most of the States, in spite of the Rules being in operation for the last two years. The NGT has passed orders on for further assistance to the implementation of its earlier orders. In this order NGT adds that coercive measures like prosecution and fixing accountability of the authorities for their failure is a different issue, but there should be interaction with the stakeholders to evolve a mechanism for execution of orders already passed by NGT particularly the order dated 22.12.2016.

Though, the Rules, 2016 provide for review and monitoring mechanism as well as time lines and accountability of the different authorities, the same has not been worked satisfactorily in most of the places. The NGT has also directed compliance of the SWM Rules, 2016 but on ground level the problem continues. NGT has taken a view that without in any manner disturbing the statutory mechanism, it is necessary to lay down a Tribunal monitored mechanism in exercise of its authority to

execute the orders of the Tribunal. The NGT has proposed to direct constitution of an Apex Monitoring Committee (AMC), Regional Monitoring Committees (RMCs) and State Level Committees (SLCs) to oversee the steps to be taken to give effect to the directions of this Tribunal so that if necessary, further action can be taken in the matter.

Apex monitoring committee -The role of the Apex Monitoring Committee will be to interact with the concerned Ministries and the RMCs. The AMC may formulate guidelines / directions which may be useful to the Regional Monitoring Committees and the States / Union Territories. The AMC may meet preferably every month to take stock of the situation. Outstation members / invitees may participate by video conferencing unless their presence is considered necessary. The AMC may have meeting with all the RMCs at least once in a month for two days to take stock of the progress and fix new targets. The report may be given to the Tribunal by e-mail once in a quarter. The AMC may have its website for dissemination of such information as may be necessary and also to enable public participation. The Committee may function for a period of one year subject to any further order.

The Regional Monitoring Committee-

It shall ensure effective implementation of the SWM Rules, 2016. The RMCs shall also ensure that mixing of bio-medical waste with municipal solid waste does not take place and bio-medical waste and processed in accordance with The Bio-Medical Waste Management Rules, 2016. The RMCs may meet preferably once in every week or longer intervals as per requirements. Out station members may participate by video conferencing unless physical presence is required. They may interact with AMC at suitable intervals. The RMCs may also have inter se interaction as and when necessary. The RMCs may have interactions with the concerned States at regular intervals. The RMCs may also consider having their website for the same purpose with the same objective as the AMC. The RMCs if feel appropriate can solicit the service of the Special Invitees of the AMC and others whom

they think can contribute to the cause of monitoring of the Rules, 2016. The RMCs may specially consider compliance of the mandate of the SWM Rules, 2016 at or around railway platform, railway tracks, bus stands or other places frequented by public. The Ministry of Railway may appoint Nodal Officers at Central, Zonal or other levels having specific responsibility of compliance of the Rules, 2016. The RMCs may interact with such officers at appropriate intervals. The report may be given to the AMC twice in a quarter.

State Level committee -The SLCs headed by Secretary of the Urban Development Department with Secretary of the Environment Department as Member. The representatives from the Central Pollution Control Board and State Pollution Control Boards would assist the SLCs. The SLCs may have interactions with the Local Bodies preferably once in two weeks. The Local Bodies may furnish report to the State Committees twice a month. The State Committees will take a call on technical and policy issues in accordance with the SWM Rules, 2016 consistent with directions of Apex and Regional Monitoring Committees. The Local Bodies may be required to have suitable nodal officers of particular level having regard to the nature of work. For bigger Local Bodies, committees headed by senior officials may be constituted. Public involvement may be encouraged and status of Municipal Solid Waste be put in public domain. The SLCs may also function for a period of one year subject to any further order. The report may be given to the RMCs on monthly basis.

The Tribunal is also of the view that the best practices may be compiled including setting up of Control Rooms where citizens can upload photos of garbage which may be looked into by an accountable person specified by the Local Bodies at the Local Level and by State Bodies at the State Level. All garbage collection van may be GPS enabled to monitor its regular collection and performance audit may be considered and guidelines laid down. The NGT referred to the MoHUA suggestion on need for Performance Audit wherein Central Public Health and Environmental Engineering

organization (CPHEEO), technical wing of MoHUA, can extend technical support in performance audit. CPHEEO can also be a member of the core technical committee constituted by NGT for supervising such performance audits. MoHUA has stated that initially performance audit be conducted for 500 ULBs with population of 1 lakh and above. The fees / expenses for such audit may be raised by ULBs through various means including levying a surcharge / cess over property tax. The parameters for this audit could be as mentioned below:

	Key Parameters/ Indicators	Description of Parameters/Indicators for physical evaluation
1	Door to Door Collection	Door to door collection of segregated solid waste from all households including slums and informal settlements, commercial, institutional and other non residential premises.
2	Source Segregation	Transportation in covered vehicles to processing or disposal facilities Segregation of waste by households into Biodegradable, non-biodegradable, domestic hazardous.
3	Litter Bins & Waste Storage Bins	<ul style="list-style-type: none"> Installation of Twin-bin/ segregated litter bins in commercial & public areas at every 50-100 meters. Installation of Waste storage bins in strategic locations across the city, as per requirement (Unless Binless) Elimination of Garbage Vulnerable Points .
4	Transfer Stations	Installation of Transfer Stations instead of secondary storage bins in cities with population above 5 lakhs.
5	Separate transportation	<ul style="list-style-type: none"> Compartmentalization of vehicles for the collection of different fractions of waste. Use of GPS in collection and transportation vehicles to be made mandatory at least in cities with population above 5 lakh along with
6	Public Sweeping	All public and commercial areas to have twice daily sweeping, including night sweeping and residential areas to have daily sweeping.
7	<ul style="list-style-type: none"> Waste Processing Wet Waste Dry Waste MRF Facility 	<ul style="list-style-type: none"> Separate space for segregation, storage, decentralised processing of solid waste to be demarcated Establishing systems for home/decentralised and centralised composting

		<ul style="list-style-type: none"> Setting up of MRF Facilities.
8	Scientific Landfill	<ul style="list-style-type: none"> Setting up common or regional sanitary landfills by all local bodies for the disposal of permitted waste under the rules Systems for the treatment of legacy waste to be established.
9	C&D Waste	Ensure separate storage, collection and transportation of construction and demolition wastes.
10	Plastic Waste	Implementation of ban on plastics below <50 microns thickness and single use plastics.
11	Bulk Waste Generators (BWGs)	To set up Bulk waste generators decentralized waste generating facilities as per the SWM rules 2016.
12	RDF	Mandatory arrangements have to be made by cement plants to collect and use RDF, from the RDF plants, located within 200 kms.
13	Preventing solid waste from entering into water bodies	Installation of suitable mechanisms such as screen mesh, grill, nets, etc. in water bodies such as nallahs, drains, to arrest solid waste from entering into water bodies.
14	User Fees	Waste Generators paying user fee for solid waste management, as specified in the bye-laws of the local bodies.
15	Penalty provision	Prescribe criteria for levying of spot fine for persons who litters or fails to comply with the provisions of these rules and delegate powers to officers or local bodies to levy spot fines as per the byelaws framed.
16	Notification of Bye Laws	Frame bye-laws incorporating the provisions of MSW Rules, 2016 and ensuring timely implementation.
17	Citizen Grievance Redressal	Resolution of complaints on Swachhata App within SLA.
18	Monitoring mechanism	States/ULBs to update month wise targets/action plans on the online MIS.

Conclusion: The issue of solid waste management in urban areas is becoming more and more complex. The above judgements of the highest level judicial organisations indicates the situation wherein it is clear that the governments at all levels have not been able to deliver to the expectations of the stakeholders. Despite the presence of law, government authorities who are expected to comply with the law and deliver public services, NGT is required to create its own parallel mechanism for monitoring the implementation of rules. The Supreme Court also had to take a stringent initiative like banning the constructions in few states. There have been various audit reports of CAG of

India on this issue. May be the time has come when an all India Performance Audit on this issue is required so as to bring the facts for consideration of various stakeholders.

➤ **Manoj Kumar**

VII. E-Waste (Management) Rules, 2016 - A Critical Analysis

Introduction

Scientific and technological advancements and mismanagement of natural resources have given rise to numerous environmental problems. One of these problems is 'E-waste' which means waste electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as reject from their manufacturing, refurbishment and repair processes.

