

NEWS LETTER

Volume 2, Issue 3, July-September 2016



Solution to Indoor Air Pollution

The indoor air pollution has been identified as the second largest killer in India (as discussed in issue 2, 2016: Indoor Air Quality: An Unsolved Puzzle). Despite the fact, very low priority has been given to address indoor air pollution problems in India. As a result, no explicit policy, regulations, standards and guidelines exists on IAQ. There is no synergy between key stakeholders and practically no dialogue at the national level, which is the need of an hour to evolve the roadmap for managing the IAQ in India.

In order to address above concerns IPCA organized a collaborative International Summit on Indoor Air Quality

(IAQ) " Airothon" at India Habitat Centre on 20th October, 2016. The experts from all the sectors, i.e. Government and Regulatory Bodies, Research, Academia and Industries have participated in the event and identified the gaps exist for IAQ management in India. In order to fill the gaps and improve IAQ status in India, solutions were recommended at all the three levels, i.e. Government, Industrial and Research level, which are highlighted in this issue. The issue also addresses the individual's efforts for improving the IAQ, reducing the exposure level and protecting their health.



Figure 1: Three-level approach for improving IAQ

Levels	Gaps Identified
At Government Level	<ul style="list-style-type: none"> No IAQ standards. Lack of a well framed robust IAQ policy and guidelines at the national and state level. Lack of national/state level calibration, testing and labeling facility for IAQ-related solutions/products. Lack of comprehensive integrated protocol for systematic monitoring and modeling of IAQ and framework for its implementation.

<p>At research /Academia level</p>	<ul style="list-style-type: none"> • Most of the existing researches are based on short terms measurement suffering with smaller sample size, which may limit reliable interpretation of results • Most of the studies have focused either on urban poor and /or rural poor households. Very few studies have been conducted on urban or peri-urban school buildings and hardly any study on urban households • IAQ studies in households mostly focus on cooking as the only potential source of pollutants. However, in Indian households sources may also include re-suspension of household dusts from cleaning activities, burning of incense, use of candles/oil lamps indoors, generation of fine aerosols while mixing / making spices and other condiments, etc • Lack of studies on building orientation and land use pattern • No study has been conducted at public places such as auditoriums, cinema halls, and in public transport systems like metro • No studies on establishing relationship between IAQ and energy requirements for mechanically ventilated buildings • Focus of research is limited to conventional pollutants like PM₁₀, NO₂ and/or CO. Cumulative or synergistic impacts of other key pollutants, especially VOCs, BTX, aldehydes, bioaerosols and PM_{2.5} are not yet studied • VOC emissions from materials and surfaces are not researched for quantification - especially to build local emission factors • Hardly any study focusing on exposure estimation. Most of them focus on indoor air pollutant concentrations • No study on impact of air purifiers on the immunity of the users • Economic implications of IAQ are not worked out. Insufficient data exists on health implications of poor IAQ and economic impacts
<p>At the industry level</p>	<ul style="list-style-type: none"> • No community surveillance system exists for studying the health effects due to air pollution in hospitals. Doctors have not yet identified indoor air pollution as a cause of any ailment • Occupant's health is not considered by ISHRAE in designing new guidelines/standards for IAQ • The health protection instruments (masks, air purifiers etc.) are not certified and calibrated for their performance

Strategic approach to Improve IAQ

IAQ in India can be addressed and managed at all the three levels following multi -pronged strategy (Figure II) including short, medium and long-term measures. It shows how IAQ could be addressed through (a) Standards, Codes and Guidelines governing IAQ, that is available nationally and/or internationally, (b)

Source reduction strategies by choosing right materials and finishes and (c) Engineering control for cleaning the air. Standards/codes and Guidelines essentially provide a base for engineering control and source reduction.

(Source: Dr. P. Modak, President EMC, at a workshop on Roadmap for managing IAQ)

