GREEN AUDIT CELL
GURUKULA KANGRI (Deemed to be University)
(Deemed to be University U/S 3 of UGC Act 1956)
HARIDWAR - 249404,
UTTARAKHAND, INDIA

ENVIRONMENTAL AUDIT REPORT: 2022

GURUKULA KANGRI (DEEMED TO BE UNIVERSITY)
HARIDWAR

ENVIRONMENTAL AUDIT

2022
REPORT

Assessing Sustainability

ENVIRONMENTAL AUDIT - 2022

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"ASSESSING SUSTAINABILITY"

GURUKULA KANGRI (DEEMED TO BE UNIVERSITY),

HARIDWAR, INDIA

CITATION

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Environmental Audit - 2022

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Green Audit
2022

CERTIFICATE

This is to certify that

GURUKULA KANGRI (DEEMED TO BE UNIVERSITY)

Haridwar, Uttarakhand

has achieved the standards for Green Cover, Buildup and Landscape Environment Conservation and Awareness responsibility with academic accountability for the Universities during the

Green Audit 2020 - 2022

(This certificate is issued after Green Audit Report and on-site assessment)

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INTRODUCTION

Environmental Audit was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. It exposes the authenticity of the proclamations made by multinational companies, armies and national governments with the concern of health issues as the consequences of environmental pollution. It is the duty of organizations to carry out the Green audit of their ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve the procedures and ability of materials, to analyse the potential duties and to determine a which can lower the cost and add to the revenue. Though Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. Some of the incidents like Bhopal Gas Tragedy (Bhopal; 1984), Chernobyl Catastrophe (Ukraine; 1986), Exxon-Valdex Oil Spill (Alaska; 1989), have cautioned the industries that setting corporate strategies for environmental security elements have no meaning until they are implemented.

Environmental Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. Green accounting can be defined as systematic identification quantification, recording, reporting & analysis of components of ecological diversity & expressing the same in financial or social terms. The 'Environmental Audit' aims to analyze environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. The green audit is a tool that organizations use to identify their environmental impacts and assess their compliance with applicable laws and regulations, as well as with the expectations of their various stakeholders. It also serves as a means to identify opportunities to save money, enhance work quality, improves employee health, safety and morale, reduce liabilities and achieve other form of business values. This concept has got its origin in recent past and suddenly got acceleration due to growth in population, needs has increased causing the increase in GAP between demand and supply.

Educational institutions have broad impacts on the world around them, both negative and positive. The activities pursued by campus can create a variety of adverse environmental impacts. But they are also in a unique position as educational institutions to be leaders in pursuing environmentally sustainable solutions. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes

essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric carbon-di-oxide from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

On the occasion of **World Environment Day - 2015** an initiative was taken by Gurukula Kangri Vishwavidyalaya and expressed its commitment to sustainability while forming a committee to conduct audit of campus and its facilities. Vishwavidyalaya has taken a number of positive steps to reduce its environmental impact. But many areas remain in which substantial improvements can be made. This report serves to highlight some accomplishments of and to make recommendations for improving the campus Green and environmental sustainability.

Phases of Environmental Audit

Phase – I: Pre – Audit

- Plan the Audit
- Selection of Audit Team (External experts and Members for Current Audit)
- Collect the Background Information
- Start assessing the certain environmental factors required for prior to On – Site Phase

Phase – II: On – Site

- Understand the significance of Green Audit
- Conduct the Audit and collect the information in prescribed format
- Make an inventory for all the observations during the audit

Phase – III: Post – Audit

- Prepare the Draft report on the information collected during audit
- Generate a Final Report
- Submit the Report to higher authorities of Institution with action plans to overcome the flaws
- Share all the current status and recommendations with all the Heads and Deans of Institution
- Time to time check the action plan

OBJECTIVES

Green Audit is assigned to the Criteria of NAAC, National Assessment and Accreditation council which is a self-governing organization of India that declares the institutions as Grade A, B or C according to the scores assigned are the time of accreditation.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly institute.

