

TRAFFIC MANAGEMENT

Urban mobility is a cornerstone of modern life, yet traffic congestion remains one of the most persistent challenges facing cities worldwide. As populations swell and vehicle ownership rises, poorly managed roads become choke points, slowing economic activity, increasing pollution, and endangering public safety. Effective traffic management is no longer a convenience; it is a necessity for urban governance, environmental sustainability, and public well-being. Traffic congestion is more than an inconvenience. Studies show that time lost in traffic directly impacts productivity, with commuters in congested cities losing hours daily that could otherwise be spent on work or personal development. Beyond the economic cost, vehicular emissions contribute significantly to air pollution, leading to respiratory illnesses and exacerbating climate change. In India, where urban air quality often exceeds safe limits, traffic management is inseparable from public health. Current challenges stem from multiple sources. Rapid urbanization has often outpaced infrastructure development, leaving roads overcrowded and poorly designed. Mixed traffic conditions, where motorized vehicles share roads with bicycles, rickshaws, and pedestrians, exacerbate congestion and increase accident risks. Lack of efficient public transport systems pushes more citizens to private vehicles, further burdening road networks. Additionally, enforcement of traffic rules is inconsistent, leading to reckless driving, illegal parking, and poor lane discipline. Addressing these issues requires an integrated approach. Smart traffic management systems leveraging technology can significantly reduce congestion. Real-time traffic monitoring using sensors, CCTV, and GPS-based applications allows authorities to adjust signal timings, redirect traffic, and provide commuters with route options. Cities like Singapore and Amsterdam have demonstrated that data-driven traffic management reduces travel time and improves urban mobility. Public transport infrastructure must be strengthened as well. Efficient, affordable, and reliable buses, metros, and suburban rail systems can reduce dependence on private vehicles. Incentivizing shared mobility solutions such as carpooling and app-based ride services can further decrease traffic density. Urban planning should prioritize pedestrian and bicycle-friendly pathways to encourage non-motorized transport, which not only eases congestion but also promotes healthier lifestyles. Enforcement and awareness campaigns are equally critical. Strict implementation of traffic laws, combined with public education on road safety and responsible driving, can minimize accidents and improve road discipline. Investment in road infrastructure, including flyovers, underpasses, and well-marked lanes, must be paired with regular maintenance to ensure smooth traffic flow. Sustainable urban mobility also demands coordination among multiple stakeholders—municipal authorities, transport departments, police, urban planners, and citizens. Traffic is not just a technical problem; it is a social challenge that reflects collective behavior and governance efficiency. Community engagement, such as citizen reporting of road hazards and participatory traffic planning, can enhance compliance and responsiveness. Traffic management is a multidimensional challenge requiring technological innovation, infrastructure development, policy enforcement, and behavioral change. With rising urbanization and vehicular growth, cities must adopt smart, sustainable, and citizen-centric solutions. Failure to act will not only slow economic activity but will degrade environmental quality and public safety.

Sustainable Management of Urban Pollution

DR. BANARSI LAL

Every year 2nd of December is observed as the National Pollution Control Day in India. This day is observed in the memory of people who lost their lives in Bhopal gas calamity. Bhopal gas tragedy occurred in the year 1984 on the night of 2-3 December. Many people died due to harmful gas Methyl Isocyanate also known as MIC. Bhopal Gas Tragedy is considered as one of the biggest industrial pollution disasters. On the night of December 2-3, 1984, a toxic gas leak occurred at the Union Carbide India Limited (UCIL) pesticide plant in Bhopal, Madhya Pradesh, killing thousands and affecting lakhs of people. This tragedy is remembered as the world's worst industrial disaster. This day is observed to create awareness on environmental pollution and industrial safety. This day reminds us the need for strict pollution control laws, safe industrial operations and environmental protection to prevent similar disasters in the future. The theme of this year National Pollution Control Day 2025 theme is Sustainable Living for a Greener Future. With a population of over 1.4 billion, India supports around 17.84 per cent of world's population on 2.4 per cent of world's land resulting in a paucity of resources that jeopardises growth in the long run. 32 per cent of the Indian population live in the urban areas. It is estimated that by 2030 about half of the Indian population will be residing in urban areas. This rapid pace of urbanization is already being accompanied by air and water pollution, water supply, sewage disposal, municipal waste, transport, lack of open landscaped spaces etc. Most of these problems arise due to unplanned development in cities leading to higher use of natural resources such as land and water. In most cases consensus is not made as to which challenges are more important and how to mitigate them. We all need to have the awareness on India's environmental challenges. Presently urban air pollution is a major issue in both the developing and developed countries across the globe. Increasing population and vehicles in the urban areas have resulted in severe air pollution which ultimately is deteriorating our environment and health. Transport, domestic, commercial and industrial activities mostly contribute to urban air pollution. Urban development in India is going through a very dynamic stage

