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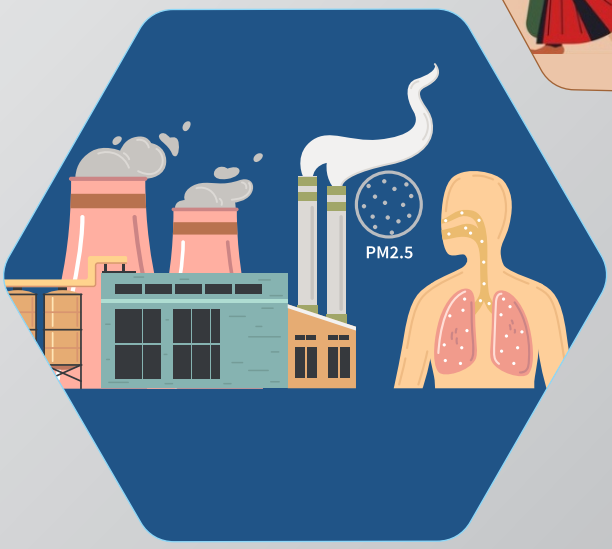

Regional Centre for Urban and Environmental Studies
All India Institute of Local Self-Government, Mumbai

Regional Centre for Urban & Environmental Studies (RCUES), Mumbai

(Supported by the Ministry of Housing and Urban Affairs, Government of India & Accredited under Capacity Building Commission's National Standards)

All India Institute of Local Self-Government (AIILSG) established in 1926, is a premier & autonomous research and training institution in India. It is a guide to Urban Local Bodies (ULBs) and contributed to the principles and practice of urban governance, education, research and capacity building.

The Regional Centre for Urban & Environmental Studies (RCUES) anchored by All India Institute of Local Self Government (AIILSG), Mumbai, was established in 1968 & supported by the Ministry of Housing and Urban Affairs (MoHUA), Government of India (GoI). The MoHUA, GoI has formed National Review and Monitoring Committee (NRMC) for RCUES, Mumbai in 2018 under the Chairmanship of the Secretary, MoHUA, GoI. The Principal Secretary, Urban Development Department (UDD), Government of Maharashtra (GoM) is the ex-officio Chairperson of the Advisory Committee (AC) of RCUES, Mumbai, which is established by MoHUA, GoI.

RCUES, Mumbai has received an Accreditation Certificate under the Capacity Building Commission's National Standards. RCUES, Mumbai is registered on Integrated Government Online Training (iGOT) platform of Karmayogi Bharat, GoI and associated with Amrit Gyan Kosh under Mission Karmayogi, GoI. RCUES, Mumbai is empaneled as Swachhata Knowledge Partner (SKP) for capacity building & technical support to ULBs under Swachh Bharat Mission (SBM) 2.0, MoHUA, GoI & also registered as a Partner with Swachhata Hi Seva (SHS) 2024 Portal.

RCUES, Mumbai as a National Training Institute (NTI), undertakes capacity building initiatives for elected representatives, municipal functionaries & mission functionaries from the States of Maharashtra, Goa, Gujarat, Rajasthan and UTs of Diu, Daman, Dadra Nagar Haveli & Lakshadweep from the western region and Assam & Tripura from northeast region. Over the years, RCUES, Mumbai has been working in close coordination with states and Urban Local Bodies (ULBs) to provide strategic, advisory, technical and capacity building support focusing on preparing action plans/strategies, technical assessment reports, urban plans such as DPRs, CSPs, CDPs as well as providing on-ground support by engaging with communities for assessment and improvement in infrastructure service delivery in cities.

RCUES, Mumbai has initiated Training Needs Assessments (TNA) and impact assessment to better understand the effectiveness of their training programs. This approach helps identify knowledge/skill gaps and measure the outcomes of training initiatives. The assessments aim to enhance capacity building efforts and improve training program delivery.

Maharashtra Urban WASH and Environmental Coalition (Maha UWES-C) is a joint initiative of the RCUES of AIILSG, Mumbai, and UNICEF Maharashtra. In 2022, MoU is signed with the Directorate of Swachh Maharashtra Mission, Urban Development Department, Government of Maharashtra for building capacities, facilitating partnerships, and supporting innovations under Swachh Maharashtra Abhiyan - Urban 2.0 under Maha UWES-C.

In 2017, AIILSG was empaneled among one of the 35 agencies in India for conducting Integrated Capacity Building Programmes (ICBP). AIILSG Mumbai is supporting the states of Maharashtra, Rajasthan and Goa for the same.

RCUES, Mumbai is advancing capacity building initiatives by extending its efforts beyond training and workshops, urging strong collaboration with states and ULBs. Driven by a small but passionate team, it remains dedicated to empowering municipal officials, with the goal of strengthening governance, thereby enabling better cities.

The Urban World - Quarterly Publication of Regional Centre for Urban and Environmental Studies of All India Institute of Local Self-Government, Mumbai

(October-December, 2024)

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Editorial

Current debates on the urban development trajectory have raised several questions in the minds of policy makers, town-planners, development practitioners and civil society organizations. How can social and economic policies strive to achieve sustainable development? How do policy makers address the trade-off between ecological sustainability and equitable development? Can we dream of achieving economic development, which is both sustainable and egalitarian at the same time? Can we achieve inclusive growth through targeted reducing of inequality? What are the policy implications of sustainable development? Can sustainable development offer better healthcare, education, access to better quality education and other amenities– such as clean drinking water and sanitation as well as promote participatory development and gendered equitable society?

In this context, it is important to focus on the relationship between sustainable development and socioeconomic parameters on the one hand and ecological sustainability on the other, while emphasizing the pivotal role of public policy in addressing these questions. There is an urgent need to explore innovative and pragmatic policy approaches, consider the complexities and trade-offs involved, and present case studies and best practices in the areas of urban transport, housing, air quality, WASH agenda and human security.

The decision makers of the urban local self-government bodies must be vigilant about emerging trends, potential challenges and opportunities that lie ahead. This forward-looking approach includes considerations of how technological advancements and innovations, environment and socioeconomic and attitudinal transformation shape the structure of public policy in addressing the above aspects. In essence, how might these current trends and trajectories shape the future from a variety of perspectives and envision the policy design with a multidisciplinary approach wherein professional experts, administrators, and development practitioners share their views on sustainable development towards more equitable and resilient society and ensuring safe environment. Discourses must happen under three rubrics, mentioned below: Environmental Sustainability, Economic Sustainability and Social Sustainability.

The Urban World invites scholars, policy makers, practitioners, urban planners and researchers to send their original research-based articles and book reviews with special focus on developmental concerns of the Urban India.

Call for Research Papers!

The Regional Centre for Urban & Environmental Studies is pleased to invite contributions for Urban World in the form of articles and research papers from researchers, authors, publishers, academicians, administrative and executive officers, readers on the following themes –

1) Environmental Sustainability
2) Solid Waste Management
3) Women Empowerment
4) Safe Cities for Women
5) Responsive Urban Governance
6) Citizens Participation and Local Governance.
7) Sustainable Urban Transportation

Articles could be between 2000 to 4000 words. They may contain compatible tables, charts, graphs, etc. We reserve the right to edit for sense, style and space. Contributions may be e-mailed in digital form as a Word file to the Director, RCUES, Mumbai.

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Union Budget 2024 and Inclusive Cities: An Appraisal of India's Urban Development Schemes & Policies

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Abstract

In quest of building sustainable and inclusive cities, the Budget 2024 has identified urban development as one of the nine priority areas with the budgetary allocations for the Ministry of Housing and Urban Affairs (MoHUA), Government of India (GoI) increased by almost 19 percent. This paper analyses their implications for inclusive urban transformation. PMAY-U accounts for 62 percent of the total budgetary allocations but the schemes have benefitted middle- and high-income group people more than the urban poor. Revised eligibility norms, increased financial assistance and better credit risk guarantee under the PMAY-U 2.0 could ensure greater incidence of benefits reaching the 'deserving' beneficiaries and slum dwellers. The allocations for addressing urban service deficits indicate neglect of smaller towns. Even the big-ticket metro projects have continued to attract sizable budgetary allocations, albeit, they hardly benefit the majority of people both in terms of accessibility and affordability. Given such exclusionary trend, this paper argues for rethinking urban policies through empowerment of the city government and integration of urban poor's needs in urban planning and governance mechanisms so as to achieve the mission of Viksit Bharat – Developed India by 2047.

The Backdrop

India is urbanizing rapidly with an expectation of adding more than 416 million people to it's cities by 2050, almost doubling its size. Urban policy makers are facing two uphill challenges for managing this massive urban transformation. First, to capitalize on the benefits of agglomeration economies towards creation of greater employment opportunities and sustainable economic growth. And second, to make the cities inclusive and livable. However, availability of urban infrastructure has been inadequate and of poor quality, jeopardizing the prospect of Indian cities to emerge as the 'growth hubs' as envisaged by the Union Budget 2024-25. Importantly, these deficiencies pervade both large and small cities in India but tend to be more severe in smaller cities and poorer regions and informal & slum settlements within the cities.

Considering universal application of service delivery norms set by the Ministry of Urban Development in 2008, the HPEC (2011) estimated urban infrastructure investment deficit of $827 billion at 2009-10 prices for the period 2012-2031. Urban roads and transport accounted for about two thirds of this deficit and about one-fourth of this total was for water and sanitation services. Persistence of such investment deficits in our cities is evident from the World Bank study that highlights the urban investment requirements of

$840 billion in the next 15 years till 2036 (Athar et al., 2022). Of this total, $450 billion is needed for addressing the deficits in provision of basic municipal services like water supply, sewerage, waste management, roads, street lights and storm water drainage while about $300 million is required to build mass transits. Given the huge investment deficits, the annual budgetary provisions of urban development are unlikely to offer any magic solution. Yet, they reflect on the future course of urban policy making. This paper decodes the budgetary allocations under urban schemes and analyses their implications for making the cities inclusive as well as livable so that they transform into the growth hubs.

Cities & Union Budget 2024-25

The Union Budget of the last few years recorded increasingly higher allocations for urban development and housing. The Union Budget 2024-25, which was presented by the Finance Minister on July 23, was the first budget by the third NDA government, which presented interim budget 2024-25 in the month of February. Identification of urban development as one of the nine priority areas by the Budget 2024 is in line with that trend and also with the NDA government's continued rhetoric of building sustainable and inclusive cities.

The MoHUA, GoI receives an allocation of INR 82577 crores equaling almost 19 percent increase over the revised estimates of INR 69270 crores in 2023-24 (the allocation for interim budget 2024-25 was INR 77523 crores) (**Table 1**). However, the same allocation as a percentage of GDP has declined from 0.45 percent in 2021-22 to 0.25 percent in 2024-25 (Rana et al, 2024). Going by the allocation trend from 2021-22, revised budgetary allocation would be about 8 percent of the budget estimate for the FY 2024-25. Funds have been allocated broadly under central sector schemes and centrally sponsored schemes. For both the schemes, there are increases in budgetary provisions in 2024-25 of about 9.5 percent and 26 percent respectively.