To conduct the Environmental Audit, Green Audit Cell, Gurukula Kangri (Deemed to be University), Haridwar has made a self-inquiry on various parameters of the campus with the following objective:

- To establish a baseline of existing environmental conditions with focus on natural and physical environment.
- securing the environment and cut down the threats posed to human health.
- To make sure that rules and regulations in terms of environmental laws are taken care of.
- To understand the current practices of sustainability with regard to the use of water and energy, generation of wastes, purchase of goods, transportations, *etc.*
- To avoid the interruptions in environment that are more difficult to handle and their correction requires high cost
- To suggest the best protocols for adding to sustainable development
- To promote environmental awareness through participatory auditing process
- To create a report that documents baseline of good practices and provide future strategies and action plans towards improving environmental quality for future.

Significance of Environmental Audit

One of the major threats arising from urbanization and increase in population on earth is over-development and unmanaged utilization of resources. To monitor this there are a number of environmental management techniques that can be used to minimize the effects of development. One of the techniques associated with environmental management programmes is that of Environmental Auditing. The purpose of this management tool is to measure the actual and potential environmental impacts in the ecosystems.

In the present time, the pollution is significantly increasing day-by-day due to the industries and factories. It is causing serious health problems to the human being and also polluting the environment. It can also make an adverse effect on the mental, social, and economic ability of the person. It becomes imperative to save the people from dangerous chemicals and waste of the industries because people have to live in the environment to lead a healthy life. It is important for the government to regulate rules and regulations for the industries to make the environment neat and clean. For this purpose, there is a strict need to employ environmental inspectors who can perform Environment audits to prevent the pollution.

Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being and he bears a solemn responsibility to protect and improve the environment for present and future generation." Most countries today face environmental threats due to the increase in pollution of the atmosphere, water and land. Wildlife habitats continue to be threatened. Water contamination and air pollution are critical problems facing most countries. Environment related problems are linked closely to the rapid growth of population, as well as to technological advancements.

Environmental audit is a process of extracting information about a company that provides a realistic assessment of how the company affects the environment and also a set of environmental objectives and targets to reduce the effects. Eco-auditing is a systematic multidisciplinary method used periodically to assess the environmental performance of a project. Eco-auditing evolved as a management tool in the USA in 1980s. It has been promoted in Europe by the International Chamber of Commerce and by some multinational corporations as a means of getting effective environmental management. But, in developing countries, the eco-auditing concept is still a theoretical concept. However, India has modified its Companies Act to include a requirement for eco-audits. This it is very important for each organization to conduct it environmental audits or overall green audit to ensure that we are working in the direction of sustainable development.

Environment audit is necessary to evaluate the impact of industries and their manufacturing on the natural resources. The environmental auditing is an important process to make sure continuous development in the environmental management. The environmental auditor appropriately monitors the system for safe disposal of waste in the industries to ensure the safety of the natural resources.

It also lessens the interference of the government directly since the environmental auditor can examine the required standards and present the report to the government.

A good environmental auditing system needs a constant effort to monitor and analyse the industrial working system to create the analysis on pollution being generated. The major objective of performing environmental audit is controlling the pollution. It also helps in improving the production safety and to making sure the prevention and reduction of the chemical waste. It also provides performance reviews of institutional working facilities and its possible impact on the surroundings.

The environmental auditor has to detect the existing environmental compliance problems and make recommendations to the manufacturers for reducing the pollution to save the environment.

While enforcing the Green Audit effectively,

- Will help to maintain the environment and its resources in institution
- Highlight the problems from energy loss to water loss.
- Minimize the waste and use the resources efficiently.
- Give the better approach to environmental conditions and its improvisation
- Helps in awareness activities for students.