E-Waste (Management) Rules, 2016

There are various laws which directly or indirectly deal with hazardous wastes and toxic substances. One of them is the Environmental (Protection) Act, 1986 which comprehensively deals with environmental problems. Section 6 expressly empowered the Central Government to make rules on various items including 1) the procedures and safeguards for the handling of hazardous substances and 2) the prohibition and restriction on the handling of hazardous substances in different areas. Looking to growing problems of e-waste, the Central Government in the exercise of the powers provided under Sections 6, 8 and 25 of the Environment (Protection) Act, 1986 has notified these rules. E-Waste (Management) Rules, 2016 supersede the E-Waste (Management and Handling) Rules, 2011. The 24 rules divided in Six Chapters aim to enable the recovery and / or reuse of useful material from e-waste, thereby reducing the hazardous wastes destined for disposal and to ensure the environmentally sound management of all types of waste of electrical and electronic equipment. These rules have come into force from 1 October, 2016.

E-Waste (Management) Rules, 2016 has been further amended vide notification dated March

22, 2018. The amendment in rules has been done with the objective of channelizing the E-waste generated in the country towards authorized dismantlers and recyclers in order to formalize the e-waste recycling sector. The collection targets under the provision of Extended Producer Responsibility (EPR) in the Rules have been revised and targets have been introduced for new producers who have started their sales operations recently. Further, E-Waste collection targets have also been revised and were made applicable from 1 October 2017 which has now been set to 10 per cent in 2017-18 to 70 per cent in 2023 onwards of the quantity of waste generation as indicated in EPR Plan.

These rules shall apply to every Producer, Consumer and Bulk Consumer, Manufacturer, collection centers, dealers, e-retailer, refurbisher, dismantler and recycler involved in the manufacture, sale, purchase and processing of electrical and electronic equipment, including their components, consumables, parts and spares which make the product operational but shall not apply to used acid batteries, micro enterprises and radioactive waste.

Responsibilities of Manufacturer, Producer, Collection Centers, Dealers, Refurbisher, Consumer/Bulk Consumer, Dismantler and Recycler:

The Rules define various responsibilities of manufacturer, producer, collection centers, dealers, refurbisher, consumer / bulk consumer, dismantler and recycler in relation to e-waste management as under:

a) Responsibilities of Manufacturer:

- The manufacturer shall be responsible to collect e-waste generated during the manufacture of any electrical and electronic equipment and channelise it for recycling or disposal;
- The manufacturer shall ensure that no damage is caused to the environment during storage and transportation of e-waste and also file annual returns to the concerned State Pollution Control

Board (SPCB) on or before the 30th day of June.

b) Responsibilities of Producer:

- The producer shall be responsible for the collection of e-waste generated from the 'end of life' of their products and channelizing it for recycling or disposal. And to ensure that such e-waste are channelized to registered dismantler or recycler.
- The import of electrical and electronic equipment shall be allowed only to producers having Extended Producer Responsibility-Authorization and also filing annual returns to the Central Pollution Control Board (CPCB) on or before 30th June of following financial year.
- The producer shall also be responsible for providing contact details such as address, telephone numbers / helpline numbers to consumer(s) or bulk consumer(s) so as to facilitate return of used electrical and electronic equipment.
- Further, the producer shall be responsible to create awareness among consumers or bulk consumers with regard to hazardous constituents, hazards of improper handling and improper recycling of e-waste and instructions for handling the equipment after its use along with do's and don'ts.

c) Responsibilities of Collection Centers:

- The collection centres are responsible to collect e-waste on behalf of producer or dismantler or recycler or refurbisher.
- The collection centre shall also ensure that e-waste collected by them is stored in a secured manner and no damage is caused to the environment during storage and transportation.
- The collection centre shall file annual return to SPCB on or before the 30th day

of June and also maintain the records of the e-waste.

d) Responsibilities of dealers:

- The dealer shall collect the e-waste by providing the consumer a box, bin or a demarcated area to deposit e-waste, or through take back system and send the e-waste so collected to collection centre or dismantler or recycler. The dealer or e-retailer shall refund the amount as per take back system to the depositor of e-waste;
- Every dealer shall ensure that the e-waste thus generated is safely transported to authorised dismantlers or recyclers and no damage is caused to the environment during storage and transportation of e-waste.

e) Responsibilities of the refurbisher:

- Refurbisher is responsible to collect e-waste generated during the process of refurbishing and channelise the e-waste to authorised dismantler or recycler through its collection centre.
- The refurbisher shall ensure that no damage is caused to the environment during storage and transportation of e-waste, processing does not have any adverse effect on the health and the environment and also ensure that the e-waste thus generated is safely transported to authorized collection centres or dismantlers or recyclers.
- The refurbisher shall also file annual returns to the concerned SPCB, on or before the 30th June following the financial year.

f) Responsibilities of Consumer or Bulk Consumer:

- Consumers or bulk consumers shall ensure that e-waste generated by them is channelized to authorized collection centre or registered dismantler(s) or recycler(s) or returned to the pick up or

take back services provided by the producers and also shall maintain the records of e-waste generated by the bulk consumer.

g) Responsibilities of Dismantler:

- Every dismantler shall obtain authorization and registration from the SPCB.
- Also the dismantler shall ensure that no damage is caused to the environment during storage and transportation of e-waste, no adverse effect on health and environment.
- Also the dismantling processes shall be in accordance with the guidelines published by the Centre Pollution Control Board from time to time.
- The dismantler shall also ensure that non-recyclable or non-recoverable components are sent to authorized treatment storage and disposal facilities.

h) Responsibilities of Recyclers:

- Every recycler shall ensure that the facility and recycling process shall be in accordance with the guidelines of the CPCB from time to time and residue is disposed of in a hazardous waste treatment storage disposal facility.

Procedure for Seeking and Grant of Authorization for Management of E-Waste:

Procedure for seeking and grant of authorization for management of e-waste contains under Rules 13 and 14 of the E-Waste (Management) Rules, 2016.

Every producer, manufacturer, refurbisher, dismantler and recycler of e-waste shall obtain an Extended Producer Responsibility – Authorization of Procedures as the case may be from CPCB or the SPCB as the case may be. For getting EPR Authorization they shall make an application within a period of 90 days or 120 days as the case may be starting from the date of commencement of the rules to the SPCB or the CPCB.

The SPCB or the CPCB after making enquiry grant an authorization within a period of 120 days and such authorization shall be valid for a period of five years. An application for renewal of EPR Authorization shall be made before 120 days from the expiry of given time period (5 years). The SPCB or the CPCB may renew the authorization if there is no violation of rules.

If the holder of authorization has failed to comply with any of the conditions of authorization or the Environment (Protection) Act, 1986, the SPCB after giving reasonable opportunity to be heard in writing shall suspend or cancel the authorization for such period as it consider necessary for public interest and inform CPCB within ten days of cancellation.

Procedure for Registration with CPCB or SPCB:

Every manufacturer, refurbisher, dismantler or recycler of e-waste shall make an application for the grant or renewal of registration of consent to establish plant and collection centre; certificate of registration issued by the District Industries Centre; proof of installed capacity of plant and machinery issued by District Industries Centre. Such application shall be disposed of within a period of 120 days from the date of receipt of application.

The SPCB after satisfying that the application is complete in all respects and the applicant is utilizing environmentally sound technologies and possess adequate technical capabilities, requisite facilities and equipment to recycle and process e-waste may grant registration. Such registration shall be for a period of 5 years.

Every manufacturer, producer, bulk consumer, collection centre, dealer, refurbisher, dismantler and recycler may store the e-waste for a period of 180 days and also shall maintain a record of collection, sale, transfer, storage and segregation of wastes and make these records available for inspection. There is no time period has been fixed for inspection.

Reduction in the Use of Hazardous Substances in the Manufacture of Electrical and Electronic Equipment and their

Components or Consumables or Parts or Spares:

Every producer of electrical and electronic equipment and their components or consumables or parts or spares shall ensure that new electrical and electronic equipment and their components or consumables or parts or spares shall not contain Lead, Mercury, Cadmium, Hexavalent Chromium, Polybrominate biphenyls or Polybrominate diphenyl ethers beyond a maximum concentration value of 0.1 per cent in Information Technology and Telecommunication Equipment and Consumers electrical and electronic equipment. But the electrical and electronic equipment and their parts placed in the market before 1st May 2014, the restriction of above materials is not allowed. There is no punishment if any producers exceed the concentration fixed under rule 16.