Table 1: Budget - Ministry of Housing and Urban Affairs, Government of India

Centre's Expenditure	**Actual Estimate**	**Budget Estimate**	**Revised Estimate**	**Interim Budget**	**Budget Estimate**
(in INR crores)	**2022-2023**	**2023-2024**	**2023-2024**	**2024-2025**	**2024-2025**
Net of Recoveries	77310	76431	69270	77523	82577
Revenue Component	50432	50434	42737		53948
Capital Component	26878	25997	26533		28628
Total MRTS and Metro Projects	23603	23175	23104	24931	24932
Pradhan Mantri Awas Yojana Urban (PMAY U) - 1. Credit Linked Subsidy Scheme (CLSS)- I for Economically Weaker Section (EWS) / Lower Income Group (LIG)	10820	0.01	0	0	3000

Centre's Expenditure	Actual Estimate	Budget Estimate	Revised Estimate	Interim Budget	Budget Estimate
(in INR crores)	2022-2023	2023-2024	2023-2024	2024-2025	2024-2025
PMAY U - 2. CLSS-II for Middle Income Group (MIG)	.	.	.	.	1000
PMAY U (Total)	28652	25103	22103	26170	30171
Deendayal Antyodaya Yojana - National Urban Livelihoods Mission (DAY-NULM)	547	0.01	523	0.02	300
Prime Minister Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi)	405	468	468	326	326
Atal Mission for Rejuvenation and Urban Transformation (AMRUT)	6499	8000	5200	8000	8000
Smart Cities Mission (SCM) - Mission for Development of 100 Smart Cities	8479	7665	7718	2237	2237
SCM - City Investments to Innovate, Integrate and Sustain (CITIIS)	233	334	281	163	163
SCM (Total)	8652	8000	8000	2400	2400
Swachh Bharat Mission Urban (SBM-U)	1926	5000	2550	5000	5000

Source: https://www.indiabudget.gov.in/

Although the increased budgetary allocations seem to be promising, would these be helpful in facilitating inclusive urban transformation? The following sections attempt to address this concern.

The Budgetary Allocations and the Primacy of PMAY-U

Among the centrally sponsored schemes, the PMAY-U accounts for 62 percent of the total budgetary allocations. The PMAY-U has been given INR 30171 crores as against INR 22103 crores in 2023-24 (and INR 26170 crores in the interim budget 2024-25). Since inception of PMAY-U in 2015, as on 29 July 2024 - a total of about 11.86 million houses have been sanctioned based upon the housing demand survey by the municipalities, of which 11.43 million houses have been grounded for construction and 8.54 million houses are completed. The overall investment approved is INR 8.07 lakh crores, of which the contribution of centre, state & beneficiaries was 2, 1.23 & 4.85 lakh crores respectively. The major thrust on housing was the outcome of the government mission of Housing for All by 2022. This physical progress falls way short of urban housing shortage of 29 million in 2018 as estimated by the Indian Council for Research on International Economic Relations (ICRIER) Report 2020. The Report also estimated the

housing inadequacies[1] separately for slum and non-slum areas of Indian cities. Almost 44 percent of slum households live in inadequate houses while the incidence of inadequacies is about 20 percent for the non-slum households. Moreover, 99 percent of the urban residents experiencing housing shortages belonged to the lower income groups.

In-Situ Slum Redevelopment Scheme (ISSR)

Among the four verticals of the PMAY-U, the ISSR aims to provide in-situ houses to the marginalized households in slum settlements lacking ability to access houses through formal housing markets. However, the number of housing units sanctioned under the ISSR is only about 3 lakh units. Redevelopment of slums uses government land or private land and involves participation of multiple agents including government departments, private landowners, private developers, and, in some cases, slum dwellers' associations. Apart from the financial provision of Rs. 1 lakh per housing unit, there are provisions of extra floor space index (FSI) or transferable development rights (TDR) to incentivize the private developers.

However, the implementation of ISSR schemes is constrained by legislative and administrative difficulties in accessing land, lukewarm private sector response owing to limited scope of profit making, procedural delays in tendering as well as approvals of projects. Neither the developers possess knowledge about the needs of slum dwellers, nor do they find opportunities to get involved in different stages of housing projects under the ISSR. In many redevelopment cases, the poor households have been uprooted from their livelihood sources leading to deterioration in their quality of life. The success of JAGA Mission in Odisha entails important lessons for rethinking supply driven top-down approaches inherent in the implementation of ISSR. The Mission combines the granting of non-transferable land title to the slum dwellers with the provision improvement in basic amenities and infrastructure through community participation. Replicating similar approaches in other cities would make the ISSR more effective in addressing the housing inadequacies of the urban poor.

Credit Linked Subsidy Scheme (CLSS)

The re-introduction of the CLSS component with budgetary provisions of INR 3000 crores for the economically weaker sections/lower income group people and INR 1000 crores for the middle-income group is the other notable feature of the current budget. The CLSS scheme was discontinued in the last two years, after having heavy focus during the government mission of Housing for All by 2022. This Scheme has its precursor in the form of Rajiv Rinn Yojana (RRY) with provision of interest subsidy for improving housing affordability of the urban poor in 2013. It functions as a central sector scheme for providing interest subsidy on home loans taken by eligible beneficiaries of Economically Weaker Section (EWS) / Low-Income Group (LIG) and later extended for the middle-income group (MIG) for purchase or re-purchase or construction of houses or incremental housing (**Table 1**). The interest subsidy of 6.5 percent is available for loan amount up to Rs.6 Lakh for EWS (with annual household income upto 3 lakhs)/LIG (with annual household income between 3 to 6 lakhs) while MIG-I group (with annual household income between 6 to 12 lakhs) is eligible for interest subsidy of 4 percent for loan amount up to 9 lakhs and for MIG-II group (with annual household income between 12 to 18 lakhs) is eligible for interest subsidy of 3 percent for loan amount upto 12 lakhs.

[1] *Inadequate houses refer to either non-pucca houses or obsolete houses (housing units being more than 60 years old and between 40 and 60 years with bad condition) or congested houses (housing units lacking a separate room for a married couple).*

Primary lending institutions (PLIs) credit the interest subsidy of Rs, 2.67 lakhs (against loan amount of 6 lakhs at 6.5 percent interest rate); Rs. 2.35 lakhs (against loan amount of 9 lakhs at 4 percent interest rate) and Rs 2.30 lakhs (against loan amount of 12 lakhs at 3% interest rate) upfront to loan account of EWS/LIG, MIG-I and MIG-II groups respectively. This is estimated to reduce the Equated Monthly Instalment (EMI) for EWS/LIG, MIG-I and MIG-II groups by Rs. 2579, Rs.2268 and Rs. 2211 respectively (Kundu and Kumar, 2017).

As on 12 August 2024, 6.08 lakh MIG households have benefited from CLSS out of a total of 25.04 lakh CLSS beneficiaries, which is about 24 percent of total beneficiaries. The specified carpet areas of the dwelling units for the EWS and LIG groups remain unchanged at 30 sqm and 60 sqm respectively while the same for the MIG I and MIG II groups have been increased from 120 sqm to 160 sqm and from 150 sqm to 200 sqm respectively in 2021. These changes were introduced to widen the scope and coverage of the scheme as increased carpet areas would cater to the MIG groups' preferred categories of housing and provide a fillip to the sale of ready built affordable housing units (Kundu and Kumar, 2017).

However, an analytical examination of the CLSS guidelines and beneficiary reveals that the scheme has not been responsive to the housing needs of the economically marginalized EWS/LIG groups. Receipt of the subsidy under the CLSS is linked to the beneficiaries' eligibility to secure a home loan from the PLIs which, in turn, depends on the creditworthiness of the home loan borrowers. This latent conditionality practically excludes the low-income households with uncertain income stream as the PLIs check their creditworthiness from business perspectives (Khaire, 2023). Even after becoming eligible for the interest subsidy, the urban poor could find it difficult to pay the balance EMI.

Kundu and Kumar (2017) estimated that repayment of loan amount with interest generally exceeds half of the earnings of the EWS and LIG groups. Moreover, in the pretext of promoting affordable housing the inherent objective of the CLSS schemes seems to enhance the uptake of housing stocks. Various reports of the property consultancy firms have indicated a distinct deceleration in demand for housing units priced under Rs 50 lakhs over the last five years (The Hindustan Times, 2024). Housing developers with their better access to policy making circles have been successful in extending the scheme benefits to the MIG groups having relatively better repayment capacities that also suit the financial interests of the PLIs. Such alignment of business goals of housing developers and PLIs has, in practice, facilitated affordable housing demand catering to the needs of MIGs and developers (Khaire, 2023).

Rental Housing

Given most of the urban resident's lack of affordability to own a house, rental housing can potentially cater to the increasing demand for housing. Majority of the urban poor engaged in the informal sector or being self-employed prefer inexpensive rental accommodations with greater flexible housing options. So, the budget proposal of rental housing, specifically the dorm-like accommodations in PPP (Public-Private Partnership) mode for the industrial workers, appears to be a timely intervention. Earlier, in 2020, the central government experimented with the Affordable Rental Housing Complexes (ARHCs) as a sub scheme under PMAY-U to respond to the housing needs of the urban poor, especially the migrants who were hard hit by COVID-19. There were provisions for repurposing the vacant houses in the cities to rentals through PPPs and developing rental housing by public or private entities on their own available vacant land. This indicates over-reliance on the private sector for building rental housing units.

However, in spite of the concessions including tax rebates, project loan at lower interest rate, additional Floor Area Ratio (FAR)/ Floor Space Index (FSI), provision of trunk infrastructure, the private sector response to this scheme was lukewarm. Even in case of the housing units being constructed under the ARHC scheme, there are multiple problems in terms of poor location and non-availability of basic urban services, making the rental housing units inhabitable. Moreover, affordability remains a key concern as rents of the units under the AHRC have often exceeded the prevailing private rental market rent (Harish, 2021). Absence of specific income criteria for eligibility and implicit binding of rental housing access to the beneficiaries' ability to pay rent put the most vulnerable urban poor in disadvantageous position. Further, the experiences of Mumbai Metropolitan Region Development Authority led rental housing scheme reveal two crucial implementation challenges – first, lack of capacity of the public agency to manage rental housing stock and second, improper assessment of needs and capacities of the beneficiaries[2] (Tandel et al., 2016). Given these complexities, the budget document's emphasis on the enabling policies and regulations for efficient and transparent rental housing markets is praiseworthy. Fast tracking the implementation of the Model Tenancy Act with provisions for safeguarding the interests of the vulnerable sections and setting up of professional rental management committees to manage the renting practices can be helpful in bringing efficiency and transparency in the rental housing market in India.

The Union Cabinet, chaired by Hon'ble Prime Minister Shri Narendra Modi, approved PMAY-U[3] 2.0 on 9 August 2024, under which financial assistance will be provided to 1 crore urban poor and middle-class families through States/Union Territories (UTs)/PLIs to construct, purchase or rent a house at an affordable cost in urban areas in 5 years. The central government assistance of ₹ 2.30 lakh crore will be provided under the Scheme. The PMAY-U 2.0 will have four verticals: Beneficiary-Led Construction (BLC), Affordable Housing in Partnership (AHP), Affordable Rental Housing (ARH) & Interest Subsidy Scheme (ISS). In order to seek benefit under PMAY-U 2.0, States/UTs will have to formulate 'Affordable Housing Policy' containing various reforms and incentives for ensuring active participation of Public/Private entities and promote Affordable Housing Ecosystem. 'Affordable Housing Policy' will include such reforms which will improve the affordability of 'Affordable Housing'. Technology & Innovation Sub-Mission (TISM) will be set up under PMAY-U 2.0 to guide and facilitate States/UTs and other stakeholders in adoption of modern, innovative and green technologies and building material for faster and quality construction of houses. Under TISM, States/UTs/Cities will be assisted through innovative practices and projects in challenge mode focused on disaster resistant and environment friendly technologies for climate smart buildings and resilient housing.

In essence, it seems that the PMAY-U scheme has benefitted middle- and high-income group people more than the urban poor. On a positive note, the PMAY-U 2.0 envisages certain changes to make the program inclusive (The Times of India, 2024). Under the CLSS scheme, households with annual income up to 9 lakhs are eligible for interest subsidy for dwelling units of up to 120 sqm. Households opting for a house costing maximum Rs. 35 lakhs can avail loan up to Rs. 25 lakhs although the 4 percent interest subsidy is provided only for Rs. 8 lakh loan amount over a repayment period of 12 years.