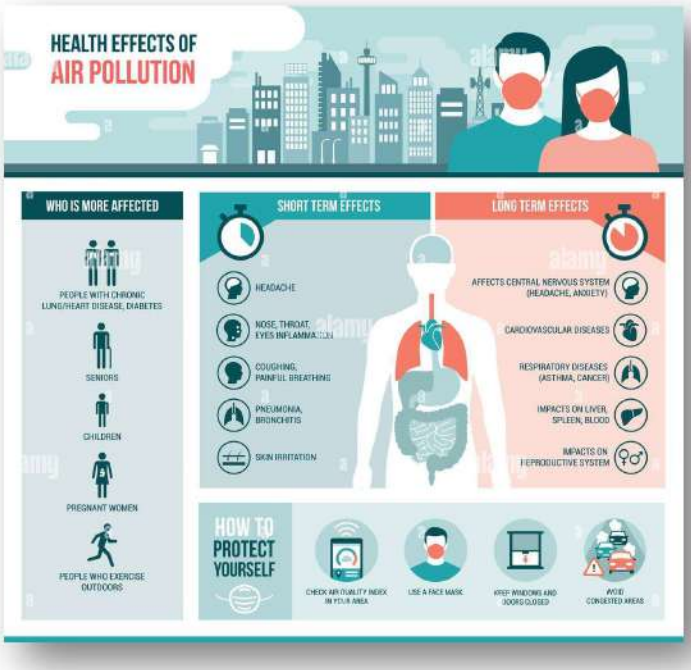
Can participate in national programmes like SWACHH BHARAT MISSION, NAMAGI GANGE, WATER CONSERVATION, SWASTH BHARAT *etc*.

Part I: AIR QUALITY

Air quality is influenced by a variety of factors and is a complex issue. The term air quality refers to the degree to which the air in a particular place is free from pollutants. Air pollutants are substances present in the atmosphere at concentrations above their normal background levels which can have a measurable effect on humans, animals and vegetation.

Good outdoor air quality is fundamental to our well-being. On average, a person inhales about 14,000 litres of air every day, and the presence of contaminants in this air can adversely affect people's health (see figure 4). People with pre-existing respiratory and heart conditions, diabetes, the young, and older people are particularly vulnerable.

Overseas studies have shown poor air quality can also adversely affect the natural environment. Ecological damage may occur when air pollutants come into direct contact with vegetation or when animals inhale them. Pollutants can also settle out of the air onto land and water bodies. From the soil, they can wash into waterways, or be taken up by plants and animals. Poor air quality can also affect our climate: some pollutants have a warming effect while others contribute to cooling (European Environment Agency, 2013). These effects of poor air quality on human health and the environment can, in turn, have negative economic impacts. We incur major costs, for example, for hospitalisation and medical treatment, premature deaths, and lost work days. Damage to soils, vegetation, and waterways may reduce the productivity of our agriculture and forestry industries. In urban areas, air pollution can be costly when, for example, transport is disrupted (due to large-scale events like volcanic eruptions), or corroded buildings need to be repaired. The sources of some of these pollutants also have positive effects. For example, having a warm home (from burning wood or coal, or other heating sources) has health benefits, while transport provides people with mobility and the distribution of goods and services.



Indian cities are reeling under multiple problems, including environmental issues that they must contend with. Most pressing of them all is the issue of air pollution. The poor air quality that citizens are forced to breathe- especially in the heavily polluted cities- has a detrimental impact on their health and well-being. In 2016, a World Health Organisation (WHO) study found that fourteen of the twenty world's most polluted cities belonged to India. Kanpur, in Uttar Pradesh, emerged as the city with the highest PM2.5 level, standing at 173 (17 times higher than the limit set for safety). It is estimated that in 2016, over 9 lakh deaths were caused due to air pollution in India. Some other cities with high PM 2.5 levels include Faridabad, Varanasi, Gaya, Patna, Delhi, Lucknow and Agra. Delhi, as the capital of the country, too gained notorious reputation as a result of its severely poor air quality. In the past, there have been multiple instances where the presence of heavy smog in the national capital has led to the declaration of public health emergencies, flight cancellations, school closures and inevitable political acrimony.