Every producer, dealers, collection centers, refurbishes, dismantlers, recyclers, auctioneers, consumers or bulk consumers shall not import used electrical and electrical equipment in India for use without the compliance of these rules.

The concerned SPCB shall prepare and submit to the CPCB an annual report with regard to the implementation of these rules by the 30th September every year. Also the CPCB shall prepare the consolidated annual review report on management of e-waste and forward it to the Central Government along with its recommendations before the 30th December every year.

Every appeal shall be filed within a period of thirty days from the date on which the order is communicated to aggrieved person to the Appellate Authority comprising of the Environment Secretary of the State.

Conclusion

There are several new features introduced in E-Waste (Management) Rules, 2016 and amendments made in 2018. The new rules has introduced various new stakeholders. In earlier Rules (2011) Producer, Bulk Consumers, Dismantler and Recycler were major

stakeholders. Manufacturer, dealer, refurbisher and Producer Responsibility Organization (PRO) have been introduced as additional stakeholders in the rules. Increasing the ambit of stakeholders will help in coverage of complete chain of production and recycling of electronic goods.

A new feature of these Rules is 'Collection Mechanism'. Collection mechanism based approach has been adopted to include collection centre, collection point, take back system, etc. for collection of E - waste by Producers under EPR.

However, the Rules 2016 are not applicable to micro enterprises as defined in the Micro, Small and Medium Enterprises Development Act, 2006. It is an area of concern as unorganised sector accounts for a large portion of industrial pollution due to handling of waste.

While formal dismantlers and recyclers are very aware of the health and environmental problems surrounding e-waste, the informal collectors, traders, dismantlers and recyclers working with e-waste are often either unaware of the problems or do not see the necessity to act upon them. The collectors have no reason to change anything, as their business causes harm neither to the environment nor to health. The same applies to the waste traders who often do not even see the waste but rather coordinate the waste flow. The problems affect informal dismantlers and recyclers most. As a result, the severity of the environmental and health hazards depends very much on the processes applied. While the workers are often aware of the problems, they are unable to change anything. Due to the illegal nature of their business, they have no possibility to ensure that the E-waste is recycled in an environmentally and health friendly way.

The awareness among manufactures has increased over the last couple of years. Until recently the manufacturing industry was very reluctant to associate itself with the problem and acknowledge its responsibility. A study conducted by Greenpeace India in 2008 assessed which manufacturers had a take-back

policy in place and actual take-back systems in operation.

There are no guidelines given to consumer or bulk consumer for the handling of electrical and electronic equipment. Also there are lengthy procedures in case of financial penalty pay in case of violation of rules mentioned under E-Waste (Management) Rules, 2016. Effective implementation of these rules will always be challenging due to large unorganised sector handling waste, lack of manpower with PCBs, etc. Despite the registration scheme for recyclers, the menace of recycling in the unorganised sector with all its attendant environmental and health hazards will remain a challenge. The Government, however, is very optimistic about positive impacts of new Rules. The Government has claimed that it has amended the E-waste (Management) Rules in a move to facilitate and effectively implement the environmentally sound management of E-waste in India. The amendment in rules has been done with the objective of channelizing the E-waste generated in the country towards authorized dismantlers and recyclers in order to formalize the E-waste recycling sector.

➤ Pawan Meena

VII. National Audit Report -Performance audit on Role of Rajasthan State Pollution Control Board in controlling air pollution in the State

Introduction

Air pollution has become a growing concern in the past few years, with an increasing number of acute air pollution episodes in many cities worldwide. Ambient (outdoor) air pollution alone kills around three million people each year, mainly from non-communicable diseases. Air pollution continues to rise at an alarming rate, and affects economies and quality of life in all regions. Air pollution has also been identified as a global health priority in the sustainable development agenda. Sources of Air Pollution are Natural and Manmade. Natural are like Forest Fire, lightning, volcanoes etc and Manmade are like Burning of fossil

fuels, smelting of metals, Road traffic emissions from vehicles etc.

As per the World Health Organisation's (WHO) report on 'Ambient Air Pollution 2016', India has the highest number of polluted cities in the world. Out of the 100 most polluted cities in the world, India has 33, while 22 cities among the top 50 most polluted cities are in India. There are five cities of Rajasthan viz Jodhpur, Jaipur, Kota, Udaipur and Alwar, in this list of top 100 polluted cities in the world.

According to the Indian Council of Medical Research's (ICMR's) Health of the Nation's States Report 2017, Rajasthan has the dubious distinction of faring significantly higher than the national mean in terms of death rates caused due to pulmonary diseases, lower respiratory tract infections and Asthma. Similarly, Rajasthan has the highest ratio of the Disability Adjusted Life Years (DALY) rate attributable to air pollution in the country and it is the second biggest reason for loss of life in the State, after malnutrition.

Audit Objectives

A Performance Audit of 'Role of Rajasthan State Pollution Control Board in controlling air pollution in the State' was conducted with the objective to assess whether the planning, implementation and monitoring for prevention, control and abatement of air pollution were proper, adequate and effective.

Audit Criteria

The Audit criteria were derived from:

- Air (Prevention and Control of Pollution) Act, 1981 and rules framed there under;
- The Central Motor Vehicles Rules, 1989 notified under the Motor
- Vehicle Act, 1988 and Rajasthan Motor Vehicle Rules, 1990;
- Rajasthan State Environment Policy, 2010; and
- Notifications, circulars and orders issued by Government of India, State

Government, Central Pollution Control Board and RSPCB.

Audit Coverage and Methodology

A Performance Audit of role of Rajasthan State Pollution Control Board in controlling air pollution in the State was conducted covering the period from 2012-13 to 2016-17 in the office of the RSPCB at Jaipur along with Central Laboratory, six Regional Offices (ROs) out of 15 and four Regional Laboratories. Relevant records in the Departments of Environment and Forest, Transport and respective Implementing Agencies were also scrutinized. Five ROs were selected on the basis of the World Health Organisation's Report (2016) on hundred most polluted cities of the world. These were the only ROs where ambient air quality monitoring was done by RSPCB (during the period of audit). Further one Regional office, Bhiwadi was selected as it has critically polluted industrial cluster and is ranked sixth among 88 clusters in the Comprehensive Environmental Pollution Index prepared by CPCB (2009). Besides it is part of the NCR.

The audit team with the representatives of concerned Regional Offices, RSPCB jointly visited 148 industrial units and 33 air monitoring stations under the jurisdiction of six selected ROs. Besides, 120 PUC centres were also jointly visited along with the flying squad of concerned five Regional Transport Offices.

Audit Findings

a. Planning –

The five cities of Rajasthan in the list of top 100 polluted cities in the world are considered as 'non-attainment' cities by Central Pollution Control Board (CPCB). These cities have not met the National Ambient Air Quality Standards consecutively over three years' period. The source apportionment studies were not carried out in these cities to identify and quantify the sources of pollution. In absence of which RSPCB could not prepare comprehensive programmes for prevention, control or abatement of air pollution.