The urban areas have been expanding exponentially by encroaching the surrounding agricultural lands and forests from the last few decades. Urban areas harbour a variety of habitats such as water-bodies, parks, gardens, forests etc. We observe that urban areas have old monuments and old trees. Nowadays our cities have millions of vehicles, ever expanding roads and spewing out immense pollution. People are migrating from rural areas to the urban areas and these people carry their poverty along with them to the cities which gets perpetuated in urban areas. These rural people migrate to the cities in search of employment and finally want to settle down in the cities. Urban areas have their own limitations as they too have limited resources. With the increasing urbanization and demand for more houses, transportation etc. does urban forestry today stand a chance? The answer may be yes. With the increase in population the demand for wood has also been increased resulting in the fast degeneration of forests and villages woodlots. Presently India has only 11% of the land area under close forest cover. In cities pollution is very high due to emission of harmful gases produced by the automobiles, factories, sewage etc. The towering buildings in the cities prevent the free circulation of air, absorb a lot of heat and thus increase the atmospheric temperature. Noise pollution affects the peaceful living in the cities and accelerates the sickness among the people. The pollution in cities can be controlled by planting trees in urban areas as the greenery in the cities helps to sustain natural ecosystem and acts as buffer zones against the pollution. These green areas can also provide habitats for a variety of animals and birds and act as rest places for the hectic life styles of urban people. Tree planting in urban areas is easy because of protection of livestock, availability of water, awareness among the literates' people etc. Water plays the critical role for the trees growth right from planting. Roof top water harvesting, proper water management and recycling of water including that of utilization of sewage and effluents and other untapped sources can be recommended for growing the trees in urban areas. Different trees species can be recommended according to the needs of the people. If a river flows through the city then the ecological and landscape value of the river need to be studied

and analyzed. The River Front Development along with appropriate tree species add to the beauty and health of the cities. Selection of tree species for industrial areas is dependent on the nature of industry. It is necessary to select tall evergreen trees so as to reduce the wind velocity around the chemical factories. Adaptability of tree species to hazardous gases and particulates should be the primary criterion followed by the tolerance of effluent water. Species like Neem, Eucalyptus, Mulberry, Guava, Jamun, Ber and Bel can bear Sulphur Dioxide toxicity. In areas having fluoride pollution tree species such as Cashew, Amaltas Casurina, Peepal, Banyan and Jackfruit can be grown. In Cement factories and thermal power plants areas trees like Peepal, Banyan, Neem, tamarind, Pride of India, Oak, Arjun, Teak etc. can be grown. In areas where there is emission of Carbon Dioxide and smoke trees such as Bougainvillea, Shishum, Drumstick, Ashok and Neem can be grown. When pollution is not a serious concern in the area then selection of trees can be done on the basis of rate of growth, utility and flowering habits. People generally visit parks and other recreational sites to relax. The trees having spreading branches with colourful flowers are preferred for such areas. Trees such as Cassias, Bottle brush, Gulmohar, Putravanti, Banyan and most of ornamental trees can be selected for parks. Trees in parks should be planted at a wider distance and maintained with proper training and pruning. Medicinal plants help to cure the common ailments but unfortunately they are vanishing fast. There is need to create awareness among the people about the scientific use of medicinal plants and to conserve them to make use of Ayurveda popular. Medicinal plants such as Aonla, Asparagus, Cinnamon, Neem, Jamun, Pomegranate, Tamarind etc. can be grown in the herbal gardens. For planting along the roads, the tree species should grow straight with medium canopy. Hardy, evergreen, deep rooted, flowering trees instead of fruit and other valuable species should be preferred. Tree species such as Coral tree, Protea, Plumeria, Raintree and Narra are preferred in these areas. Strong and deep-rooted trees should be preferred in these areas so that they can be protected from fast winds. Many times we observe that trees alongside the roads are uprooted