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The sources of air pollution are multiple. Vehicular emissions, crop burning, generation of dust- particularly from construction sites, depleting tree covers and poor waste management – all contribute towards the declining air quality. One of the problems with tackling air pollution solely at the city level is that several factors which contribute towards increasing pollution levels have their origins in the bordering sub-urban areas. In Delhi, for instance, one of the major factors responsible for its declining air quality is paddy straw burning in its neighbouring states.

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Air pollution does not recognize geographical boundaries. Just as polluted air from rural areas travels into cities, cities too contribute towards rural pollution. Thus, it is critical for anti-pollution efforts to be coordinated across different levels. Urban-rural and inter-state responses are integral to crafting successful solutions. Fortunately, the Government of India (GoI) has responded to the air pollution epidemic with a nation-wide programme. This is likely to have very positive impact on the health of all citizens, especially city dwellers. The Air Quality Life Index indicates that if national standards with regard to air quality are met, life expectancy would go up by two years.

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This is clearly what the National Clean Air Mission (CAM-INDIA) aims to achieve. It is a cross-sectoral initiative for air pollution mitigation launched by GoI involving Ministries of Transport, Power, Construction, Agriculture, Rural Development, Environment and the states. Along with a five-year action plan to curb air pollution, the Mission hopes to build a pan-India air quality monitoring network and heighten citizen awareness. Air quality can be significantly improved by cutting the use of solid fuel in households; using sustainable fuels can reduce air pollution levels by almost 40 percent. According to the 2011 Census, 16.6 crore households out of a total of 24.7 crore continued to rely on solid fuels (firewood, crop residue, dung and coal) for cooking. Hopefully, GoI's Ujjwala scheme, which provides cooking gas to millions of poor households will substantially reduce solid fuel usage. Additionally, reducing emissions from thermal power plants, instituting strong emission standards for industries and introducing stronger vehicular emission standards also need to be effectively implemented. In this regard, state pollution control boards (PCBs) are adopting the Star Rating Programme. The programme rates industries on their fine particulate pollution emissions and enables the monitoring of industries' pollution levels. Furthermore, in partnership with GoI, states are promoting an electric vehicle policy. Use of electrically powered buses, cars and two-wheelers are bound to have a positive qualitative effect on air quality in cities.

The National Clean Air Mission is a cross-sectoral initiative for air pollution mitigation launched by GoI involving Ministries of Transport, Power, Construction, Agriculture, Rural Development, Environment and the states.

Certain policies and programmes focus specifically on cities- The National Clean Air Programme targets 102 polluted Indian cities and aims to reduce their PM2.5 levels by about one-third over the next five years. Steps are also being taken for upgradation to BS VI fuel from BS IV which is expected to reduce air pollution. Initial results are encouraging. The Environment Ministry reported a fall in the national annual average concentration of PM 2.5 from 134 micrograms per cubic metre in 2016 to 125 in 2017. For PM 10, the national annual average fell from 289 micrograms per cubic metre in 2017 to 268 in 2016. An action plan has also been readied for 94 cities which suffer from severe air pollution.

While steps are being taken to reduce air pollution at the national and state levels, cities could improve the national performance by introducing complementary initiatives. Firstly, the Clean India Campaign requires energetic implementation. Since dust and waste burning are major sources of PM, cities must ensure wall-to-wall paving of streets, the vacuum cleaning of roads, enforce bans on open solid waste burning and attempt to effectively recover methane from landfills.

While steps are being taken to reduce air pollution at the national and state levels, cities could improve the national performance by introducing complementary initiatives.

Some state municipal acts make it mandatory for cities to prepare an annual environment status report. The main objective of such a report is to curate data which allows cities to take cognizance of where they stand in terms of environmental well-being, including the status of air pollution. The next step for cities should be to launch remedial steps as the annual report enables municipalities to assess the impact of their policies on a yearly basis. Sadly, while the reports have been prepared, not much action has been taken. This needs to change.

Many cities also carry out a decennial tree census' which tells them what their tree population is. Depletion of tree cover in specific areas triggers a warning mechanism advising the city to replenish tree stock via fresh plantation. Another city-centric solution that municipalities should consider implementing is the incentivisation of the maintenance of roof-top gardens as well as, potted plants in balconies and kitchen gardens through suitable amendments in development control regulations.