Under the Beneficiary Led Construction (BLC) vertical, the financial assistance for the EWS group

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[2] *This scheme was launched in 2008 in PPP mode to construct half a million single-roomed tenements within a span of five years.*

[3] *https://pib.gov.in/PressReleasePage.aspx?PRID=2043924*

(with annual income less than Rs. 3 lakh) is increased from Rs.1.5 lakh to Rs. 2.5 lakh per house. The other important vertical – ISSR is subsumed within the AHP vertical with higher financial assistance of Rs. 2.5 lakhs per house as compared to the previous provision of Rs. 1 lakh per house. Credit Risk Guarantee Fund Trust (CRGFT) offers credit risk guarantee to the urban poor taking housing loans from the PLIs. Recent increase in the CRGFT's corpus from Rs. 1000 crore to Rs. 3000 crore would ease the processing of housing loans for the urban poor. Strict adherence to these revised norms could ensure greater incidence of benefits reaching the 'deserving' beneficiaries and help them to manage the increasing costs of housing construction. This must be backed up by regulatory measures to control housing prices, especially targeted for the EWS/LIG households. In this context, the digitalization of land records with GIS mapping, if implemented properly, would ease the administrative difficulties in providing land titles to the poor. Proper urban planning coupled with reforms in land development regulations, as envisaged in the Budget, would also facilitate adequate supply of urban land for housing.

Budgetary Allocations for Urban Basic Services and Urban Transport

Cities in India continue to experience significant urban service deficits. The NSSO (2019) report shows that almost one-fifths of households in urban India lack access to water within their homes and 6 percent of them collect water from sources situated more than 200 meters away from their homes. In case of sanitation, about 16 percent of the urban households rely on shared facilities while 8 percent and 4 percent urban households lack access to bathroom and latrine facilities respectively (NSSO, 2019). Inadequate access to basic services affects every part of people's lives – greater is service deficits, higher is the negative impact on productivity and prosperity of people.

Among the different government programs for addressing service deficits, the proposed outlay for AMRUT scheme has registered an increase of about 54 percent from the revised estimate of Rs. 5200 crores in 2023-24 to INR 8000 crores for 500 cities.

In case of SBM-U, the current budget has proposed Rs. 5000 crores as compared to the revised allocation of Rs. 2550 crores in 2023-24 (**Table 1**).

On the other hand, the outlay for the SCM has decreased from revised estimate of Rs. 8000 crores in 2023-24 to budget estimate of Rs. 2400 crores in 2024-25 (also same in interim budget 2024 as the scheme's tenure is over). Notably, two budgetary heads namely City Investments to Innovate, Integrate and Sustain 2.0 (CITIIS 2.0) and National Urban Digital Mission (NUDM) – erstwhile component of SCM – have received separate allocations of Rs. 225 crore and Rs. 1450 crore respectively. The Budget has also proposed augmentation of basic services (water, sewerage and solid waste management) for 100 large cities in partnership with the State Governments and Multilateral Development Banks.

The Budget has continued its focus on MRTS and metro rail projects with budgeted allocation of Rs. 24932 crore, accounting for 83 percent of the central sector schemes in urban development. The Budget also envisions the Transit Oriented Development plans for only 14 large cities with a population above 30 lakhs.

These programs specific allocations have two important implications. First, they indicate the neglect of smaller towns at the expense of improving the availability of urban basic services in very few cities/towns only. This would make Indian urbanization more unbalanced and exclusionary as the incidences of service deficits are higher in rapidly growing smaller towns. Even in case of 100 smart cities, out of total proposed investment of Rs. 2.05 lakh

crore, 80 percent of the fund is earmarked for Area Based Development (ABD) projects while the rest is for the Pan City Development (MoHUA, 2024). The ABD projects have covered only a fraction of the city areas, for example, in case of the New Delhi Municipal Council (NDMC), the ABD project coverage is only 2.2 sq. km. out of total geographic area of 1,483 sq. km.

Over-reliance on commercially viable projects has resulted in concentration of such projects in city areas inhabited by the economically better off sections of the city population. Second, projects undertaken have failed to cater to the needs of majority urban people. For example, the big-ticket metro projects, although appealing to the popular imagination, hardly benefit the majority of people both in terms of accessibility and affordability. Inadequate public transport infrastructure and absence of multi-modal transport facilities has made the cities congested and polluted. In smart cities, there are some evidences showing preference for costlier infrastructure projects over the basic infrastructure required for majority urban residents. Under the SCM, projects related to water, sanitation and health account for only 18 percent of the total completed projects while the corresponding share for 'smart mobility' is 20 percent and only 2 percent of the entire transportation budget is focused on buses (Rana et al., 2024; Taraporevala, 2018). Moreover, the needs and priorities of urban poor fail to find representation in SPV led formulation of city development plans in the SCM. All these have made the urban policies increasingly exclusionary in nature.

Aspects of Urban Livelihoods

One concerning aspect of the current budget is that the livelihood of urban poor has received less attention. Budgetary allocation for the NULM programme has been reduced to Rs. 300 crores from the revised estimates of Rs. 523 crores in 2023-24 (allocation in interim budget 2024 was 0.02 crores). The DAY-NULM program was introduced in 2013 to provide gainful employment to urban poor, thereby reducing their poverty and vulnerability. Although about 8.7 lakhs SHGs have been formed in the cities, but lack of adequately diversified income generation activities has clouded the gainful employment opportunities for the urban poor. However, instead of reducing the budgetary allocation, repurposing of the NULM with focus on entrepreneurship development is urgently needed.

Even the PM SVANidhi sees a cut of Rs. 141.68 crores in 2024-25. IGSSS (2021) study indicated that, in spite of the scheme's poor coverage and small short term financial assistance of Rs. 10000, the scheme beneficiaries utilized the money to ease their business losses during COVID and to avoid debt trap of the private moneylenders. Provision of 100 weekly 'haats' or street food hubs in select cities, as declared in the budget, would hardly be able to address the livelihood challenges of millions of urban informal workers including the street vendors. There is a strong need for extending the outreach of PM SVANidhi with higher limit of credit, awareness campaigning, simplification of loan application process and involvement of the city government to meet the livelihood challenges of the street vendors.

Summing Up

With the limited availability of urban infrastructure investment in India, it is crucial to augment the scale of urban investment. Annual budgetary allocations can, at best, partly contribute to that endeavor. State and local governments are required to complement the central allocations for urban investment. Availability as well as utilization of market-based financing mechanisms can be useful

for trimming the investment deficits. This requires rethinking the urban policy making in India. This budget has acknowledged the importance of formulating a framework for enabling policies, bankable projects and market-based mechanisms. Empowerment of the city government in terms of functions, finances and functionaries should centrally feature in that framework. Empowered city governments can better conceive bankable projects and leverage the market-based financing instruments. Finally, the foregoing discussion reveals exclusionary trend and perspective in-built in the urban development program as well as policy design. So, instead of focusing on the needs of the urban poor in isolation, it is imperative to integrate their needs through participatory urban planning and governance so as to achieve the mission of Viksit Bharat – Developed India by 2047.

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Assessing Human Health Risks from Particulate Matter Pollution: A Study of PM2.5 in the Kolkata Metropolitan Area

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Abstract

A recent report by the US-based Health Effects Institute (HEI) identified Delhi and Kolkata as the cities with the highest exposure to hazardous fine particulate matter (PM2.5). To address this issue, regulatory measures have been in place in Kolkata since 2018 to comply with the National Ambient Air Quality Standards (NAAQS). This study examines PM2.5 levels in the Kolkata Metropolitan Area (KMA) and surrounding regions from 2021 to 2023, focusing on the associated human health risks. Findings reveal that transportation, households, and industries are the primary sources of PM2.5, with contributions varying across the metropolitan area. Mean and median PM2.5 concentrations are highest in Kolkata and nearby areas, including Bidhannagore and New Town Kolkata. Seasonal trends show elevated PM2.5 levels during both winter and summer.

Keywords: Particulate matter, Metropolitan Area, Kolkata, NAAQS, Air Pollution

Introduction

Over the past few decades, climate change and air pollution have become prominent global issues. The urban areas, facing extreme weather events like heavy rainfall, extreme temperatures, floods, and droughts poses a substantial threat to human health. The increasing levels of air pollution and the impacts of climate change pose significant challenges for rapidly growing cities in the modern era. According to the 2022 reports from the US-based HEI, higher levels of PM2.5 are associated with a reduction in human life expectancy by 1.5 years. The reports also emphasize that air pollution contributes to more than one in nine deaths worldwide (Health Effects Institute, 2022). Furthermore, the report observed that 93 percent of the population in India is exposed to higher concentration of particulate matter, contributing to the global health risks identified. Countries undergoing transitions from predominantly rural to increasingly urban societies, like India, face substantial challenges in addressing climate action and sustainable development. According to a World Health Organization (WHO) report from 2015, over seven million people globally succumb to diseases linked to PM2.5 pollution each year (WHO, 2016). Ambient air containing particulate matter with an aerodynamic diameter less than 2.5 μm (PM2.5) stands as the primary environmental factor contributing to morbidity and premature mortality. In 2017 alone, it is estimated to have caused approximately 2.9 million premature deaths worldwide (Stanaway et.al. 2018). Over the past few decades, this increase in air pollution has had noticeable impacts on human health, leading to the prevalence of conditions like asthma and cardio-respiratory illnesses (Sarath and Ramani, 2014;

Shaw & Gorai, 2020). The impact of PM2.5 induced diseases is unevenly distributed due to heightened exposures, limited surveillance, and a scarcity of preventive healthcare services. This burden disproportionately affects populations in low and middle-income countries, with particularly vulnerable groups including pregnant women, infants, and young children (Landrigan, 2018). US-based HEI reported that the majority of global cities surpass the air pollution guidelines set by the WHO, resulting in significant health risks. The report also highlights that Delhi and Kolkata rank as the top two most polluted cities in terms of exposure to hazardous fine particulate matter (PM2.5).

The KMA extends beyond the city of Kolkata, encompassing several neighboring districts and municipalities. As one of India's most populous and economically significant regions, the KMA boasts a thriving industrial and commercial sector, playing a pivotal role in the economic growth and development of West Bengal. Despite its significance, the KMA grapples with various urban challenges, including traffic congestion and environmental issues. Notably, concerns about air quality have arisen due to rising levels of air pollution in the region. Factors such as industrial activities, vehicular emissions, construction, and urbanization contribute to the deterioration of air quality in the KMA. Particular pollutants of concern encompass particulate matter (PM2.5 and PM10), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and volatile organic compounds (VOCs). These pollutants pose significant threats to human health, giving rise to respiratory problems, cardiovascular issues, and various other health complications.

This paper delves into the examination of the spatio-temporal variation of PM2.5 (particulate matter with a diameter of 2.5 micrometers or less) within the Kolkata Metropolitan Area. The primary objective is to understand the factors influencing PM2.5 levels in both the city and its surrounding regions. Additionally, the paper examines the human health risks associated with PM2.5 in the KMA.

Methodology

The methodology of this paper is segmented into the following subsections –

Study Area and Population

Table 1 presents the 12 monitoring locations along with the corresponding temporal duration of the data. These monitoring locations are distributed across six districts, namely Kolkata, North 24 Parganas, South 24 Parganas, Hooghly, Howrah, and Nadia.