In case of National Capital Region (NCR) area or non-attainment cities of the State, no action plans were submitted by the concerned department / authority. Resultantly directions issued by CPCB could not be monitored by RSPCB, hence, most of the actions given in the direction could not be initiated.

b. Implementation –

- i) As of March 2017, only 32 Ambient Air Quality Monitoring Stations (AAQMS) and two Continuous Ambient Air Quality Monitoring Stations (CAAQMS) were operating in six districts while 27 districts having 4.70 Crore population and 74.50 lakh vehicles were still out of the purview of air quality monitoring. It was also seen that RSPCB and Environment Department did not have meaningful data of the sources of pollution in rural areas in absence of which planning to mitigate pollution could not be undertaken.
- ii) The annual mean value of Respirable Suspended Particulate Matter (RSPM) (PM10) ranged between 87 $\mu\text{g}/\text{m}^3$ and 295 $\mu\text{g}/\text{m}^3$ which exceeds the prescribed limit (60 $\mu\text{g}/\text{m}^3$) in all 21 AAQMSs. Periodic survey to identify the sources of air pollution and the adverse impact on ecosystem as well as human health was neither done by RSPCB nor were any action plan prepared with clear timelines to reduce the air pollution. In Jodhpur, the first measurement of PM2.5 was taken after 42 months of installation of sampler and only 19 measurements were taken up to June 2015 against 120 measurements required to be taken. In absence of proper monitoring of PM2.5, the purpose of procuring the costly equipment was defeated.
- iii) The samplers were installed at unapproved locations. The instruments for measuring air quality at monitoring stations were installed in violation of the guidelines. This has the risk of generating inaccurate and non-representative result. Information on type and number of

vehicles and meteorological data with respect to temperature, relative humidity, wind speed and its direction was neither collected by the RSPCB nor maintained at the 27 AAQMSs test checked as required under National Air Quality Monitoring Programme (NAMP) guidelines.

c. Industrial Pollution –

- i) RSPCB does not have consolidated data of category wise number of industrial units covered under consent mechanism in the State. It had neither conducted any survey nor coordinated with other departments to effectively discharge its regulatory functions to cover all industrial units under its consent mechanism. In joint inspections of 148 industrial units by audit team along with representatives of Regional Offices (ROs) of RSPCB, it was found that 15 industrial units were operating without even consent to establish.
- ii) The RSPCB did not evolve any mechanism to watch the renewal of consent to operate after expiry of the validity period of consent issued earlier. There was inordinate delay in issuing consents and consents were issued with retrospective effect in some cases. Test check of 573 cases of the selected ROs revealed that 74 industries had run without consent to operate for periods ranging from 14 to 3038 days. During joint inspection, 12 units were found operating though their CTOs had expired.
- iii) Number of detection and death cases of silicosis were continuously increasing. Detection and death cases were 304 and one respectively in 2012-13, which increased to 4931 and 449 respectively in 2016-17.
- iv) In compliance with recommendation of Rajasthan Human Rights commission, RSPCB had committed to carry out Ambient Air Quality Monitoring periodically near clusters of mines / quarries. However, the details of clusters of mines were not provided by the Director, Mines and Geology to the RSPCB. In absence of this,

the RSPCB had neither prepared any plan for frequency of inspection nor had started ambient air monitoring near mining clusters.

- v) All units of Kota Super Thermal Power station (KSTPS) and Chhabra Thermal Power Plant (CTPP) were operating without obtaining consent to operate / renewal of consent to operate which was the violation of provision of the Air Act.
- vi) In KSTPS, prescribed standards of Particulate Matter (150 mg/Nm³) and RSPM (100µg/m³) could not be achieved as Particulate Matter remained between 174 and 952mg/Nm³ and RSPM remained between 110 and 202µg/m³ for the period 2012-13 to 2016-17.
- vii) In Jaipur, 33 brick kilns had not even applied for Consent to Establish / Consent to Operate (CTE / CTO). No concrete steps were taken by RSPCB against these units. Further, three brick kilns were found operating without consent to operate regularly during inspections carried out by the respective ROs despite the fact that closure notices were issued to them about six years ago.
- viii) In seven stone crusher units in Udaipur, Suspended Particulate Matter (SPM) level had exceeded the prescribed limits (600 µg/m³) and ranged between 2286 and 4685 µg/m³. However, the Regional Officer renewed CTO without ensuring adherence to the norms as no further sample analysis report was found on record.

d. Vehicular pollution-

- i) The Transport Department failed to prepare an action plan to phase out the 15-year-old vehicles. No action was taken to ensure that the 'Pollution Under Control' Certificate centres were functioning as per prescribed norms.
- ii) The Transport Department neither conducted any survey to identify the places with heavy traffic nor was pollution load assessed in major cities of the State.
- iii) Only 22 Pollution Flying Squads (PFS) were covering 10 out of 12 regions for monitoring

of polluting vehicles. Two regions comprising six districts had no PFS. Further, Transport Department did not have data of number of vehicles which were found emitting excess pollutants during inspections by the flying squads.

- iv) During joint inspection of Pollution Under Control (PUC) centres, it was observed that Transport Department had issued licences without verifying the site and equipment of PUC centres as 20 licensees had not installed equipment but they had the requisite licenses from the Transport Department. In 10 instances, PUC certificates were issued by the operator of PUC centres without testing of vehicles. In Udaipur, one centre was generating computerised certificates on plain paper from computer while these should have been issued on stationery allotted from Rajasthan Petroleum Dealers Association.

e. Monitoring

- i) Shortfall in conducting inspection of highly polluting industrial units during 2012-17 ranged between 48 and 60 per cent. The number of stack samples drawn and analysed in selected ROs were less than the numbers of consent to operate issued during 2012-13 to 2016-17. Information provided by five ROs disclosed that 1846 stack samples were collected and analysed during 2012-17 whereas 6159 CTOs were issued during the same period by these ROs.

Conclusion:-

- RSPCB did not prepare comprehensive programmes for prevention, control or abatement of air pollution. The source apportionment studies were not carried out in the State to identify the sources of pollution along with their quantification.
- As of March 2017, 32 AAQMS and two CAAQMS were operating in six districts while 27 districts having 4.70 Crore population and 74.50 lakh vehicles were still out of the purview of air quality monitoring.

- The RSPCB and the Environment Department do not have any meaningful data of the sources of pollution in rural areas.
- RSPCB does not have consolidated data of category wise number of industrial units covered under consent mechanism in the State. The samplers were installed at locations other than approved locations and instruments for measuring air quality at AAQMS / CAAQMS were installed in violation of the guidelines.
- As per NAMP guidelines, information on type and number of vehicles, meteorological data with respect to temperature, relative humidity, wind speed and its directions should have been collected by RSPCB. However, this Information neither was collected by RSPCB nor was maintained at all 27 AAQMS test checked.
- RSPCB had neither conducted any survey nor coordinated with other departments to effectively discharge its regulatory functions to cover all industrial units under its consent mechanism.
- During joint inspections of 148 units by audit team along with representatives of Regional Offices of RSPCB, it was found that many industrial units were operating without even consent to establish.
- The RSPCB did not evolve any mechanism to watch the renewal of consent to operate after expiry of the validity period of consent issued earlier.
- The RSPCB had not taken any proactive steps to prevent silicosis amongst the workers.
- Transport Department also failed to prepare an action plan to phase out the 15 years' old vehicles. The Monitoring of PUC centres was weak and no follow up action was taken to ensure that these centres were functioning as per prescribed norms.
- The Transport Department neither conducted any study / survey to identify the places with heavy traffic nor was pollution load assessed in major cities of the State.

- Manpower management in RSPCB was poor. The vacancies were steadily increasing thus impacting the effective functioning of the Board.
- Shortfall in conducting inspection of highly polluting industrial units during 2012-17 ranged between 48 and 60 *per cent* and the number of stack samples analysed by Central Laboratory reduced by 50 *per cent* in 2016-17 when compared to the year 2012-13.

2. Recommendations :-

- *RSPCB should conduct source apportionment studies in all major cities to identify the quantum of pollution from various sources. Accordingly, comprehensive programmes for prevention, control or abatement of air pollution should be prepared and submitted to the State Government.*
- *RSPCB should coordinate with other departments like Industries, Factory and Boilers, etc. to obtain data of newly established industrial units to bring them under consent mechanism.*
- *RSPCB should enhance coverage for Ambient Air Quality Monitoring Systems in the towns and villages located near the major polluting industries.*
- *RSPCB should ensure that the samplers are installed at approved locations and the site should be suitable as per guidelines of NAMP so that representative data is generated.*
- *The State Government and RSPCB should strengthen the AAQMS by providing all necessary instruments and facilities so that type and number of vehicles, meteorological data with respect to temperature, relative humidity, wind speed and direction could be recorded.*
- *RSPCB should ensure that no industrial unit operates without obtaining consent to establish and it should evolve a mechanism to watch the validity period of consent issued. The consent to operate must be issued in time and not retrospectively so that*

compliance with environmental conditions can be enforced.