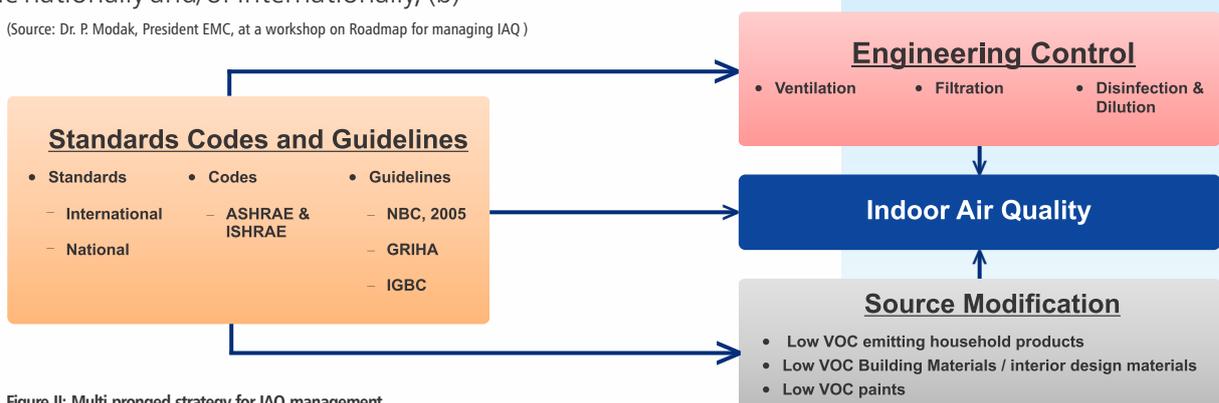


Figure II: Multi pronged strategy for IAQ management

At Government Level

There is an urgent need for developing a regulatory mechanism for monitoring and maintenance of IAQ. Controls or guidelines on levels of pollutants in an indoor air should be set for public and domestic places and should be implemented strictly.

- A need of creating Central Coordination Agency (CCA) with the involvement of multiple stakeholders and multiple agencies, i.e. Ministry of Health and Family Welfare (MOHFW), Ministry of Women and Child Development (MOWCD), Ministry of Urban Development (MOUD), Ministry of Rural Development (MORD), Ministry of Non-renewable Energy (MNRE), Bureau of Indian Standards (BIS) etc. under the umbrella of Ministry of Environment, Forest and Climate Change (MOEFCC), which can play a role in formulating an overarching policy on IAQ and the standards/regulations with CPCB
- A multidisciplinary, integrated and holistic approach needs to be adopted to combat the problem of indoor air pollution in India under the umbrella of above-said ministries, which can work on data sharing, validating and conducting studies related to IAQ
- Government must adopt guidelines and set standards for IAQ in consistence with the guidelines of the World Health Organization
- Government must set codes/guidelines for eco-friendly kitchens to assist builders and architects in reducing pollution, conserving energy, and improving the work environment
- The National Building Code should be amended to incorporate architectural strategies that help to fight indoor pollution. A comprehensive review of ventilation and air filtration system is also crucial
- Standards and regulations could be introduced first at public places such as cinemas/auditoriums; entertainment plazas, commercial complexes and conference facilities of certain size and grade. Next could be IAQ standards in transportation systems such as air conditioned buses, metros and trains.

This may be followed by IAQ standards for hospital facilities

- A separate IAQ index for different building types needs to be developed for industrial settings
- The air quality monitoring stations should be established after consulting all the experts of the relevant departments. A master plan for land use must be considered for IAQ
- A multidisciplinary team of experts/professional consisting of architectural, engineering and occupational health expert with well defined roles and responsibilities
- Large-scale awareness raising campaigns and educational activities are required to deal with the existing information gap. Agencies like ISHRAE could help in awareness generation in urban scenarios, whereas in rural areas MNRE, MOW&C, MORD and MOH should take charge of grass root level awareness generation with the help of NGO's
- Linkages between health, indoor air quality and pollution must be included in school curricula, and also circulated through various media as well as adult education programs. Mandatory display of IAQ levels in Cinemas and Auditoriums could be a good step. This will not only help in spreading awareness, but also will help in capacity building and generating confidence among commoners
- Reporting IAQ data at public places in the Environmental Status Report (ESR) of cities and State of Environment Reports (SoER) as a requirement can make a big difference
- Need to develop a public information system that elaborates on what material, furnishing, paints, etc. to be used indoors. A manual on buildings operation and maintenance should be available to the occupants
- Provide incentive on cleaner fuels, technologies and award the industries/ communities for developing/promoting the use of clean and green products/technologies

How NGT can play an important role in improving IAQ in India?