Table 1: Air Quality Monitoring Stations in KMA

Monitoring Location	Data Recording Period		Duration
	Starting Time	Ending Time	
Serampore	1st November 2021	31st March 2023	17 Months
Kolkata	1st January 2022	31st March 2023	15 Months
New Town Kolkata	1st October 2021	31st March 2023	18 Months
Bandel	1st September 2021	31st March 2023	19 Months
Barasat	1st September 2022	31st August 2023	12 Months
Barackpore	1st June 2022	31st May 2023	12 Months

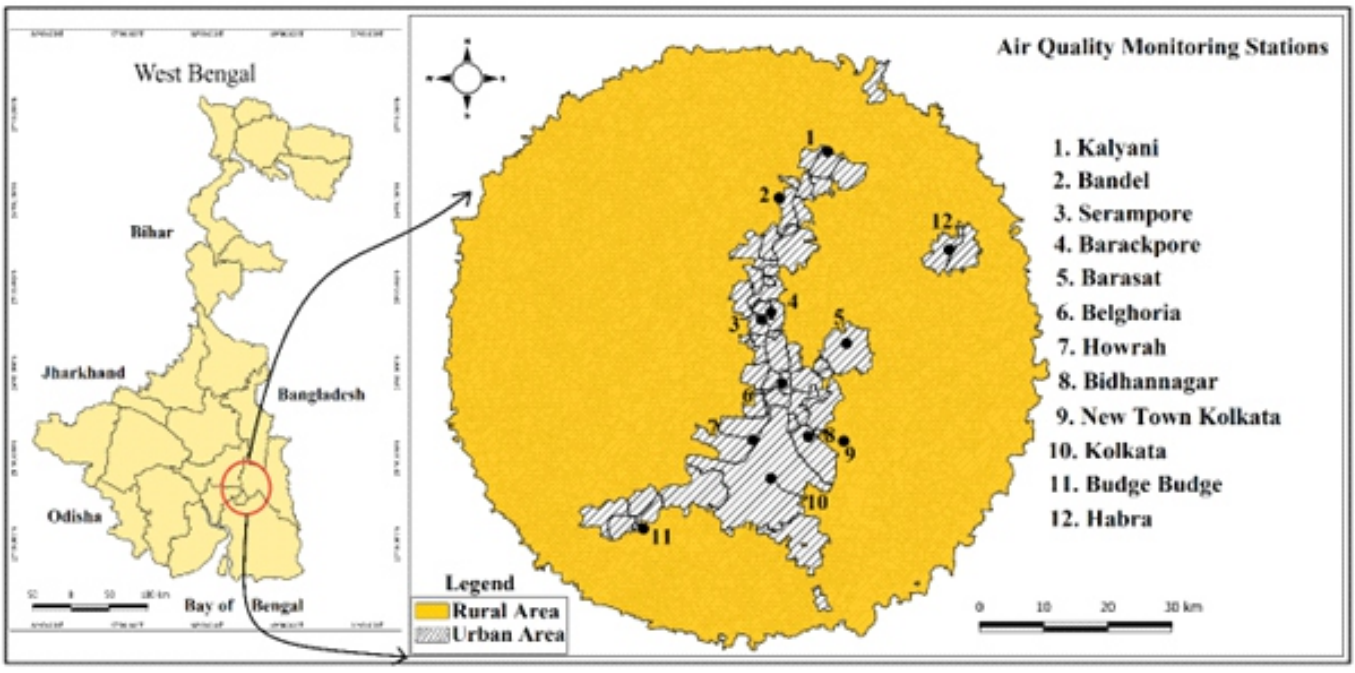
Monitoring Location	Data Recording Period		Duration
	Starting Time	Ending Time	
Belghoria	2nd July 2022	31st August 2023	14 Months
Kalyani	1st December 2021	31st March 2023	16 Months
Budge Budge	1st May 2022	31st May 2023	13 Months
Habra	1st December 2021	31st March 2023	16 Months
Howrah	1st March 2022	31st March 2023	13 Months
Bidhannagar	1st September 2022	31st August 2023	12 Months

Source: West Bengal Pollution Control Board, compiled by the author

It is worth mentioning that Budge Budge, Barackpore, and Bandel house thermal power stations. Within the Kolkata Metropolitan Area (KMA), Howrah, Barackpore, Belghoria, and Kalyani emerge as pivotal industrial centers. Bidhannagar, akin to Kalyani, and New Town Kolkata ranks among the KMA's most extensive and meticulously planned towns. Distinctively, Bidhannagar distinguishes itself as the flourishing IT hub of the state. Habra and New Town Kolkata, situated beyond the jurisdiction of KMA, also warrant attention.

The west bank towns of Hooghly River include Bandel, Serampore and Howrah while east bank town includes Kolkata, Budge Budge, Belghoria, Barrackpore and Kalyani. Among these Habra is the farthest town from the Kolkata. It is worthwhile to mention that monitoring stations are strategically located in a variety of places, including colleges, government offices, hospitals, factories and residential areas.

Figure 1: Location of the Study Area (50 Km. Radius)



Data Source and Methods

Hourly observations of the PM2.5 concentrations at 12 monitoring sites in our study period were collected from the real-time monitoring data system of the West Bengal Pollution Control Board (WBPCB). In order to uphold the integrity and dependability of the original data, the paper implemented rigorous data quality control measures on the hourly PM2.5 concentration data prior to analysis. This was done in accordance with regulations concerning the validity of air pollutant concentration data. As part of this process, any abnormal data points were eliminated to ensure accurate and consistent results. Data has been gathered from various stations for durations ranging from a minimum of 12 months to a maximum of 19 months.

This study explores the variability, trends, and exceedance patterns of PM2.5 levels measured at 12 stations within the KMA and its environs over a period of less than two years (2021-2023). An exceedance is recorded when the concentration of PM2.5 exceeds established air quality standards or limit values, which are globally defined by various agencies through air quality directives, acts, or guidelines. In India, the Air (Prevention and Control of Pollution) Act, and internationally, the WHO sets crucial thresholds for air pollutant concentrations and National Ambient Air Quality Standards (NAAQS) that should not be exceeded, both on a daily and annual basis. High PM2.5 levels are characterized as episodes when concentrations consistently surpass defined thresholds for three or more consecutive days. This research calculates the frequency and duration of pollution episodes, assessing the number of exceedances in a year, counting episodes, and measuring the duration of PM2.5 pollution episodes for each city. Exceedances are defined as PM2.5 levels surpassing 25 µg/m3 (according to WHO guidelines) and 60 µg/m3 (in accordance with India's daily standards). The diurnal, seasonal, and monthly patterns of PM2.5 are analyzed across the 12 stations in the KMA and its surrounding areas as part of this study.

The study aimed to conduct a Health Risk Assessment (HRA) for PM2.5. This involved calculating the mean concentration of PM2.5 for each station based on WBPCB data over a period of at least one year. The assessment adhered to the standardized human health risk assessment framework established by the U.S. Environmental Protection Agency (EPA). Inhalation was assumed to be the exclusive route of exposure, and exposure was treated as continuous to address the substantial infiltration of ambient air into indoor spaces. Equation (1) was employed to determine average daily doses (ADD) derived from ambient air concentrations.

$$ADD = (C \times IR) / BW \quad (1)$$

Here, C represents concentration (µg/m3), IR denotes inhalation rate (m3/day), and BW signifies body weight (kg). Exposure assessments were conducted by computing field average daily doses (FADD) through Equation (1), utilizing the average yearly concentrations measured across 12 stations in KMA and its vicinity. The inhalation rates and body weights applicable to various subpopulations can be found in **Table 2**.

Table 2: Variables and Assumptions Used for the Health Risk Assessment

Variable	Population	Value	Source
Body Weight	Adult	65 kg	National Institute of Nutrition (NIN), India
	Children	18 kg	
	Infant	8.4 kg	
Inhalation Rate	Adult	14.9 m3/day	US EPA
	Children	9.0 m3/day	
	Infant	5.4 m3/day	

Source: Compiled by author from US EPA and NIN India

Equation (1) was also used to estimate safe average daily doses (SADD). For PM2.5, SADD were calculated both from the yearly WHO guidelines (10 µg/m3) and from the yearly Indian NAAQS (40 µg/m3). The SADD based on WHO guidelines and Indian NAAQS reference concentrations were calculated using body weight data from an adult Indian reference population. Separate FADD were calculated for each age-group, using local data when available. The study used US EPA recommended values for inhalation rates, since no local data were available. Non-cancer health risks, expressed as unitless hazard quotients (HQ), were then calculated for each exposure using Equation (2).

HQ= FAAD/ SAAD (2)

If the HQ is equal to 1, it suggests that the individual's exposure is at the level of the standard, indicating a potential concern. If the HQ is less than 1, it suggests that the exposure is below the standard, indicating a lower level of concern. If the HQ is greater than 1, it suggests that the exposure exceeds the standard, raising concerns about potential adverse health effects.

Composition and Sources of PM2.5

When examining particulate matter pollution, it is common to distinguish between primary and secondary pollution. Primary pollution comprises substances like carbonaceous particles, heavy metals, and minerals emitted directly from sources or stirred up by road traffic. In contrast, secondary pollution arises from chemical reactions in the atmosphere, leading to the formation of aerosols and related compounds. The analysis of PM2.5's chemical composition offers crucial insights into source contributions, facilitating an understanding of aerosol properties and processes. Varied chemical components of PM2.5 have been observed globally (Snider et al., 2016). According to Philip et al. (2014), particulate organic mass, secondary aerosols, mineral dust, and secondary inorganic aerosols, such as sulphates, nitrates, and ammonium, significantly influence global population-weighted PM2.5 concentrations. In both Kolkata Municipal Corporation (KMC) and Howrah Municipal Corporation (HMC), $(NH_4)_2SO_4$ and organic matter show significant contributions, followed by non-crustal mass. This substantial $(NH_4)_2SO_4$ contribution suggests the inorganic nature of fine particulates in Kolkata and Howrah. Geological sources contribute 4% to 11%, while sea-salt and NH_4NO_3 contributions are negligible. Moreover, secondary organic carbon (SOC) contributes approximately 28% to organic carbon (OC). Additionally, PM2.5 is contributed by secondary ammonium sulphate in the range of 25% to 50%, while ammonium nitrate contribution ranges from 0% to 3% (CSIR-NEERI, 2019).

In the early 2000s, an examination unveiled the distribution and emission contributions from various sectors in the KMA. The transport sector, industries, and domestic sectors represented approximately 50%, 48%, and 2%, respectively. Within the industrial sector, roughly 56% of emissions were linked to large- and medium-scale industries, while about 44% originated from small-scale units operating within the city confines. It was observed that these smaller units heavily relied on outdated technologies and utilized energy-inefficient heating systems, such as coal-powered boilers or furnaces (GoWB, 2018). According to a recent CSIR-National Environmental Engineering Research Institute (NEERI) Report (2019), primary sources of PM2.5 in the KMC include road dust, transport exhaust, and households, contributing a combined 75% to total pollution. Conversely, in the HMC, the predominant sources of PM2.5 are industry and road dust, accounting for 75% of overall pollution. The following **Table 3** illustrates the distinct sources of PM2.5 in KMC and HMC.

Table 3: Sectors wise PM2.5 Emission Load in KMC and HMC

Sectors	Percentage Share		Sectors	Percentage Share	
	KMC	HMC		KMC	HMC
Household	27.96	4.02	Hot Mix Plants	0.66	1.23
Construction	3.29	1.34	Ironing Vendors	0.29	0.15
Transport Exhaust	23.54	6.16	Marine Vessels	0.02	--
Open Burning	6.74	7.49	Crematoria	0.22	0.12
Restaurants and Eateries	4.86	1.64	Industry	7.04	51.69
Power Plant	0.66	--	Road Dust	24.75	26.18
Total (MT per Year)				**4054.2**	**2785.0**

Source: CSIR-NEERI, 2019, MT: Metric ton

Table 3, clearly indicates that in addition to households, road dust, and transport exhaust, there are other significant sources of PM2.5 pollution in both KMC and HMC. These sources include open burning, restaurants, eateries, and construction sites.

Table 4, provides details on various types of industries and the corresponding amount of PM2.5 emissions generated by these industries in the KMC and HMC areas.