- *The Transport Department should conduct studies / surveys to assess pollution load in major cities so that measures for control and abatement of vehicular pollution could be planned. The Transport Department should make a strategic plan to phase out 15-year-old vehicles in a time bound manner. It should take measures like offering subsidies / direct cost benefits for fleet modernisation as envisaged under Environment Policy. Inspections of PUC centres must be carried out for strengthening the functioning of these centres.*
- *The RSPCB should fill up all vacant technical and scientific posts so that it is fully equipped to exercise its mandate effectively.*
- *The RSPCB should ensure that the meetings of the Board are held in time and as per required norms. The prescribed monitoring mechanism should be strictly enforced.*

Significance:

The air pollution is a grave problem in India and if not dealt in in near future the situation would still worsen. As per the latest Environmental Performance Index 2018 published by Yale University India ranks last in 180 countries on account of Environmental Health mainly due to its air quality. This audit report covers all important issues related to air pollution and also mentions about the regional air quality problem like silicosis. The methodology like joint visits, using flying squads for assisting audit teams is innovative and has helped bring out important issues. There are 50 more cities in the WHO list of most polluted cities of world and other audit offices can also have a look at the WHO assessment in addition to other risk factors regarding status of cities in various parts of India. This kind of audits would help governments to focus on the critical issue like air pollution at the earliest.

➤ *Sandeep Pawar*

IX. Accounting and Reporting of Australia's Green House Gas Emissions Estimates and projections

The Australian National Audit Office (ANAO) had undertaken an independent performance audit in the Department of the Environment and Energy titled Accounting and Reporting of Australia's Greenhouse Gas Emissions Estimates and Projections. The audit was conducted in accordance with the authority contained in the Auditor-General Act 1997 to undertake performance audits, financial statement audits and assurance reviews of Commonwealth public sector bodies and to provide independent reports and advice for the Parliament, the Australian Government and the community. Aiming to improve Commonwealth public sector administration and accountability.

Background

As a party to the United Nations Framework Convention on Climate Change (UNFCCC) and subsidiary agreements, Australia has agreed to meet targets to reduce human-induced greenhouse gas (GHG) emissions. Measuring and tracking greenhouse gas emissions and removals and projecting future emission levels assists the Australian Government to:

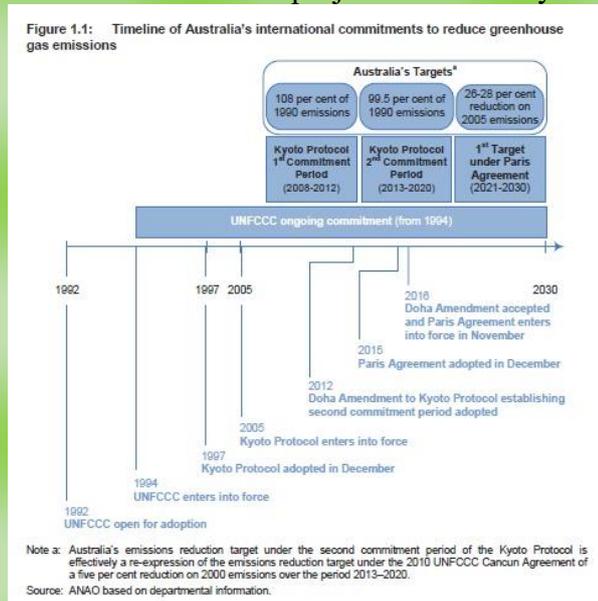
- meet its international reporting obligations;
- monitor progress towards achieving its emission reduction commitments; and
- develop and implement policies and programs to meet emissions reduction commitments.

The Department of the Environment and Energy (the department) is responsible for accounting and reporting Australia's past, and projecting future, GHG emissions.

Australia is required to submit annual estimates of its past GHG emissions—termed national or GHG inventory estimates—to the UNFCCC across five sectors: Energy; Industrial

Processes and Product Use; Agriculture; Land Use, Land Use Change and Forestry (LULUCF); and Waste. The latest National Inventory Report 2014 (revised) was submitted

to the UNFCCC in August 2016. In addition, the department recalculates or updates Australia's emissions projections annually.



Audit approach

The objective of the audit was to assess the effectiveness of the Department of the Environment and Energy's arrangements for the preparation and reporting of Australia's greenhouse gas emissions estimates and projections. To form a conclusion against this objective, the ANAO adopted the following high-level criteria:

- Were robust processes established to prepare and report emissions estimates and projections?
- Were sound arrangements in place to support the preparation and reporting of emissions estimates and projections?

In conducting the audit, the ANAO examined departmental records relating to the preparation of the estimates and projection reports including: UNFCCC and departmental guides; implementation plans and quality assurance / quality control documents; general governance documentation; and spreadsheets supporting the entry of data into AGEIS1 and projections

¹ The Australian Greenhouse Emissions Information System (AGEIS) has been designed by the department to meet the UNFCCC's requirements of national inventory systems.

calculations. The ANAO also examined key IT controls supporting the AGEIS and FullCAM2 systems, interviewed departmental staff and sought input from the public and key stakeholders.

Audit findings

A. Estimates of Australia's past greenhouse gas emissions.

1. Are inventory estimates based on relevant, authoritative source data?

The ANAO examined sub-sector line-items to verify emissions to its source data and ensure the data is captured by formulas within the AGEIS to calculate GHG emissions. Of the 5250 data points across 158 data types entered into the AGEIS for these sub-sectors, all were satisfactorily verified by the ANAO to pre-processing spreadsheets (where applicable) and source documentation except for:

- 32 data points from one data type for one Agriculture sub-sector examined where the department was unable to provide the source documentation to the ANAO; and
- 80 data points from 27 data types across all sub-sectors examined where data errors had occurred due to human error (involving data transposition / transcription, data not being updated, or incorrect values used). The department informed the ANAO that these data errors resulted in a cumulative error across the 2014 GHG emissions estimates of 0.1 per cent. In the context of over 5000 data points and inventory emissions examined, the errors are not material.

2. Extent to which Australia's inventory estimates meet UNFCCC requirements.

The UNFCCC Secretariat's technical review determined that Australia's National Inventory Report 2014 (revised) and supporting data were consistent, timely and mostly complete (64 of

² The Full Carbon Accounting Model (FullCAM) is used by the department to construct Australia's national greenhouse gas emissions account for the Land use, land use change and forestry (LULUCF) sector.

69 tables of data had been provided, with the remainder relating to some required LULUCF sector data). The Expert Review Team did not raise questions of implementation and did not require any adjustments to the contents of Australia's 2014 GHG inventory. The report of the technical review

of Australia's 2014 GHG inventory also determined the extent to which the 80 improvement recommendations from technical reviews of Australia's past GHG inventories had been resolved and made 24 additional findings and recommendations to improve Australia's future GHG inventories (of which 18 related to inventory transparency, four related to inventory comparability and two related to inventory accuracy).

3. Australian Greenhouse Emissions Information System (AGEIS) and Full Carbon Accounting Model (FullCAM).

An effective control environment within the AGEIS and FullCAM, encompassing user and administrator / IT support access, change management and data security, is important for maintaining data integrity and calculating emissions accurately and reliably. The ANAO's review of the AGEIS and FullCAM found that the department's control environment was generally effective. While IT control arrangements to support data integrity had been implemented effectively for the AGEIS, there was scope to improve.

4. Has the department responded to inventory estimates review recommendations from the UNFCCC?

Australia's implementation of previous recommendations is assessed as part of the UNFCCC Expert Review Team's technical review of Australia's annual GHG inventory. The 2015 technical review made 80 recommendations to improve future GHG inventories. Of the 80 inventory improvement recommendations, the 2016 technical review determined that Australia had resolved 61 (76.3 per cent), was addressing 12 (15.0 per cent) and had not resolved seven (8.8 per cent).

5. Has the department instituted appropriate quality assurance and control procedures over the preparation of inventory estimates?

Inventory Preparation Manuals established by the department to guide its preparation of each sector's inventories contain quality control and assurance procedures to verify the accuracy and completeness of the manual entry of source data onto templates for entry into AGEIS. However, the comprehensiveness of the procedures varies between sectors and evidence is not retained to verify that the procedures had been appropriately implemented. The effective implementation of inventory preparation quality assurance procedures would have reduced or eliminated the data errors identified by the ANAO during its examination of the source data for a selected sample of inventory sub-sector line-items. Many of the errors occurred due to human error during the department's development of the data entry templates or the pre-processing of source data for inclusion in data entry templates. In addition, all metadata references archived in the AGEIS were found to be nonspecific, out of date, inaccurate, or absent. As a result, the ANAO required extensive assistance from the department to trace the data entry template inputs to the source data. The metadata referencing weaknesses inhibit the transparency of the annual GHG inventory and create a risk to the timely and accurate preparation of future inventories through the loss of corporate memory from staff turnover.