NGT has specialized court which plays reactive as well as the proactive role in reduction of air pollution. It can adopt preventive and remedial measures on indoor air pollution such as creating awareness on biomass burning and health-related issues and can force the regulatory bodies to take steps on prevention of burning

of uncleaned fuels in urban slums and rural areas. NGT can adopt a very stringent monitoring mechanisms in terms of controlling the indoor air pollution due to various mechanisms responsible for it. In case any violation /by passing is found among the rules/guidelines, the offender can be penalized

At research / Academia level

- More studies need to be conducted to establish linkage between indoor air quality, exposure and health effects since impact of air pollution on health is a new area of research, the response of the people to air pollution also needs to be studied
- More focus should be on data collection at regional level which should then be collated with the state level data which should be properly validated and authenticated by a nodal agency
- In data collection of IAQ, other parameters like food habits, occupational habits etc should also be considered
- Need for a proper study on household air pollution, outdoor pollution and urban indoor air pollution with multidisciplinary team considering

all aspects of building design, orientation, sources, pollutants dispersion pattern, ventilation etc

- Data needs to be collected from the hospital areas also to know the exact status of pollution on health of the patients. Seasonal IAQ data from hospitals is every much essential
- File patents & tie up with industries for mass production of IAQ related solutions
- The environment course curriculum of the children should be more attractive so as to generate awareness about IAQ and outdoor air pollution in a more interesting way
- Build robust framework for economic assessment

At Industrial Level

- Identify the best practices and benchmarks for IAQ
- Provide the feedback to the government on the IAQ guidelines and their suitability according to the demands and requirements
- Develop cost-effective IAQ monitoring systems
- Community surveillance system at hospital industry
- Sensitize the members, clients and industries on IAQ to create demand for clean and green building and air cleaning products
- Industries have to come up with many innovative and cost effective products in-order to combat the indoor air pollution, such as eco-friendly (Low-VOC" and "Zero-VOC") paints, (under 150 grams for low-VOC and under 5 for zero-VOC) comply with international standards; instruments, which

can convert harmful gases to useful forms

- Develop energy efficient household appliances, improve the design of cook stoves that are suitable for Indian conditions
- The purifiers, in which the entire process of air purification is natural should be preferred over the others, e.g. indoor plants
- Preferred use of greener building material by the construction industry in new residential homes and commercial buildings
- Develop ties with international agencies for knowledge sharing and/or technology transfer
- Encourage indigenous patents in IAQ – technologies, materials and products
- Develop market based instruments for IAQ technology improvement & promotion

What people really need to do to improve the IAQ?

"Solution lies in the causes itself"

IAQ can be improved if each one of us will become "part of the solution not of the pollution". Solutions can be achieved through following ways:

- Awareness about indoor pollution level
- Adopting Green products
- Maintaining ventilation system/air distribution system

- Alteration in pattern of their fuel uses
- Adopting Changes in daily habits

<p>Do's</p>	<ul style="list-style-type: none"> ➤ Control the main sources/culprits of IAP ➤ Improve the ventilation ➤ Use ACs in summers, which help to keep humidity down and reduce dust mite allergens tenfold dehumidifier can also be used instead. ➤ Install the high-efficiency particulate air (HEPA) filters in Acs, ➤ Maintain the cleanliness and hygiene by regular wet mopping and vacuum cleaning to keep dust /pollen free indoors ➤ Use door mats and take off shoes outside to stop entering the dust insides the homes ➤ Keeping the kitchen clean and well ventilated ➤ Remove wall-to-wall carpeting and large area rugs, especially from the bedroom since these can be heavens for dust mites. ➤ Create the own green areas indoors (indoor plants as Biofilters) ➤ Use Natural Air Purifiers, such as slices of lemon on a plate to delicately perfume the air in a room, baking soda in a small bowl to eliminate odors (it works particularly well in fridges) ➤ Choose fragrance-free products, or products with scents of natural origin for your laundry and cleaning needs. ➤ Pet care and hygiene to avoid fur, dander and other microbial exposure at homes ➤ Regular Monitoring and tracking of indoor air pollution ➤ Balance diet with intakes of Vitamin C and Jaggery to reduce the impacts of air pollution.
<p>Don't's</p>	<ul style="list-style-type: none"> ➤ Avoid brooming in the morning hours to reduce exposure to all night settled dust ➤ Avoid using sprays (hair and body), perfumes and room fresheners as they contain VOCs

"Reducing the exposure and removing the air pollutant is the only way out to improve the quality of air indoor and protect our self from their detrimental health effects."

IPCA: An IAQ solution provider

IPCA is committed to provide a comprehensive solution for improving the IAQ in residential, institutional, commercial and corporate houses in urban regions of India through its Air Quality Management Services (AQMS) division- a joint venture of Your Own Green Area (YOGA) Creations Pvt. Ltd. and IPCA. It provides unbiased Air Quality Testing & Consultation services by experts with the help of finest range (Gold standard) of calibrated instruments to "understand the air we breathe and

suggest solutions accordingly". Besides Consultation and monitoring of Indoor Air quality, validation of the testing services and solutions are also provided. The organization has well developed wide network of clients which includes industrial and corporate houses, commercial building, schools, private and government building. The organization provides solutions and corrective measures for improving the IAQ.



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