Table 4: Industries Producing Amount of PM2.5 in KMC and HMC Area

Industry	MT Per Year		Industry	MT Per Year	
	KMC	HMC		KMC	HMC
Gas Plant/Coal Gasification	144.04	31.0	Non-alcoholic Beverage	2.45	---
Jute Processing	12.39	68.7	Hotels	2.82	---
Bakery	14.56	1.5	Ceramic	1.69	---
Ferrous and Non-ferrous	8.93	49.5	Dyeing and Bleaching	0.44	---
Basic Chemicals	9.04	----	Gold and Silver-Smiths	0.15	---
Milk and Milk Products	8.48	----	Lube Oils, Grease and Petroleum Products	0.31	---
Synthetic Detergents and Soaps	1.08	----	Pickling and Electroplating	0.29	24.2
Rubber Goods	0.19	----	Rolling Mill	0.17	188.8
Food and Food Processing	0.02	----	Pb-acid Battery Manufacturing	0.01	---
Textile/Yarn	----	34.8	Steel and Steel Products	---	25.3
Pulp and Paper	---	14.8	Al Smelter/Al-Cu Extraction	---	10.5
Engineering and Fabrication	---	6.9	Heat Treatment (Oil Fired)	---	1.7

Source: CSIR-NEERI, 2019, MT: Metric ton

The primary sectors in KMC that generate PM2.5 comprise gas plants/coal gasification, jute processing, bakeries, basic chemicals, and milk and milk product manufacturing. On the other hand, in HMC, the industries responsible for PM2.5 emissions include rolling mills, steel and steel product manufacturing, gas plants/coal gasification, jute processing, and ferrous and non-ferrous as well as textile industries.

The Effects of PM2.5 on Human Health

Owing to increased levels of exposure, PM2.5 contributes significantly to the disease burden, with a disproportionate impact on communities in low- and middle-income countries. This effect is particularly pronounced among vulnerable populations, including pregnant women, infants, and young children (Mannucci and Franchini, 2017). Due to their immature physiological systems, higher inhalation rates, and larger lung surface areas relative to body weight, children and infants face an increased susceptibility to adverse health effects resulting from ambient air pollution (Bennett and Zeman, 2004). Moreover, when compared to adults, children typically exhibit a higher level of physical activity, leading to an increased inhalation rate. Additionally, they often spend more time outdoors (Bennett and Zeman, 2004).

In the year 2017, PM2.5 exposure led to 4.58 million fatalities and 142.52 million years of disability globally. Ambient PM2.5 accounted for 64.2 percent of the total deaths and 58.3 percent of the disability-adjusted life years (Bu, et.al. 2017). Chronic exposure to PM2.5 has been linked to respiratory diseases, heart disease, stroke, brain, and lung cancer (Cao et al., 2011; Du et al., 2015; Fold et al., 2020). Zhou et al. (2015) documented the health impact associated with an increase in all-cause mortality per 10 μg/m3 of PM2.5. Consequently, prolonged exposure to PM2.5 is recognized for inducing heightened exposure to the alveolar angiotensin-converting enzyme 2 (ACE-2) receptor (Zhou et. al. 2015). This heightened exposure may contribute to increased susceptibility to infection or toxicity among individuals exposed to air pollution, as highlighted by Domingo et al. (2020). This is particularly significant given that long-term exposure to ambient PM2.5 has been consistently linked to higher morbidity and premature mortality in epidemiological studies.

Dockery and Pope (1994) noted that the rise in mortality and morbidity in urban areas may be linked to exposure to particulate matter. The potential for adverse health effects stemming from PM is influenced by factors such as particle size, composition, toxicity, and the extent of exposure. Additionally, for every 10 μg/m3 increase in PM2.5 concentration, Duan et al. (2020) observed a 6.88% increase in the hospitalization rate for chronic obstructive pulmonary disease (COPD). Furthermore, Xie et al. (2019) found that the total number of hospitalizations, patient admissions, and asthma emergency room visits increased by 0.67%, 0.65%, and 0.49%, respectively.

A collaborative research effort involving the Chittaranjan National Cancer Institute (CNCI), West Bengal Department of Environment, and the Central Pollution Control Board (CPCB) revealed that approximately 70% of the population in Kolkata is affected by respiratory disorders resulting from air pollution (Mukhopadhyay, 2009). Research has shown that children exposed to polluted air in Kolkata experience negative lung reactions and genetic abnormalities in lung tissues (Lahiri, et.al. 2000). Lower respiratory tract symptoms afflict roughly 47% of Kolkata's population, with city residents' lungs bearing a burden about seven times greater than their rural counterparts, primarily attributable to air pollution (Roy et.al. 2006 ; WBPCB, 2003).

Results and Discussion

Spatial and Temporal Distribution of PM2.5

The levels of PM2.5 in a particular location are influenced by a combination of factors including emissions, geography, and meteorological conditions (Alimissis et al., 2018; Ganguly et al., 2019). Previous studies by Sreekanth et al. (2018) have reported diurnal and seasonal variations in PM2.5 levels for five Indian cities over a period of less than four years, specifically from 2013 to 2016. **Table 5** shows basic information of PM2.5 in KMA.

Out of the 12 monitoring stations in and around KMA, Bidhannagore exhibits the highest mean PM2.5 concentration, followed by Kolkata, Howrah, and Kalyani. The mean values recorded at these stations are twice the prescribed standard set by the WHO. The lowest mean PM2.5 concentration is observed in Habra, followed by Barrackpore and Belghoria. The median values of PM2.5 exhibit almost a similar trend to the mean values. The maximum PM2.5 value is recorded in Serampore, while the minimum value is recorded in Bidhannagore. Temporal trends show greater consistency in Barrackpore, Barasat, Howrah, and Bidhannagar, while they are more fluctuating in Serampore, Kalyani, and Bandel.

The analysis of **Figure 2**, which displays the map of mean PM2.5 concentrations, reveals that Kolkata, along with Howrah, Bidhannagore, and New Town Kolkata, exhibits the highest spatial concentration of PM2.5 in the southern region of KMA. Conversely, Kalyani in the northern region displays the highest mean concentration of PM2.5. Belghoria, Budge Budge, and Bandel demonstrate a moderate mean concentration of PM2.5.

Table 5: Descriptive Statistics of PM2.5 in KMA

Location	Mean	Median	SD	CV (%)	Maximum	Minimum	Count
Serampore	49.13	46.33	43.77	89.09	1151.77	0.97	11672
Kolkata	53.23	50.43	34.65	65.10	473.25	1.4	9535
New Town Kolkata	50.60	46.49	33.70	66.61	796.59	0.18	12813
Bandel	45.33	42.66	33.89	74.76	672.38	0.78	12293
Barasat	46.71	42.12	25.74	55.10	193.39	0.9	8689
Barackpore	38.37	36.79	18.99	49.51	192.93	0.81	8640
Belghoria	40.07	40.05	29.40	73.37	337.24	1.62	7643
Kalyani	51.33	44.97	41.50	80.85	645.67	1.3	10133
Budge Budge	44.06	43.58	26.62	60.43	247.54	0.14	8199
Habra	38.19	34.55	23.71	62.08	256.03	1.25	8908
Howrah	52.32	50.38	28.82	55.09	187.72	1.41	8625
Bidhannagar	62.27	58.00	30.51	50.01	195.00	0.29	8509

Source: Calculated by the author based on WBPCB data.

Figure 2: Spatial Distribution of Mean PM2.5 in and around KMA

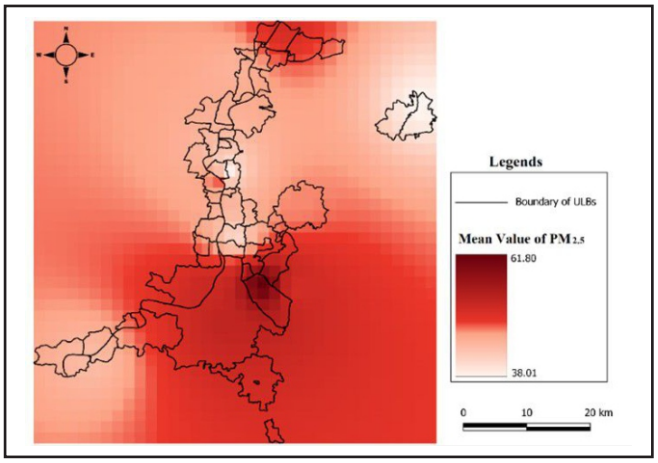
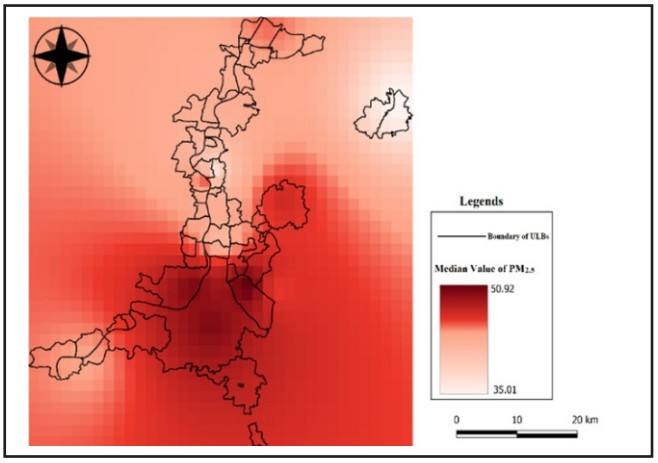


Figure 3: Spatial Distribution of Median PM2.5 in and around KMA



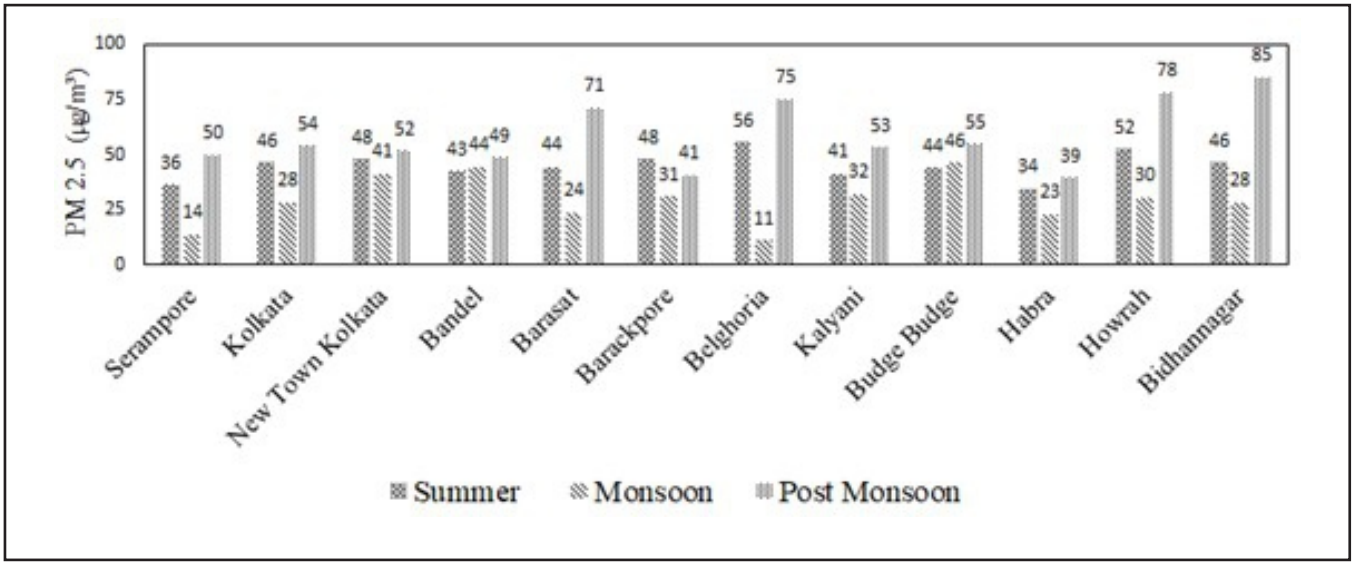
The lowest mean concentration of PM2.5 is observed in Barrackpore and Habra. Based on the distribution map (**Figure 3**) of median PM2.5, the areas with the highest spatial concentration of PM2.5 include Kolkata, Howrah, Bidhannagore, and New Town Kolkata. Kalyani and Bandel exhibit a moderate spatial concentration of PM2.5. On the other hand, Barrackpore, Serampore, and Habra show the lowest spatial concentration of PM2.5. This indicates that the areas near Kolkata experience consistently higher spatial concentrations of PM2.5 throughout the year.