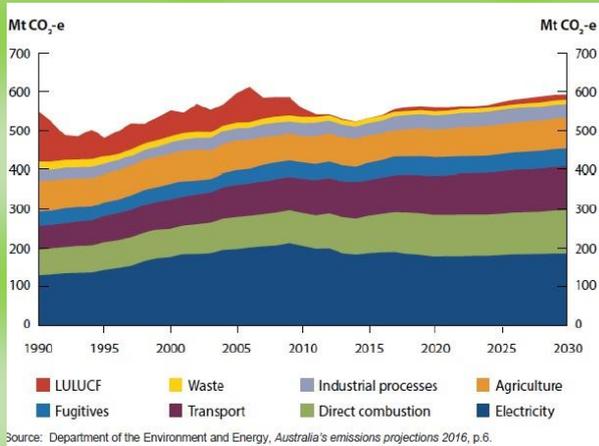
6. Has the quality of inventory estimates improved over time?

An examination of the previous year's Inventory Improvement Plan indicates that full implementation of nearly half of its 27 projects had been delayed by one or more years. The department indicated that the primary reasons for delays were a lack of resources and changing priorities. The department informed the ANAO that the implementation delays may elevate the risk of future UNFCCC technical reviews commenting adversely on the quality of future GHG inventories.

B. Projections of Australia’s future greenhouse gas emissions

1. Are emissions projections based on relevant, authoritative source data?

Domestic emissions estimates and projections, 1990 to 2030



Projection calculations are contained in multiple spreadsheets prepared for each emissions sector and / or sub-sector. The spreadsheets supporting the sampled emissions sub-sectors

Recommendation No.1
The Department of the Environment and Energy should introduce consistent quality control and assurance procedures to improve the accuracy of inventory data and referencing to source data.

examined by the ANAO contained formulas and calculations that operated as intended with the exception of seven data discrepancies and 48 formula discrepancies. These discrepancies collectively resulted

in an immaterial understatement of future emissions over the period 2015 to 2030 of 17 Mt CO₂-e (0.4 per cent of the cumulative emissions of the sub-sectors examined by the ANAO).

2. Has the department responded to emissions projection review recommendations from the UNFCCC?

The relevant Biennial Report review recommendation from the UNFCCC technical

review related to emissions projections has been addressed by the department in advance of the next Biennial Report, primarily by the inclusion of emissions projections to 2030 in the December 2016 projections report.

3. Has the department instituted appropriate quality assurance and control procedures over the preparation of emissions projections?

The department has instituted generally appropriate quality assurance and control procedures over the preparation of emissions projections for all sectors apart from the Land Use, Land Use Change and Forestry (LULUCF) sector where there is scope for improvement. Better documentation of the rationale behind the application of judgment and the quality assurance testing undertaken would enhance the transparency of the LULUCF sector projections. In addition, expanding quality assurance procedures for abatement measure projections, where calculated separately to sector projections, would provide greater assurance regarding their accuracy and robustness.

4. Has the quality of emissions projections improved over time?

The December 2016 emissions projections have improved in quality on past emissions projections in some areas, but not others.

The inclusion of sensitivity analyses has increased the robustness of the projections by forecasting quantitative

Recommendation No.2
The Department of the Environment and Energy should:
(a) to the maximum extent practicable, publish projected abatement from Australian Government greenhouse gas emission reduction measures, along with related key assumptions, in future projections documents; and
(b) expand its release of emissions projections information to include key data inputs, assumptions, formulas and methods sufficient to enable users to recalculate emissions projections within a reasonable degree of precision.

emission ranges from changes to some key projection assumptions. Nevertheless, the latest projections include less quantitative information than earlier projections about the impact that Australian Government abatement measures are projected to have on future emissions. The utility of the emissions projections would be further improved by the department publicly releasing key data inputs, assumptions, formulas and methods sufficient to allow users to recalculate emissions projections (within a reasonable degree of precision) and adapt them for their own purposes.

C. Governance of greenhouse gas emissions estimates and projections preparation and reporting

1. Have appropriate planning processes been established to guide the preparation and reporting of inventory estimates and emissions projections?

While the department updates these plans annually, it has not finalised an overarching project plan to govern the preparation and reporting of Australia's annual GHG emissions estimates. In February 2017, the department provided the ANAO with a working draft of a consolidated inventory preparation project plan. This draft plan primarily consisted of direct extracts from the existing planning documentation and the latest National Inventory Report (in relation to Australia's national inventory arrangements, inventory preparation, and data collection, processing and storage). Further, some key governance and operational information was absent, such as details regarding responsibility within the department for approving the inventory for publication and submission to the UNFCCC (currently recorded as 'Secretary's delegate') and the role of the Minister for the Environment and Energy (the Minister) during the inventory preparation and reporting process). As the inventory approving authority, the 'Secretary's delegate' should also approve the annual inventory project plan. The refinement of the current draft inventory project plan would

minimise the risk to future inventory quality and timeliness from the loss of corporate knowledge due to staff turnover.

In addition to the documentation referenced in the project plan, the department's planning framework for emissions projections is appropriately supported by emissions sector plans, instructional guidance on preparing

Recommendation No.3
The Department of the Environment and Energy should undertake fit-for-purpose risk assessments for the preparation and reporting of inventory estimates and emissions projections in accordance with the department's risk management policy and guidelines, and actively monitor its implementation of risk treatments.

projections and quality control and assurance documentation. The effectiveness of the emissions projections planning documentation could be further improved.

2. Have risks to the preparation of inventory estimates and emissions projections been identified and mitigated where necessary?

The department's risk management planning documentation for the preparation and reporting of inventory estimates is contained in the Business and Risk Management Plan 2016–17 of the National Inventory System and International Reporting branch. In this plan the department has outlined for each risk, its consequences, mitigation strategies and qualitative descriptions of the residual risk. However, the risk register does not accord with departmental risk management requirements as it:

- contains poorly defined risks by its inclusion of issues (that is, materialised risks) related to a reduction in financial and staff resources for 2016–17; and
- does not: assign risks to standardised risk categories; separate existing controls and risk treatments; identify when risk treatments will be finalised and the officer(s) responsible; and rate risks pre- and post-treatment (where

required) using the departmental likelihood and consequence matrix.

Risk registers contained in previous Business and Risk Management Plans (for 2014–15 and 2015–16, which are identical) outlined risks that had been assessed in greater consistency with departmental requirements, albeit not using the departmental risk assessment template. These risks were rated pre-treatment only, were not grouped according to departmental standard categorisations, and did not list the due dates and responsible officers for treatments. Further, the department has not retained documentation to demonstrate its active management of risks between annual assessments and of the implementation of identified risk treatments.

The risk register for the preparation and reporting of the December 2016 emissions projections identifies for each risk: risk impact; existing controls; and risk ratings pre- and post-treatment (where required). However, the risk register for projections also does not accord with departmental risk management requirements as it lacks risk sources; risk categories; and risk treatment implementation dates and the officer(s) responsible. Many of the risks listed in the 2016 risk register are listed in a similar form in the inventory sector projection plans, with treatments (some in the form of existing controls) identified for risk. As was the case for inventory estimates, the department has not retained documentation to demonstrate its active management of risks between annual assessments and of the implementation of identified risk treatments.

3. Have stakeholders been effectively engaged through the process of collecting source data and preparing and reporting of inventory estimates and emissions projections?

Data providers and external reviewers of draft inventory estimates and emissions projections have been effectively engaged throughout the data collection, preparation and reporting processes. These stakeholders expressed to the ANAO their general satisfaction with the content and quality of the estimates and

projections and made suggestions to enhance the timeliness, consistency and transparency of emissions projections. Obtaining feedback from a broader range of end users would further enhance stakeholder engagement.

4. Has the efficiency of the preparation and reporting of inventory estimates and emissions projections improved over time?

The overall efficiency of the preparation and reporting of inventory estimates has increased significantly over recent years, while the efficiency of the emissions projections' preparation and reporting has remained relatively stable.