because of fast winds. Proper planning is necessary to facilitate water infiltration around the trees. Fruit trees such as Mango, Sapota, Lemon, Ber, Fig, Apple, Papaya, Guava etc. are preferred in residential premises. Trees such as Bottle brush, Bakul, Champaka, Exorta night Jessamine etc. can beautify our surroundings. Promotion of fruit trees cultivation can also motivate the people to plant more trees and take proper care. Recommended doses of insecticides, pesticides and fertilizers can be used for the utmost care of trees. In urban areas we generally grow trees and plants in our houses or institutions but nowadays this is not necessary that we will find open spaces for the plantation in these areas. Multistoried buildings and housing complexes have reduced greenery in the urban areas as apartment complexes do not always offer space to grow trees. We should not despair over this matter and need to find solutions. Now concept of urban agriculture has been emerged through which we can use our roofs and balconies of our buildings for plantation. We can use pots, old discarded buckets, drums, trays etc. for plantation at the roofs of our residential buildings. Besides ornamental plants, vegetables can also be grown at our rooftops. For a good rooftop garden we must waterproof the place and should have proper drainage systems. If we do not water proof the place although our plants may not suffer it may harm our buildings. Seepage can occur in walls which further can damage the buildings. The water on the rooftop should not stagnate at one place and it should have suitable outlets. Many people in the urban areas are often keen to plant trees at their homes but they don't get the proper guidelines and planting material. They can seek the technical guidelines from the agricultural universities, agricultural institutions and concerned department. Print media and television too can play an important role for creating awareness on trees plantations in the urban areas. The NGOs and Municipal Corporations can also help to motivate the urban people in this direction. There is need to make the eco-clubs who can encourage the people in planting trees. We need to make joint efforts to control the pollution. (The writer is Chief Scientist & Head of KVK Reasi SKUAST-J)

BAIRAJ CHAWALGAMI

Pollution is a curse for the humanity and in India, we are beset with the growing scourge of pollution. The menace of pollution is threatening us and it has assumed alarming proportions. In the capital of our country there is dangerous and alarming pollution and the life of people there has become a hell. People of Delhi are facing worst and worrisome pollution which is posing a big health hazard to the Delhiites and people are facing dangerous breathing ailments. It, is no exaggeration to state that the air of Delhi has become poisonous and Delhi can be appropriately called Deadly. The ill effects of pollution are threatening the health and lives of the people. Citizens should be conscious of the hazards of pollution as the negative and ill health effects of pollution are many and the people should cooperate with the government/governments to combat pollution so that it may not be poisonous and

devour our lives. The risks of health problems are many and it should be brought under control so that pollution may not pose health problems to the people. We in India observe National Pollution Control Day annually on 2nd December and this is the occasion for making people aware about the ill effects of pollution and making them aware about the need and necessity of controlling pollution so that it may not become alarming and threaten our health and wellbeing. We should be well conscious of pollution and its poisonous effects and take necessary steps to contain pollution so that it may not badly impact our health. On the occasion of the national pollution day let us resolve to keep pollution under control so that it may not become a health hazard and will not be alarming to the society. It is also a day to commemorate the unfortunate Bhopal gas tragedy and it reminds us of the harmful and ill effects of pollution if it goes uncontrolled. We, should save

ourselves and others as well from the harmful impact and adverse effects of pollution. It is the day to acquaint and aware ourselves about the ill health effects arising due to alarming increase of pollution. As already said above National Pollution Control Day is observed every year to commemorate the victims of the 1984 Bhopal Gas Tragedy and to raise awareness about pollution control and prevention. The day serves as a of the severe consequences of the industrial negligence and encourages individuals, organisations, and governments to adopt sustainable practices and strengthen environmental policies. The day marks the anniversary of the tragic gas leak at the Union Carbide pesticides plant in Bhopal, India, on the night of December 2-3, 1984. A leak of toxic methyl isocyanate [MIC] gas resulted in thousands of immediate deaths and long-term health problems for hundreds of thousands more. The disaster was one of the

world's worst industrial pollution incidents acting as a wake-up call to emphasize the need for a stricter pollution control and safety measures. It serves as a reminder of the devastating human and environmental impact of industrial pollution disasters. The day aims to highlight the dangers of polluted air, water, and land, and the importance of controlling and preventing pollution. Purpose and goals---1-Promoting Prevention-It encourages people and industries to take steps to prevent future industrial disasters. -2-Highlighting environmental laws-The day emphasizes the need for strong environmental laws and safety measures. -3--Encourages Action---It promotes awareness about the need to protect natural resources and adopt sustainable lifestyles. Ways to Participate---1-Reduce pollution--Individuals can help by using public transport, carpooling, cycling, and