Seasonal Trends of PM2.5

To analyze the PM2.5 trend in the KMA, the time series data is divided into two components: trend and seasonal variations. In order to assess the inter-annual trend of PM2.5, the hourly data is compared to the standard limit of 60 µg/m3 set by the NAAQS. A positive trend suggests an excess of PM2.5, whereas a negative trend indicates a deficiency of particulate matter in the atmosphere. In simpler terms, a negative trend signifies a good quality of air in the locality. The trends observed in PM2.5 levels at various monitoring stations indicate that the concentration of particulate matter tends to be high during the months of November to February, while it remains low from March to September. In simpler terms, the concentration of PM2.5 is higher during the winter season and lower during the monsoon season.

Nevertheless, the distribution of positive and negative trends in PM2.5 levels varies across different monitoring stations. In both Kolkata and Howrah, the lowest concentration of PM2.5 is observed during the month of July. However, in Kolkata, the highest concentration of PM2.5 occurs in February and January. It is noteworthy that certain monitoring stations such as Belghoria, Habra, Serampore, and Barackpore consistently maintain PM2.5 concentrations below the standard limits for at least two months during the monsoon season.

Figure 4: Seasonal Distribution of Mean PM2.5 in KMA



Source: WBPCB, 2021-23.

Based on the data presented in **Figure 4**, the average concentration of PM2.5 varies throughout the seasons. During the monsoon season, the mean concentration of PM2.5 remains below the standards prescribed by the WHO in stations such as Serampore, Barasat, Belghoria, and Habra. Conversely, in Bandel, Budge Budge, and New Town Kolkata, the concentration of PM2.5 remains high during the monsoon[1] season. In the post-monsoon period, the maximum concentration of PM2.5 is observed in Bidhannagare, Barasat, Belghoria, and Howrah, while Habra exhibits relatively low concentrations.

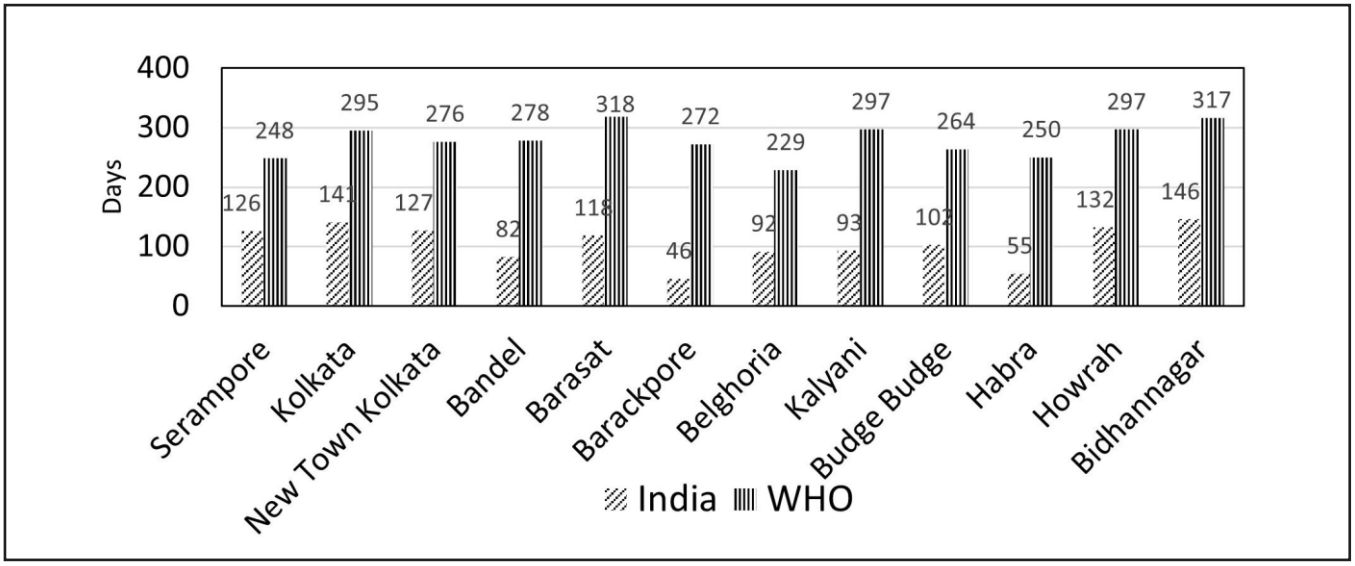
[1] *The monsoon period typically spans from June to October. Following the monsoon season, the post-monsoon period occurs from November to February. The summer season encompasses the months of March to May.*

Exceedance and Episodes of PM2.5

Two different standards have been taken to calculate the exceedance of PM2.5 across the 12 monitoring stations. In this section, we have analyzed the WBPCB data of PM2.5 to study the number of threshold exceedances of daily mean PM2.5 as per the WHO (25 µg/m3) and Indian NAAQS (60 µg/m3) values for a year.

Analysis of **Figure 5** reveals prolonged PM2.5 concentration above Indian standards in Bidhannagore, Kolkata, Serampore, New Town Kolkata, Howrah, and Barasat for Over Four months annually. Conversely, Barackpore and Habra exhibit low PM2.5 concentration for 10 months, indicating prevalence of good air quality for these two monitoring stations.

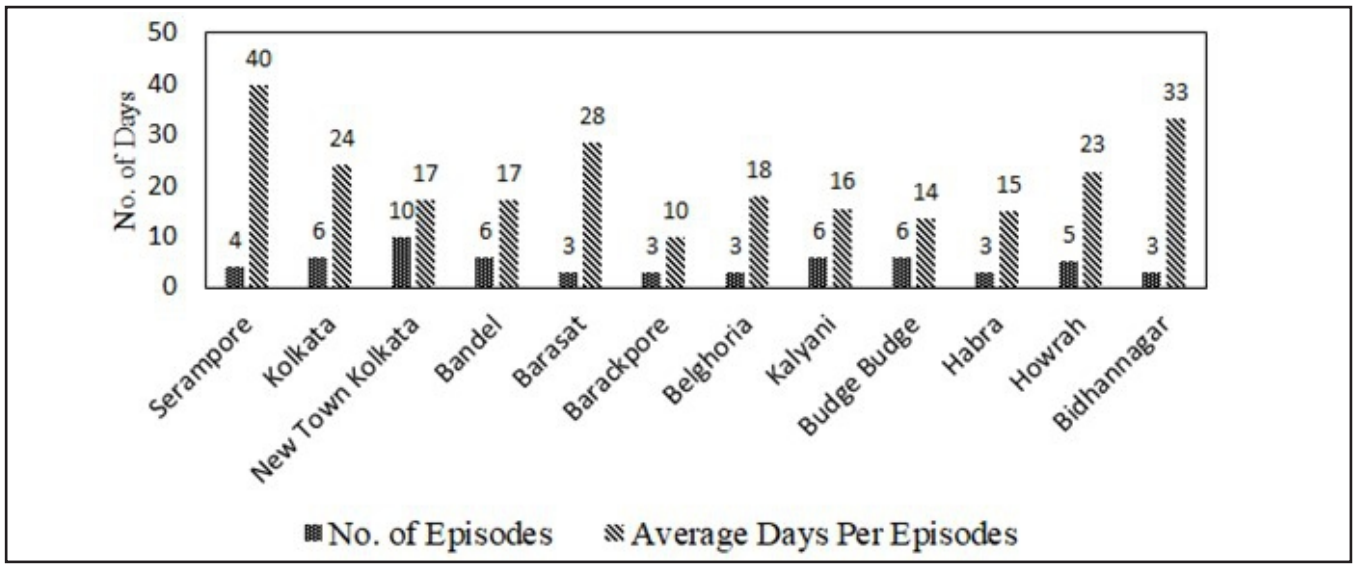
Figure 5: Occurrences of Exceedances (PM2.5) in a Year in KMA



Source: West Bengal Pollution Control Board.

When analyzing the adherence to the WHO standard, it is noteworthy that nearly eight months out of the year exhibit higher PM2.5 concentrations across all monitoring stations. It is crucial to emphasize that the concentration of PM2.5 fluctuates on an hourly basis, making the mean value essential for understanding the prevailing conditions. **Figure 6** provides information on the number of episodes and the average duration of each episode related to air quality in different

Figure 6: Number of Episodes and Average Days per Episodes



Source: West Bengal Pollution Control Board.

locations. In the case of Serampore, there were a total of four episodes, each lasting an average of 40 days. This implies that the PM2.5 concentration remained above 60 µg/m3 for approximately 160 days in a year. Similarly, Bidhannagar experienced three episodes, with an average duration of 33 days per episode, indicating that the PM2.5 concentration remained above 60 µg/m3 for nearly 100 days. Conversely, Barackpore and Habra had fewer episodes, with average durations of 10 and 23 days, respectively. These figures provide an overview of the number of episodes and the average duration of each episode, giving an indication of the frequency and duration of air quality issues in each location.

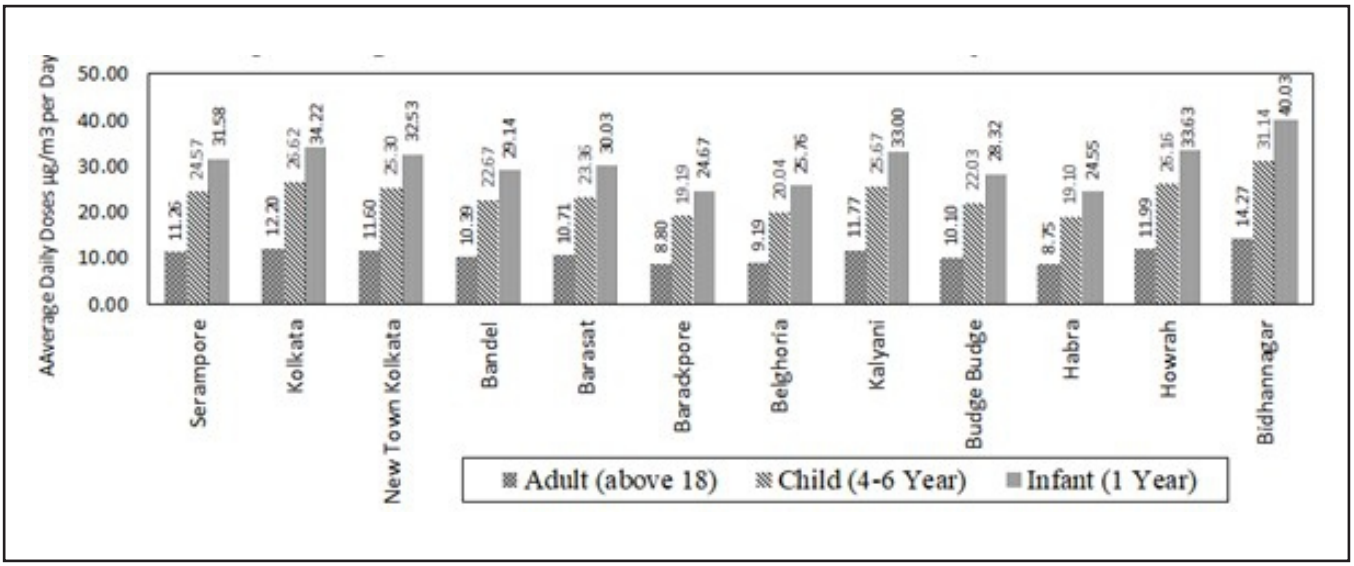
Human Health Risk Assessment

The daily PM2.5 intake through oral ingestion has been computed for all 12 stations, revealing that the inhalation levels for the adult population vary between 24 µg/m3 and 40 µg/m3. Meanwhile, the daily average inhalation for children ranges from 19 µg/m3 to 30 µg/m3. Consequently, over the course of a year in KMA, the PM2.5 inhalation for the adult population spans from 8760 µg/m3 to 14600 µg/m3.

It can be seen from **Figure 7** that Bidhannagar exhibits higher PM2.5 inhalation levels for adults, children, and infants when compared to other stations. Habra registered the lowest PM2.5 inhalation levels for adults, children, and infants. In Serampore, Kolkata, New Town Kolkata, Barasat, Kalyani, and Habra, the daily average inhalation for the adult population exceeds 30 µg/m3. However, it is remarkable that inhalation also varies across monsoon, summer as well as in post monsoon.