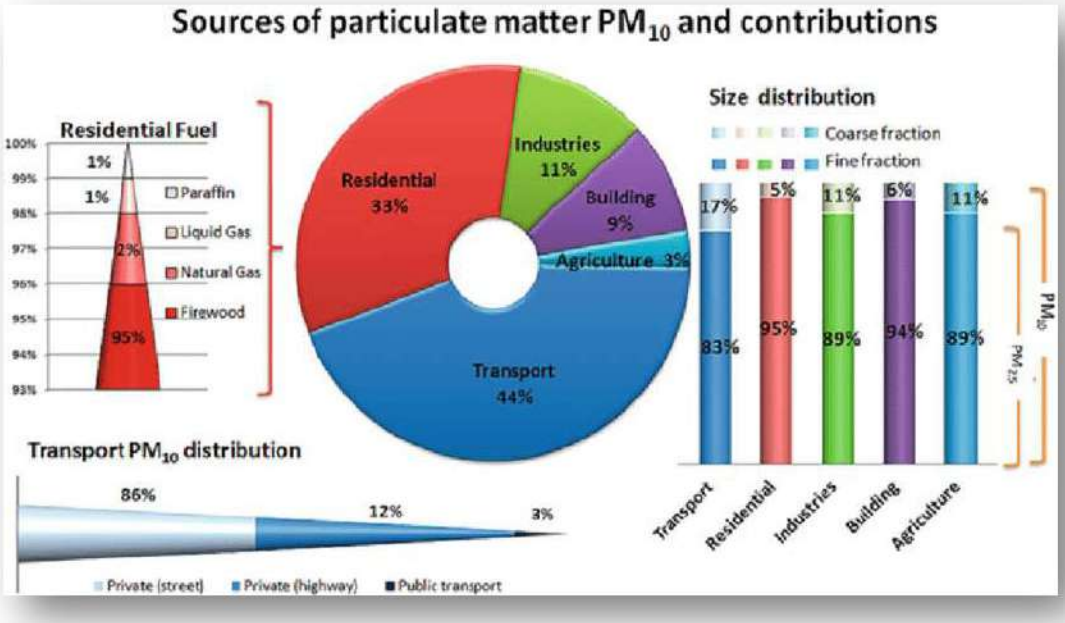
While the issue of air pollution has managed to capture public imagination, the problem of growing question of growing population density in cities continues to be at best- an afterthought. High human density hinders the successful implementation of positive initiatives. The volume of polluting activities continues to multiply, as the space to counteract them physically shrinks. The question of decentralising urbanisation needs to be addressed in a meaningful way, for it holds the key to improving the quality of urban life.

When there are many different types of air pollutants, why do we focus on PM 2.5? Why is it particularly dangerous?

A chemically charged pollutant, PM has contributions from all the primary emissions.

- Black carbon and organic carbon, as primary emissions are part of PM 2.5
- SO_2 undergoes chemical reactions to form sulphate aerosols, which is part of PM 2.5
- NO_x-CO-VOC combine and react in many ways to chemically transform to form nitrate and secondary organic aerosols, which are part of PM2.5
- NO_x-CO-VOC also combine and react in many ways to form and consume ozone (depending on the mixture of the gases), which also contributes to health impacts and also participates in the formation of nitrates and secondary organic aerosols, which are part of PM 2.5

So, if we target PM 2.5, the one pollutant we are mainly concerned about in India, we are invariably targeting all the other pollutants as well. Therefore, any control mechanism aimed to reducing direct PM 2.5 emissions also reduces other pollutants (since sources to all these pollutants are common), except for resuspended dust.



The particle size, less than 2.5 micro-meter, is small enough to enter our lungs and blood stream, and stay there for a long time. There are more studies linking PM 2.5 to various health risks than any of the other pollutants.

Meteorology over the Indo-Gangetic plains is complicated and it plays a strong role in the observed seasonal cycle of air pollution in the cities in this region – with the winter time highs (due to high inversion) and the summer time lows (due to rains).