reducing plastic waste. -2-Proper waste management--Segregating waste and promoting recycling are crucial steps. 3--Increase greenery--Planting trees and caring for plants contributes to healthier environment. 4-Conserve resources---Being mindful of electricity and water usage helps conserve energy. 5-Spread awareness---Educating others about pollution and sustainable practices is a key part of the day's goal. 6--Support stricter regulations---Advocate for and support government enforcement of strict regulations on industrial emissions and pollution. National pollution day is a significant observance in India, reminding everyone of the crucial need to control pollution for healthy environment. This day is especially relevant for students who aim to build a better, cleaner future. Building on the importance of a cleaner environment, it is essential to know the basics about National Pollution Day and its timing in India in 2025. In 2025, pollution control

day falls on Tuesday, 2nd December. The day emphasizes preventive measures and policy awareness to reduce air, water, soil, and noise pollution across the country. The day also reflects India's ongoing struggle with rising pollution levels in urban and rural areas, schools, colleges, and communities use this day to discuss the importance of pollution control for public health and environmental sustainability. he day offers people and students particularly a chance to understand real-life implications of pollution and motivates them to become responsible citizens. Activities organised in schools and colleges teach students about eco-friendly habits, environmental laws, and sustainable technology, preparing them for academic projects and practical actions. To conclude it is apt to say that on this day we should take a pledge to sincerely work for the pollution control so that the health of the people is saved and a better and healthy society is ensured.

COMBATING AGRICULTURE POLLUTION

DR. PARVEEN KUMAR

The second day of last month of the year celebrated as the National Pollution Control day is a day dedicated to awareness and sensitization of masses on a very important issue of pollution; having a very detrimental effect to all forms of life on this planet. At the same time, the day also reminds us of our role and responsibilities to control the menace of pollution in every form and that emanating from every source. Among the different sources of Pollution are industries, power plants, transport sector, improper waste management, domestic biomass fuel and agriculture. The major forms of pollution include water pollution, air pollution, noise pollution, plastic pollution, soil contamination, radioactive contamination and thermal pollution. Among the different types of pollution India, pollution arising out of agriculture has emerged as a significant challenge threatening existence of life and livelihood. The most polluted cities in India like Delhi, Patna, Faridabad etc. are surrounded by large farming areas. In the past few decades pollution from agriculture has been threatening all of us and has become a cause of worry for the agricultural scientists, policy makers and planners. Agricultural pollution refers to biotic as well as abiotic byproducts of farming practices that result in contamination or degradation of the environment and surrounding ecosystems, and/or cause injury to humans and their economic interests. As a result of various industrial activities and emissions from vehicles, pollutants like carbon monoxide, sulphur dioxide and oxides of Nitrogen are released in the air. Improper waste management in the form of landfills and burning of garbage also leads to soil and air pollution. The pollution may come from a variety of sources, ranging from point source such as water pollution (from a single discharge point) to more diffuse, landscape-level causes, also known as non-point source pollution and air pollution. Once in the environment these pollutants can have both direct effects in surrounding ecosystems, i.e. killing local wildlife or contaminating drinking water and downstream effects such as dead zones caused by agricultural runoff is concentrated in large water bodies. In a 2023 report on the 25 most polluted cities, nine cities were from India. Different agriculture related pollutants further worsen the air quality of these cities. India is the world's second-largest food producing country in the world. Agriculture leads to



Pollution in the following ways: GHGs and agriculture: Agriculture is an important source of GHG emissions. Agriculture related emissions from agriculture are mostly in the form of Methane, Nitrous oxide. According to the Global Carbon Atlas, India ranks third in total GHG emissions. Agricultural emissions in India are primarily from the livestock sector (54.6%) in the form of methane emissions due to enteric fermentation, use of nitrogenous fertilizers (19%), rice cultivation (17.5%), burning of crop residues (2.1%). Similarly soil dust arising out of ploughing and harvesting of crops also floats up in the air adding to air pollution. The soil dust accounts for a significant portion of PM 2.5 pollution, which has adverse effects on air quality and public health in the country. Crop Residue burning: According to the Indian Ministry of New and Renewable Energy (MNRE), India generates on an average 500 million tons of crop residue in a year. Although the majority of this crop residue is used as fodder, fuel or for other domestic and industrial purpose. There is still a surplus of 140 MT of which 92 MT is burnt every year. Burning of crop residues as has been noticed in several states of north India is also a major source of air pollution. It is responsible