HQs above one, indicating higher health risks. The risks for children and infants were higher than those for adults because of their higher breathing rate in relation to body weight.

Figure 7: Daily Average Inhalation of PM2.5 in KMA



Source: West Bengal Pollution Control Board.

Table 6: Hazard Quotients (HQ) of KMA

Location	Hazard Quotients								
	Adult Population			Child Population			Infant Population		
	FADD	SADD	HQ	FADD	SADD	HQ	FADD	SADD	HQ
Serampore	11.26		1.228	24.57		1.228	31.58		1.23
Kolkata	12.20		1.331	26.62		1.331	34.22		1.33
New Town Kolkata	11.60		1.265	25.30		1.265	32.53		1.27
Bandel	10.39		1.133	22.67		1.133	29.14		1.13
Barasat	10.71		1.168	23.36		1.168	30.03		1.17
Barackpore	8.80	9.17	0.959	19.19	20.00	0.959	24.67	25.71	0.96
Belghoria	9.19		1.002	20.04		1.002	25.76		1.00
Kalyani	11.77		1.283	25.67		1.283	33.00		1.28
Budge Budge	10.10		1.102	22.03		1.102	28.32		1.10
Habra	8.75		0.955	19.10		0.955	24.55		0.95
Howrah	11.99		1.308	26.16		1.308	33.63		1.31
Bidhannagar	14.27		1.557	31.14		1.557	40.03		1.56

Source: Calculated by author, 2023, Note: 40 µg/m3 as benchmark for SAAD

An overview of the **Table 6** shows that higher HQs is found in across all the 10 stations except Habra and Barrackpore. Higher than one HQs means the population of that area inhaling more than standard average daily inhalation.

Policy Measures to Curb Health Risk

On October 8, 2018, the National Green Tribunal Bench directed the Government of West Bengal to establish an Air Quality Monitoring Committee (AQMC) with the aim of formulating an effective action plan to meet the National Ambient Air Quality Standards (NAAQS). The committee was also tasked with developing a specific air quality action plan for the "Non-Attainment City" within the state. Several noteworthy measures have been implemented as part of this initiative.

In the KMA, there has been an initiative to phase out or scrap commercial vehicles that are over 15 years old. Additionally, the enforcement of Bharat Stage-IV norms in Kolkata City has been initiated to regulate vehicle emissions and enhance air quality. Furthermore, the KMA has introduced an integrated automated network system for traffic light signals, contributing to improved traffic management and efficiency. The Kolkata Traffic Police have taken additional steps, such as implementing the Multi-Layered Car Parking (MLCP) project at specific locations in the city to address pollution associated with parking issues. Another innovative measure includes the introduction of camera-based citation prosecutions, with instant communication of information to violators through SMS alerts.

To adapt to the fast-paced and dynamic environment, the existing signaling system across the city has undergone a complete revamp. It has been replaced with an automated synchronized signaling system. Road users are kept informed about real-time

ground-level conditions and travel time updates through a state-of-the-art Variable Message Sign (VMS) system. This not only provides informative updates but also raises awareness among pedestrians about their rights and responsibilities.

Some key recommendations involve transporting materials, especially, building materials, in covered conditions. It is crucial to ensure that no construction materials are left exposed to the roadside. Various measures, such as wrapping the construction area or building in geotextile fabric, installing dust barriers, or taking appropriate actions based on the location, are being employed. Prior to leveling or any earth movement activities, water is sprinkled to keep the soil consistently moist throughout the process. This practice aims to maintain the soil in a visibly damp and crusted condition for temporary stabilization. Efforts are made to dispose of construction site debris promptly, and this is carried out in consultation with the local authority, adhering to proper environmental management practices. It is important to note that these recommendations are yet to be implemented in the state to meet the NAAQS.

Conclusion

The primary objective of this study was to assess the levels and distribution of PM2.5 in the KMA and its neighboring regions. Numerous reports have consistently drawn attention to the subpar air quality within the Kolkata Municipal Corporation (KMC) area, particularly concerning elevated concentrations of PM2.5. This paper delves into the role of PM2.5 in contributing to air pollution in the KMA and its surroundings.

The study identifies households, industries, and the transportation sector as significant sources of PM2.5, with their respective contributions varying across different monitoring stations. Notably, the mean concentration of PM2.5 is notably higher in Kolkata and its immediate environment. Additionally, Kalyani in the northern region also registers a higher mean concentration of PM2.5. The levels of PM2.5 remain consistently high during both winter and summer seasons. Despite the implementation of various measures, the concentration of PM2.5 surpasses the NAAQS for a minimum of 3 to 4 months at each monitoring station. Furthermore, the PM2.5 concentration remains above the standards for a span of 10 to 40 days per year. Consequently, there is a pressing need for additional measures to effectively address air pollution in the city.

The human health risk assessment unequivocally indicates that most of the population in all stations is inhaling particulate matter exceeding the standard limit. The paper distinctly identifies areas within the KMA where the population is exposed to elevated levels of particulate matter, thereby posing a higher health risk.

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Migration of Tribal Women in India: Patterns, Challenges and Vulnerabilities

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Abstract

The migration of Women tribal populations in India is a significant yet underexplored phenomenon with profound socio-economic, cultural, and psychological implications. This theoretical research paper delves into the migration patterns of Women tribals in India, particularly focusing on the states of Jharkhand and Madhya Pradesh. By drawing from existing literature, the paper examines the multifaceted challenges and vulnerabilities faced by these women, including economic exploitation, gender-based violence, social alienation, and lack of access to essential services. The paper also discusses the socio-cultural impacts of migration on the tribal communities and suggests areas for policy intervention and future research.

Keywords: Migration, Tribes, Women migrants, Vulnerabilities, Consequences, Policy Implications.

Introduction

Migration in India is a complex socio-economic process driven by various push and pull factors, including economic disparities, lack of employment opportunities, environmental degradation, and socio-political factors (Deshingkar & Akter, 2009; Bhagat, 2018). Among the various groups involved in migration, the tribal populations, particularly Women tribals, represent a highly vulnerable and marginalized segment. In states like Jharkhand and Madhya Pradesh, known for their substantial tribal populations, the migration of Women tribals has emerged as a critical issue, affecting the socio-economic fabric of both the source and destination regions (Maharatna, 2005; Srivastava & Sasikumar, 2020).

The tribal communities in India have traditionally lived in geographically isolated regions with distinct socio-cultural practices (Xaxa, 1999; Behera, 2017). However, with increasing economic pressures and changing socio-political dynamics, these communities have experienced significant outmigration, especially among women. This paper aims to map the migration patterns of Women tribals from these regions, examining the underlying causes, challenges, and vulnerabilities they face throughout the migration process. The analysis is based on a review of existing literature, reports, and theoretical frameworks relevant to migration studies and tribal welfare (Mosse et al., 2002; Das, 2019).

Historical Context and Trends

Historically, tribal communities in India have experienced limited mobility due to their

geographical isolation and self-sustained economies based on agriculture, forest produce, and traditional crafts (Guha, 1999; Sharma & Varma, 2018). However, the post-independence period witnessed significant changes in the socio-economic structure of these communities. Land alienation, deforestation, and the implementation of large-scale development projects displaced many tribal communities, pushing them into migration as a survival strategy (Fernandes & Bharali, 2011; Kabeer, 2021).

In Jharkhand and Madhya Pradesh, migration patterns among Women tribals have been shaped by a combination of economic distress, lack of local employment opportunities, and socio-cultural factors (Sundar, 1997; Nayak, 2020). Women from these communities often migrate to urban areas and industrial hubs in search of work, primarily in the informal sector. The seasonal nature of agricultural work in their native regions also contributes to cyclical migration patterns, where women migrate during off-peak agricultural seasons and return during the harvest period (Shah, 2010; Priyadarshini, 2021).

Push and Pull Factors

The migration of Women tribals is driven by a range of push factors, including:

Economic Deprivation: Widespread poverty and lack of economic opportunities in tribal regions force women to migrate in search of livelihoods (Mehta & Shah, 2003; Bisht, 2019).

Environmental Degradation: Deforestation, land degradation, and displacement due to development projects often leave tribal communities without their traditional means of subsistence (Baviskar, 1995; Choudhary, 2019).

Social Discrimination: The intersection of gender and caste-based discrimination exacerbates the vulnerability of tribal women, making migration a coping strategy to escape oppressive conditions (Nayak, 2010; Baruah, 2020).

On the other hand, pull factors that attract Women tribals to urban areas include:

Employment Opportunities: The availability of low-skilled jobs in urban areas, such as domestic work, construction labor, and textile industries, draws Women tribals to cities (Lahiri-Dutt, 2006; Agarwal, 2019).

Perceived Better Living Conditions: The hope for better living standards, access to healthcare, and education for their children motivates migration, despite the challenges involved (Desai & Banerji, 2008; Mishra, 2021).

Social Networks: Established migrant communities in urban areas often provide support networks that facilitate the migration of new entrants from their native regions (Rao, 1994; Menon, 2020).

Challenges and Vulnerabilities Faced by Women Tribal Migrants

Economic Exploitation

Women tribal migrants primarily work in the informal sector, which is characterized by precarious employment conditions, lack of job security, and low wages (Srivastava, 2011; Bera, 2020). Their lack of formal education and skills limits their employment options, often relegating them to low-paying, labor-intensive jobs. Moreover, their marginalized status makes them easy targets for exploitation by employers who may withhold wages, force them to work long hours, and deny them basic rights and entitlements (Banerjee, 2009; Das & Sahoo, 2022).

Gender-Based Violence and Harassment

Gender-based violence is a pervasive issue faced by Women tribal migrants, both during the migration journey and at their destinations. Reports indicate that these women are vulnerable to physical, sexual, and psychological abuse by employers, landlords, and even male co-workers (Ghatak & Chatterjee, 2008; Thakur, 2021). Their marginalized social status, coupled with limited access to legal recourse, exacerbates their vulnerability to such violence. The lack of support systems and fear of stigmatization often prevent these women from reporting abuse, further entrenching their victimization (Nair, 2007; Kaur, 2019).

Health Risks and Lack of Access to Healthcare

The migration of Women tribals to urban areas often results in poor living conditions, with many residing in overcrowded slums or temporary shelters that lack basic amenities such as clean water, sanitation, and healthcare services (Sharma et al., 2011; Gupta, 2021). These conditions expose them to a range of health risks, including infectious diseases, malnutrition, and occupational hazards. Furthermore, the lack of access to reproductive health services and information exacerbates the health vulnerabilities of these women, particularly in the context of maternal and child health (Kumar & Jha, 2005; Dubey, 2020).

Social Alienation and Cultural Displacement

Migration often leads to a significant disruption in the social and cultural life of tribal women. In urban areas, they are often isolated from their communities and traditional support networks, leading to social alienation and cultural displacement (Xaxa, 2004; Patel, 2020). The loss of cultural identity and the pressures of assimilating into a dominant urban culture can result in psychological distress and a sense of loss. Additionally, the traditional roles and responsibilities of tribal women within their communities are often altered or diminished in urban settings, further complicating their adaptation to the new environment (Sundar, 2006; Raj, 2021).

Socio-Cultural Impacts of Migration on Tribal Communities

Disruption of Traditional Gender Roles

Migration, particularly of women, leads to a significant disruption of traditional gender roles within tribal communities. In many tribal societies, women play a central role in maintaining the socio-cultural fabric through their involvement in agricultural activities, community rituals, and the transmission of cultural knowledge (Rao, 1999; Prasad, 2018). The outmigration of women often leaves a void in these roles, leading to shifts in community dynamics and gender relations (Shah, 2012; Ranjan, 2020).

Moreover, the exposure of Women tribal migrants to urban lifestyles and modern values can lead to changes in their perceptions of gender roles and expectations. This can result in conflicts and tensions when these women return to their communities, as their newfound autonomy and experiences may challenge traditional norms and practices (Kandiyoti, 1988; Singh, 2022).