Conclusion

- The arrangements established by the department for the preparation and reporting of Australia's greenhouse gas emissions estimates and projections were largely effective.
- Appropriate processes have been established to prepare, calculate and publish Australia's greenhouse gas emissions estimates to June 2014 and emissions projections to 2030. The emissions estimates contained in the National Inventory Report 2014 (revised) and the December 2016 projections report have been calculated using relevant contemporary data.
- Appropriate quality assurance and control procedures are in place for the preparation of most of the emissions estimates and projections, but could be better applied in relation to data entry to improve inventory accuracy and completeness; and expanded to better encompass the estimates projections for all sectors and abatement measures. The publication of additional key input data, assumptions, formulas and methods would increase the projections' transparency and utility to stakeholders and users. On the whole, the quality of Australia's inventory compares well to the inventories of other (developed) countries.

- Governance arrangements for the preparation and reporting of inventory estimates and emissions projections are generally effective, with the exception of risk management which requires strengthening. Monitoring arrangements have facilitated the timely preparation and reporting of inventory estimates and emissions projections that met UNFCCC submission deadlines. The department has engaged stakeholders throughout the preparation and reporting process and significantly improved the efficiency of inventory estimates preparation and reporting over recent years.

Significance: There are lot of Multilateral Environmental Agreements (MEAs) which have been ratified by India. There is lot of scope for audit of national obligations towards MEAs. The MEAs require reporting by national governments to respective secretariats of MEAs at a prescribed frequency. The systems in the country for such reporting could be audited as has been illustrated in this case of audit by ANAO. The audit has provided a kind of assurance towards effectiveness of arrangements established by the government for the preparation and reporting of national greenhouse gas emissions estimates and projections. The Agenda 2030 about SDGs would also require these kinds of audits towards data used by national governments in reporting the progress based on the indicators.

Anupam Srivastava & Vijendra S. Tanwar

IX. Environmental Management in Government Residential Colonies: Possibilities in CBIC

I. INTRODUCTION

The report on the environmental management / greening in residential colonies of Central Board of Indirect Taxes and Customs (CBIC) endeavours to focus on the greening of residential projects undertaken by CBIC. To understand sustainable development, we need not necessarily ape the western world. Ancient Indian architecture offers a lot of inputs

towards sustainable construction. The benefits of these methods is two-fold. Firstly, the methods are extremely cost-efficient, the primary concern when it comes to implementing the sustainable engineering concepts is the cost of compliance. However, the ancient traditional practices simultaneously reduce costs and improve sustainability. Secondly, the ancient Indian techniques are tailor made for Indian weather and are highly structured to the region in question. Hence, by adopting the traditional practices after understanding the science involved, we not only reduce the project cost but also make the structure more suited to the local climate and ethos.

II. Present Status of Environment Management in Residential Colonies of CBIC

To understand where we should reach it is vital that we know where we are at present. When we analyse the typical layout of a residential complex under CBIC at present the following shortcomings are glaringly obvious:

Structural Shortcomings:

- Identical planning and layout in vastly different climatic conditions
- Lack of orientation of building to light and ventilation leading to overuse of artificial lighting and air conditioning systems
- Lack of understanding of the materials used in construction leading to the use of components with high VOC content, materials causing environmental issues and also unethically sourced materials

Shortcomings in Maintenance / Usage:

- Complete lack of reuse of gray-water and ignorance of water conservation measures
- Lack of rain water harvesting measures in most sites
- Renewable energy harnessing is either absent or limited to solar water heaters in most residential projects
- Lack of native trees and biodiversity in housing projects leading to excessive lawns or concrete surfaces

- Lack of segregation of waste, especially with respect to plastic waste and composting of organic waste

The above points make it amply clear that sustainable development and environmental management has been given a backseat in almost all residential projects undertaken by CBIC and implemented by agencies such as Central Public Works Department (CPWD). The major causes of the above shortcomings are lack of awareness of the basic concepts of environmental management, lack of guidance and support from organizations such as CPWD which are supposed to conform to the sustainable engineering standards and also a) high compliance cost of sustainable practices which might not be feasible in the allotted budget for the sanctioned projects.

III. Reducing the Overall Carbon and Ecological Footprint Of CBIC

Having identified the major issues that plague the residential projects in the department, a directed approach is vital to solving the said issues. Despite having agencies like Green Rating for Integrated Habitat Assessment (GRIHA), Indian Green Building Council (IGBC) and Bureau of Energy Efficiency (BEE), Green Buildings are not becoming popularized in India. Even government agencies not stepping into the arena of sustainable engineering. The primary reason for this is the complications involved in understanding and applying the various techniques that are deemed mandatory by the above agencies to procure a 'green rating' thereby declaring the building as 'green'. b)

But the current system of rating is simply a perversion of the concept of a green building. A building should be made sustainable or environmentally conducive to ensure energy efficiency, natural lighting, clean air flow c) which in turn guarantee the health and welfare of the individual. The building, thus constructed keeping in mind both the environment and its occupant will naturally be a sustainable one. This building can then go for a green rating to understand where it stands and also examine areas where it can improve.

Instead of blindly copying the western idea of environmental management, we should try to understand our own history of harmony with nature.

1) *Vastu and the science behind it:*

Since Ancient Indian principle of architecture and engineering are based on observation of nature, it can be considered as fundamental or core principle. They can be applied in construction techniques of any era. Scientific knowledge of these principles and its application in modern construction can increase efficiency and give better results.^[1]

Site selection and sub soil exploration: Shape of site should be rectangular and in proper proportion as it defines good structural grid and provides good aesthetic. It is very difficult to plan in narrow site. Another check is when water is poured on soil and when one walks five steps backward on the wet place, if water is absorbed site should be rejected as this indicates presence of sandy soil which is not suitable for foundation.

Vastu Purusha Mandala: Arrangement of component in house is described by Vastu Purusha Mandala. Proper lighting and ventilation should be provided throughout the day. But during whole day people perform different activities in different rooms / parts at different time. The Sun's position keeps changing from sunrise to sunset. Each room should be positioned so that it faces the Sun at the time of the day when it is most likely to be used. For example room for prayer / exercise should be located in the North / North-East as it would receive sunlight in the early hours of morning. Workplace should be towards the South as this is the location of maximum light from 12:00 to 15:00.

Site preparation: Location of bore hole should be in North-East or North-West direction as major construction would be done in South-East direction. Considering movement of the Sun, boring in North-East or North-West direction will not affect foundation of major part of building. Also the direction of excavation should be from North-East to South-East, then South -East to South-West

corner i.e., the North-East is generally kept lower than the South-West at any time of the construction. This is to ensure a flow of light and wind at all times from the North-East the rest of the construction if the North-East is lower.

2) *Utility of a courtyard:* Courtyard is a traditional gathering place for intellectual encounters, cultural functions and social interactions -- which acts as a "light well", providing light to the adjoining rooms. It helps in stack ventilation and forms a safe inside yet outside environment. In modern engineering terms, natural light from the courtyard, combined with energy efficient lighting systems, results in 88 per cent energy savings, higher than that of an electrically-lit building of the same size. Sensors detect the illumination levels from the courtyard and trigger the deployment of efficient electric lighting. Dimmers control the illumination levels by turning off unnecessary lighting. Some 90 per cent of building spaces have daylight access and views to the outside.^[2]

3) *Jaali as diffuser of natural light and ventilation:* Jaalis (latticed screen) prevent glare and heat gain, while facilitating ventilation and having visual and aural connection with the outside. While a glass façade helps heat the interior of buildings in a temperate climate, Jaalis help diffuse direct sunlight in a tropical thereby cutting heat supply to interiors but at the same time permitting diffused light and natural ventilation to pass effortlessly.