for air pollution, public health concerns, green house gas emissions, radiation imbalance and declining soil organic matter and soil productivity. Although, burning crop residues is a crime under section 188 of the IPC and under Air and Pollution Control Act, yet the practice is going on more so in Punjab and Haryana where farmers burn the residues of Kharif crops like Paddy as they consider it an obstacle for performing tillage and other agricultural related operations for the rabi season crops. The burning of crop residue or biomass burning usually is done after the wheat harvest in April-May and the rice harvest in October-November, mostly in the northwestern regions of the country. In Oct.-Nov. the smoke from crop residues burning mixes with the fog to come out with a deadly combination Smog which makes even breathing difficult. Plant Protection Chemicals: Different types of chemical insecticides, pesticides and herbicides are applied to agricultural land to control insects, pests and unwanted plants that disrupt crop production by competing with main crop for nutrients and other resources. These persist and accumulate in soils and contaminate the soil thereby altering various soil microbial processes. With this, they also increase plant uptake of the chemical, and are toxic to soil organisms. Pesticides can also accumulate in animals that eat contaminated pests and soil organisms. In addition, pesticides can be more harmful to beneficial insects, such as pollinators, and to natural enemies of pests (i.e. insects that prey on or parasitize pests) than they are to the target pests themselves. Pesticide leaching occurs when pesticides mix with water and move through the soil, ultimately contaminating groundwater. Chemical Fertilizers: Different types of chemical fertilizers that are used to provide crops with additional sources of nutrients, such as Nitrogen, Phosphorus, and Potassium. Nitrogen fertilizers supply plants with forms of nitrogen that are biologically available for plant uptake; namely NO3 (nitrate) and NH4+ (ammonium). This increases crop yield and agricultural productivity, but it can also negatively affect groundwater and surface waters, pollute the atmosphere, and degrade soil health. Not all nutrient applied through fertilizer are taken up by the crops, and the remainder accumulates in the soil or is lost as runoff. Nitrate fertilizers are much more likely to be lost to the soil profile through runoff because of its high solubility and like charges

between the molecule and negatively charged clay particles. Besides these other chemical fertilizers also release many greenhouse gases which contribute to climate change. Metals: The major source of heavy metals (e.g. lead, cadmium, arsenic, mercury) in the agriculture production systems are fertilizers, organic wastes such as manures, and industrial byproduct wastes. Inorganic fertilizers especially represent an important pathway for heavy metals to enter soils. Besides, some farming techniques, such as irrigation, can lead to accumulation of selenium (Se) that occurs naturally in the soil, which can result in downstream water reservoirs containing concentrations of selenium that are toxic to wildlife, livestock, and humans. Steel industry wastes, which are often recycled into fertilizers due to their high levels of zinc (essential to plant growth), can also include the following toxic metals: lead, arsenic, cadmium, chromium, and nickel. The most common toxic elements in this type of fertilizer are mercury, lead, and arsenic. These potentially harmful impurities can be removed during fertilizer production; however, this significantly increases cost of fertilizer. Livestock: Ruminant like buffalo and cattle owing to their digestive process also emanate methane owing to enteric fermentation which is also a potent Green House Gas contributing to Global Warming. The methane emanating from ruminants constitute 14% of India's total methane emissions. Due to enteric fermentation, the livestock in the country is responsible for generating 200 million tons of pollution each year. This is like the sky with as much pollution as over 30 million airplanes emit in a year. This adds to the problem of air pollution in India. National Pollution Control Day: The National Pollution control day is celebrated every year on December 02 in the memory of the precious lives that were lost as a result of the accidental leakage of the poisonous Methyl Isocyanate gas from Union Carbide factory on the intervening night of Dec. 02 and 03 in 1984. For controlling agriculture pollution, there is an urgent need to promote sustainable farming practices, offering alternatives to crop residue burning, and improving livestock management are essential strategies, along with replacing chemical intensive agriculture with natural farming practices. On this day, let us commit ourselves to the cause of mother earth and protect its precious resources from all types of pollution. (The author writes on agriculture and social issues)