While meteorology plays its part, there is also an increase in the total emissions during the winter months, which further exaggerates the problem. These additional emissions are primarily from the burning of wood, coal, and waste for space heating as the temperatures drop. While the need for space heating is there for most part of the winter season, there are also episodic spikes from bursting of crackers during Diwali, which lasts for 2-3 days as well as crop residue burning, which lasts for 2-3 weeks.

Do we have adequate information on air pollution in India? What do we need to improve the quality of this information?

An excerpt from an article recently published in 'The Wire' – *It's About Time We Got Smarter About Monitoring Our Air Pollution* (9th September, 2017):

> **The quality of air in India is bad and is becoming a serious public health issue with huge repercussions to our quality of life and economy. We know this through anecdotal evidence and through the little data on monitoring that trickles down to the public. This limited information is not enough – to formulate policy, to understand seasonal and diurnal variations, to tease out patterns or to calibrate forecasting models. It is the right of any citizen to have access to**

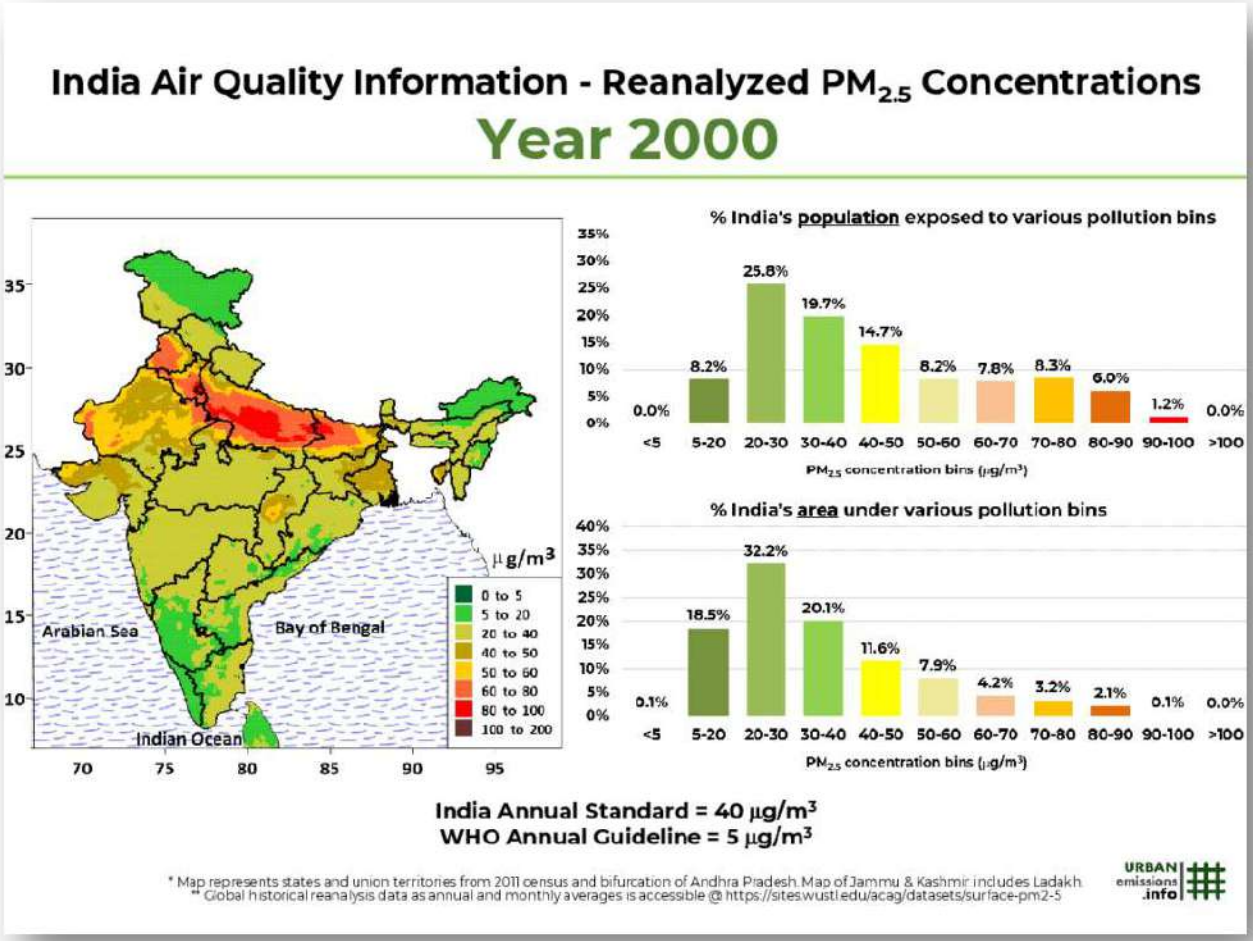
information on the quality of air she is breathing – monitoring data that is real-time, reliable and accessible to any citizen.