4) *Pond for harvesting rainwater:* Building a collection pond for rainwater is another ancient strategy to reduce consumption of municipally supplied water. Rainwater flows are retained and water runs into a pond at the lower end of the site. Here, an indigenous method is used for water purification. The water that is used passes through the roots of two plants -- *Phragmites australis* and *Typha latifoli* -- for purification. After it is purified, the water is used for landscaping, called the "Root Zone" treatment; 100 per cent of the water used in the building is recycled, thereby cutting down the

dependence on the city water supply by 30 per cent. Furthermore, the ancient Indian design principle of local usage of material is adopted in the building -- 60 per cent (by cost) of the material is sourced within a radius of 500 miles; of this, 95 per cent are extracted or harvested locally.^[3]

5) *Concept of a step-well:* An ancient method of cooling in India was the Step well, a pond dug into the soil or surrounded by walls above position so that the air is chilled by evaporating water in a shaded zone. While step-well cannot be constructed into modern buildings, the concept can still be utilized to control temperatures within commercial and even residential areas. A central pool in a flat complex can effectively reduce temperature inside by three to four degrees thereby reducing the load on the central cooling system and also ensuring a pleasant atmosphere due to the natural cooling action.^[4]

IV. Challenges

Only by predicting and analysing the challenges we are bound to face can we draw up a fool proof plan for ensuring the holistic development of our residential and official infrastructure in a sustainable manner. Having dealt with the need for sustainable development and environmental management, we should next address the major challenges that plague the way forward.

1) *Cost of compliance:* One of the primary challenges when it comes to sustainable buildings is the increase in the initial cost at the time of construction. Despite adopting all conventional measures to ensure sustainability, we might have to still comply with strict norms of the certifying agency like LED lighting, five-star energy rated equipment and energy efficient materials and structures. The process and registration of green rating itself may add additional economic burden on the project. Working on a government sanctioned budget and third party estimate based monetary sanctions, many government projects simply cannot afford to have their building comply with the strict norms of various green building rating agencies.

There is no complete solution to added costs. However it can be considerably mitigated. Large developers like Central government may seek to enter an MOU with their certifying authority, to obtain either a freeze in current published rates or a discount in current published rates. Also, Green Technology with significant costs should be subject to a cost-benefit analysis and a simple payback assessment. Often, in government buildings, the energy prices are borne by state. It should also be kept in mind that the gap between local building regulations and the standards adopted by GB rating systems often narrow over time and the potential costs for future upgrades for code compliance can be high.^[4]

2) *One-size-fits-all approach:* Projects differ widely in terms of scale, functionality, and form and require different approaches depending on the type of projects, increasing diversity and complexity. While there may be certain areas in which a unified approach is useful, generally past solutions have no guarantee of success when applied directly to future projects. Inexperienced consultants often try to replicate the approach they used on their last project when they begin their next project.^[2]

3) *Local regulations and permitting systems:* Developers are often confused about the development control regulations. Also, often designers are reluctant to innovate in their designs out of the fear that it could cause delays in project approvals.

4) *Inexperienced and difficult team members:* Project team members who are unfamiliar with GB rating systems can have a negative impact on setting and achieving the sustainability ambitions of a project, whereas team members who understand the purpose of the GB rating system need less coaching. If senior design or construction team members are inexperienced on GB rating systems, they are often reluctant to consider any strategies that may incur a GB cost premium. While some scepticism is healthy for debate, it is essential that there is a buying from senior professionals in the project team.

5) *Work schedules without time for sustainability review:* GB professionals often receive design reports from discipline engineers only shortly before the deadline for stage submittals, and this gives very little time for their review and comment. This becomes a serious concern especially when agencies like CPWD are involved wherein the estimate given by them at the beginning of project is time sensitive. If the GB professional is involved in the design process early through an integrated design approach, then there should be very few comments required at this late stage. However, late changes made to the design will still require review.

6) *Lack of coordination:* A key component for any integrated design approach is to enable project team members to understand the implications of their decision on other related disciplines. Where there is a lack of coordination, design considerations should be overlooked and opportunities to achieve sustainable outcomes will be wasted. It is recommended that appropriate mechanisms be put in place to assign team members with responsibility to lead on their respective disciplines. Facilitating the coordination of an integrated design approach is at the core of all GB rating systems. The forms, templates, studies, and simulations involved in GB rating systems are designed to encourage an integrated design approach and increase cooperation among team members.

V. Setting Benchmarks and Performance Indicators to Assess Initiatives

- The CII-Sohrabji Godrej Green Business Center (GBC) was the first building outside of the US to be awarded the LEED platinum rating at the time of its inauguration. Ninety percent of the building does not require artificial lighting during daytime. It has also inculcated measures like solar panels, rainwater harvesting and green roofs. (1)
- Having received a platinum certification by the LEED, Suzlon One Earth uses a variety of resource-efficient mechanisms. Natural daylighting, fresh

indoor air and use of energy-efficient air conditioning are just some examples. (2)

- Empress Altius, Kolkata was Eastern India's first IGBC Green Homes' pre-certified platinum-rated building. Features include energy savings of more than 20 %, water savings of more than 50 %, waste management, on-site water treatment and use of grey water for flushing and landscaping. (3)



In time CBIC will have its own list of Green Buildings which can themselves be used as indicators to assess future initiatives. Till the concept of Green Buildings become mainstream in India, the real challenge is to ensure that the upcoming projects all over the country maintain sustainability standards and at least fulfil the mandatory requirements for a building to become fit for a Green Building certification. A comprehensive effort is required from all levels to not only ensure that our partners in infrastructure development like CPWD and NBCC are on board with the green initiatives but also to ensure participation of our own officers.

VI. Incentivising Green Practices by Offices

- 1) *Incentivising segregation of waste:* Segregation of waste into various components is an economically rewarding endeavour. Components of waste have individual value which, if harnessed can make waste disposal a lucrative business. Food and organic waste can be turned into quality manure by investing in a compost pit. Plastic waste can be segregated and sold. Metal waste including aluminium foil fetches a fair price in market. If a system of waste management is established in residential quarters, not only does it solve waste problem but also provide a small revenue source for community activities.
- 2) *Incentivising initial investments:* A GB retrofit has an economic aspect as well. To ease

financial burden capital cost of common amenities which are converted into sustainable systems can be borne by CBIC. A common compost pit, sewage treatment plant, biogas plant and even greening of campus can be undertaken by the parent organization. CBIC can even partner with colony representatives to source LED lighting and energy efficient appliances in bulk at wholesale pricing and also ensure buyback of old equipment and lighting.

- 3) *Incentivising occupants towards organic alternatives:* Many local products like organic soaps, lotions and even building materials are not only cheaper but also environment friendly. A proper awareness and education can do wonders. An informed user base is vital to success of any GB.

To help CBIC officers at all levels see the benefit of having a Green Building residential complex or office space, it is vital to educate and train them regarding the same. The recent course conducted at iCED is an excellent starting point towards this goal. Only by seeing the benefits of the sustainable engineering first hand can a person be convinced to follow the path. CBIC officials should be encouraged and incentivised to visit Green Buildings rated by various agencies in their city or neighbouring cities.

VII. Systemic Changes

A good share of systemic changes can be brought about by investing in

- Biogas plant / Compost pit (viability survey to be done beforehand for biogas plant)
- Rainwater harvesting including storage tank
- Solar street lighting
- Grid connected solar power plant / Solar water heater
- Individual water meters / sub-metering in common water tank to ensure penalty to those overusing the resource
- Tank alarm system to prevent overflowing / overflow of overhead tanks

- Continued insistence on GRIHA / Green Building rating for all new Residential Projects
- Support and hand-holding for initial adapters of Green Building technology
- Additional budgetary support and overheads for GRIHA registered projects
- Audit and reporting of the long term energy savings and other benefits of constructed GBs
- Long-term goal of mandatory sustainability parameters and mandatory GB Rating

VIII. Changing the Mindset of Users

Greening of the environment cannot happen without greening of the mind-set of people. If we can ensure that the concept of Green Buildings gets embedded, then it will soon become the norm in the department. And once the initial adapters of the technology start reaping the benefits of the green environment, others would easily follow. The initial projects would also clarify the cost to benefit ratio and the procedural modalities required to implement a Green Building within the sanctioned budget and estimates. The initial successes would also embolden agencies like CPWD to take up GRIHA ratings for their projects as a matter of policy.

To ensure the above, following points must be kept in mind:

- Educate users including children about benefits of green building
- Create awareness about the benefits of GB by holding weekly / monthly seminars and workshops
- Conduct competitions and camps for kids to help them understand the benefits of GB
- Prizes to children / family members of households which reduce consumption of energy
- Conduct green celebrations on environmental day and celebrate the green campus (awareness)

With a coordinated effort and support from partner agencies, CBIC can be at the forefront of bringing Green Buildings to the residential

projects in India. If implemented with finesse and austerity, CBIC projects will act as a forerunner to all major residential projects in India, both public and private, which are conceptualized on sustainability parameters.

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