While the results of the GBD study do fill in this lacuna of information, it is not a substitute for real-time information. These results are obtained through a modelling exercise that combines satellite feeds, emission inventories and historical monitoring data to then estimate ground-based concentrations. Note that satellites neither measure one location nor take ground measurements at all times (orbital satellites create a snapshot of the entire planet every one or two days). These snapshots are interpreted using the global chemical transport models to better represent the vertical mix of these measurements (known as aerosol optical depth). Like any modelling exercise, this data also comes with uncertainty. While this process is very useful in establishing annual trends, these systems are not a substitute for daily on-ground monitoring.

What we need are ground measurements using reference methods approved by the environment ministry. This ensures that the monitoring information is reliable and conforms to the government's standards. Low-cost sensors do provide some information but because many of them are not recognised by the government or are not calibrated accurately, the data they generate cannot be used for policymaking."

In India, we estimate that we require around 4,000 continuous monitoring stations to spatially and temporally represent the air pollution problem – 2,800 in the urban areas and 1,200 in the rural areas. Currently, data when available comes from around 600+ manual stations and less than 100 continuous monitoring stations.

Among all the cities and states, most number of continuous monitoring stations are present in Delhi, which means there is more information coming from Delhi, there are more studies by national and international institutions on Delhi, and there is more media and public focus on the issue of Delhi. It is very important to understand that air pollution is a regional problem. We need to focus on regions in the country, where people are exposed to unsafe levels of pollution, and there are no monitors to determine how much that is.



As Delhi's air quality worsens every day, a similar situation has been observed in one of India's most visited destination – Haridwar. Pollution in Haridwar has been in news for about a few years now. As the tourist population of Uttarakhand is rising, naturally the pollution level is increasing.

The constant rise in industrial emission, stubble burning, and forest fire has resulted in air pollution in Haridwar. Weather reports suggest that Haridwar weather is getting hotter during summers due to unusual weather pattern.

The locals say that the city is facing major water and air pollution issue. Local government authorities have done no more than little to control the issue. Similar to major city people, Haridwar and Rishikesh are also choking on hazardous air quality. The increase in PM 2.5 in the city's air quality is the real reason for major respiratory issues among the people.

PCRI (Pollution Control Research Institute) recently reported that the presence of PM 2.5 – one of the deadliest air components, causes chronic health issues.

Fine particulate matter can pose a great health risk and can have both long-short-term effects. Breathing PM 2.5 can be dangerous and it can minimize the human heart and lung functionality.

Tourists and Locals – Prone to ill effects of pollution in Haridwar and other cities

The shocking figures of pollution in Haridwar is worrisome

Ambrish Gupta of Pollution Control Research Institute says, "The actual cause of increasing air pollution which is reported highest during the summer season in Haridwar is vehicular emission. The tourist influx in the city leads to excessive movement of vehicles."

Haridwar is about 223 km away from the national capital of India, New Delhi. Currently, the capital sees a daily average of AQI as 97 (Moderate Air Quality Index), while Hardiwar is 174 which is poor air quality.