Impact on Family Structures and Childcare

The migration of Women tribals also has profound implications for family structures and childcare practices within tribal communities. In many cases, women who migrate leave behind young children and elderly family members, leading to a breakdown in traditional caregiving arrangements (Rao, 2003; Khanna, 2021). The absence of mothers and primary caregivers can have adverse

effects on the upbringing and well-being of children, who may face neglect, lack of education, and emotional distress (Desai, 2007; Iyer, 2019).

Furthermore, the economic burden of migration often falls on the remaining family members, who may struggle to maintain the household in the absence of the primary breadwinner. This can lead to increased vulnerability and poverty within the community, exacerbating the conditions that drive migration in the first place (Sengupta & Sharma, 2008; Yadav, 2022).

Cultural Erosion and Identity Crisis

Migration also poses a significant threat to the cultural identity of tribal communities. The prolonged absence of women, who are often the custodians of cultural practices and traditions, can lead to the erosion of cultural heritage and knowledge (Xaxa, 2005; Kumar, 2021). The exposure of Women migrants to urban cultures and lifestyles can result in a dilution of traditional values and customs, leading to an identity crisis within the community (Guha, 2006; Mandal, 2023).

In some cases, returning migrants may experience difficulties in reintegrating into their communities, as they may have adopted new values and behaviors that are at odds with traditional practices. This can lead to social tensions and conflicts within the community, further exacerbating the challenges faced by returning migrants (Kumar & Rao, 2010; Sen & Das, 2021).

Positive Consequences of Migration

The migration of Women tribal members in India, while often associated with significant challenges, can also lead to various positive consequences for the women involved, their families, and their communities. Below are some of the positive impacts that have been observed:

Economic Empowerment

Increased Income: Migration often leads to employment opportunities that may not be available in tribal areas, resulting in increased income for Women migrants. This income can improve their own financial independence and contribute to the household income back in their villages (Bhagat, 2012; Deshingkar & Farrington, 2009). The money sent back to their families in the villages (remittances) can play a crucial role in improving the living standards, health, education, and overall well-being of their families (Mitra, 2014).

Enhanced Skills and Education

Skill Development: Migration can provide opportunities for Women tribal members to acquire new skills, such as in domestic work, construction, or small-scale industries. These skills can enhance their employability and provide them with more job opportunities in the future (Mehta, 2020).

Access to Education: Migration to urban areas can sometimes improve access to education for migrant women and their children, particularly when they settle in areas with better educational facilities (Mukherjee, 2010).

Improved Social Status

Greater Autonomy: The process of migration often leads to increased autonomy for women, as they make decisions regarding employment, finances, and daily living. This can boost their self-esteem and social status within their families and communities (Rao, 2004).

Exposure to New Cultures: Migrating to urban areas or different regions exposes women to new ideas, cultures, and social practices. This exposure can broaden their worldview and increase their

understanding of diverse social norms, potentially leading to a greater appreciation of their own cultural identity (Nayak, 2020).

Reduction in Gender Disparities

Challenging Gender Norms: Migration can challenge traditional gender roles within tribal societies. By taking on jobs and contributing financially to the household, Women migrants may shift gender dynamics in their families, leading to more equitable gender relations (Sen & Das, 2021).

Empowerment Through Employment: Employment in urban areas can provide women with the confidence and bargaining power to negotiate for better treatment and rights both at home and in their workplaces (Sharma & Varma, 2018).

Improvement in Living Standards

Better Access to Services: Migrants often settle in areas with better access to healthcare, sanitation, and other essential services. This can lead to improvements in their health and overall quality of life (Mukherjee, 2020).

Housing and Infrastructure: While many migrants face challenges related to housing, some manage to improve their living conditions through better access to infrastructure and basic amenities in urban areas (Prasad, 2018).

Strengthening of Social Networks

Building New Communities: Women migrants often establish or join migrant networks in urban areas. These networks can provide crucial support, including housing, employment opportunities, and emotional support, helping women to navigate the challenges of migration more effectively (Mishra, 2020).

Social Capital: The formation of new social ties in urban areas can create a sense of community and belonging among migrants. These networks can also serve as a platform for collective action and advocacy, particularly in demanding better working conditions and rights (Roy & Verma, 2020).

Investment in the Next Generation

Educational Opportunities for Children: Migration can sometimes lead to better educational opportunities for the children of Women migrants, which can have long-term positive effects on their future prospects (Nambissan, 2021).

Breaking the Cycle of Poverty: The increased income and opportunities that come with migration can help break the cycle of poverty for future generations, enabling them to access better education, healthcare, and job opportunities (Yadav, 2022).

Empowerment through Collective Action

Formation of Women's Groups: Migrant women often form or join collective groups in urban areas. These groups can provide mutual support, advocate for better rights and conditions, and create a sense of solidarity among members, leading to greater empowerment (Ranjan, 2020).

Advocacy and Rights Awareness: Migration can expose women to new ideas about their rights and entitlements. This awareness can lead to greater advocacy for their rights and better protection against exploitation and abuse (Mishra, 2021).

Improvement in Health Outcomes

Access to Better Healthcare: Urban migration can sometimes lead to better access to healthcare services, resulting in improved health outcomes for

migrant women. This includes access to maternal and reproductive health services, which may be limited in rural areas (Roy & Verma, 2020).

Awareness of Health Practices: Exposure to urban health practices and campaigns can increase awareness about personal and family health, leading to better health practices and outcomes (Mukherjee, 2020).

Contribution to Economic Growth

Economic Contributions: Women migrants contribute significantly to the economy, particularly in sectors such as domestic work, textiles, construction, and small-scale industries. Their labor is crucial for the functioning and growth of these sectors, particularly in urban areas (Srivastava & Sasikumar, 2020).

Entrepreneurship: Some migrant women may engage in entrepreneurial activities, starting small businesses or cooperatives that contribute to the local economy and provide employment to others (Pandey, 2023).

While the migration of Women tribal members involves numerous challenges, it is essential to acknowledge the positive consequences that migration can bring. These outcomes not only improve the lives of the women themselves but also have broader implications for their families, communities, and society.

Policy Interventions and Recommendations

Strengthening Legal Protections

To address the vulnerabilities faced by Women tribal migrants, there is an urgent need to strengthen legal protections and enforcement mechanisms. This includes ensuring the effective implementation of labor laws, particularly in the informal sector, to protect migrant workers from exploitation and abuse (Deshingkar, 2005; Chakraborty, 2021). Additionally, efforts should be made to raise awareness among tribal women about their rights and legal recourse options, as well as to provide them with access to legal aid and support services (Mosse, 2005; Mishra, 2022).

Enhancing Access to Education and Skills Training

Improving access to education and skills training for tribal women is crucial in empowering them to secure better employment opportunities and break the cycle of poverty that drives migration. Programs aimed at providing vocational training, adult literacy, and entrepreneurship skills can equip Women tribal migrants with the tools needed to succeed in both urban and rural environments (Jha & Sinha, 2020; Joshi, 2023).

Additionally, enhancing access to education for children of migrant families is essential to ensure that migration does not disrupt their educational attainment and future opportunities (Nambissan, 2021). Implementing policies that facilitate the enrollment of migrant children in schools and providing support for their integration into new educational environments can help mitigate the negative impacts of migration on the younger generation (Roy & Verma, 2020).

Strengthening Social Security and Welfare Programs

Social security and welfare programs play a vital role in providing a safety net for Women tribal migrants and their families. Expanding access to social protection schemes, such as health insurance, pensions, and unemployment benefits, can help mitigate the economic vulnerabilities faced by these women (Ghosh & Chakravarty, 2019; Patnaik, 2021). Additionally, targeted interventions aimed at providing housing, sanitation, and healthcare services to migrant communities in urban areas can improve their living conditions and overall well-being (Mukherjee, 2020).

Promoting Inclusive Development and Sustainable Livelihoods

Addressing the root causes of migration among Women tribals requires a comprehensive approach that promotes inclusive development and sustainable livelihoods in tribal regions. This includes investing in infrastructure, healthcare, education, and sustainable agriculture to create local employment opportunities and reduce the economic pressures that drive migration (Sharma & Bhattacharya, 2019; Pandey, 2023). Moreover, policies that support the preservation and promotion of tribal culture and traditions can help strengthen community resilience and reduce the socio-cultural impacts of migration (Mishra, 2023).

Conclusion

The migration of Women tribals in India is a complex phenomenon shaped by a multitude of factors, including economic deprivation, social discrimination, and environmental degradation. While migration offers opportunities for better livelihoods and improved living standards, it also exposes these women to significant challenges and vulnerabilities, including economic exploitation, gender-based violence, health risks, and cultural displacement.

To address these challenges, it is essential to adopt a holistic approach that strengthens legal protections, enhances access to education and skills training, and promotes inclusive development in tribal regions. By empowering Women tribal migrants and addressing the root causes of migration, policymakers can help create a more equitable and just society where these women can thrive both in their native communities and in urban environments.

Future research should continue to explore the dynamics of Women tribal migration in India, with a focus on understanding the long-term impacts on both the migrants and their communities. Additionally, there is a need for more data-driven studies that can inform evidence-based policy interventions aimed at improving the lives of Women tribal migrants and their families.

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An Inquiry into Women Representation in Management: A Case Study of Indian Industries[1]

Book Review

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It is a well-known fact that overall, women's workforce participation is low in India, both in urban and rural areas. However, limited research is available on 'women in management'. The book by Guha and Kadam, a unique and enlightening contribution, examines in-depth women's representation in management in Indian industries undertaken through empirical study. The book explores the possible reasons for the glass ceiling (upward career mobility) and glass wall (inter-departmental mobility). It examines the various barriers using feminist theory and dives deep into the gender stereotypes and systematic patriarchy that influence organisational set-up. The study scrutinises the challenges women face to grow in an organisation, not only as employees but also the barriers they face when returning to work after a career break, which sometimes means wiping out on the experience and starting as a fresher.

The study has undertaken a rigorous literature review, explaining the basic concepts of patriarchy, feminism, and gender. It has looked at women in management worldwide and then examined the Indian scenario, particularly the constitutional and existing legal provisions protecting working women. The study uses three theoretical approaches used in the field of women in management designed by Fagenson. These approaches are gender-centric perspectives, organisational perspectives, and gender-organisational system perspectives. The gender-centric approach looks at the behavioural aspects such as traits, attitudes, and cognition. The organisational perspective suggests that the organisation's structure influences women's behaviour at work. The gender–organisation perspective examines the interaction between a person, organisation and social system. The authors have added 4th approach, namely work perspective. This framework, called the GWOS framework, is based on gender, work, organisational and social perspectives. The conceptual framework considers all four dimensions, namely work, organisation, social and personal, to understand women's representation in management. Other research studies use only one or two dimensions, and using all four dimensions is a new contribution to the existing literature. Using the GWOS perspective, the study identifies the characteristics of the work, the organisational context, social system, and gender that shape a person's attitude and behaviour, providing a comprehensive understanding of the topic.

The authors adopted an exploratory and descriptive cross-sectional research design. Before the actual study, a pilot study was conducted, and in the pilot, 38 in-depth interviews of successful women and men managers were done to design the final questionnaire.

[1] *Sampati Guha and Sanskruti Kadam (2024), Springer Nature, Singapore. Pages: 254, ISBN 978-981-97-3712-3.*

The study examines respondents from 22 industries using the survey method. The 22 selected industries were from the top 68 performing industries published by the Bombay Stock Exchange. These 22 industries were Banking, IT, Finance, Pharmaceuticals, Engineering, Jewellery Industry, Telecom, Automobile, Chemicals & Fertilizers, Construction, Shipping & Logistics, Insurance, Textiles, Chemicals, Steel, Power Industry, Glass, Aviation, Paint, Media, Cement, Petrochemicals and Oil & Gas Industry. The study used a quantitative approach; a survey was conducted by using a questionnaire and semi-structured interview methods for collecting the data. A multi-stage sampling method was used, depending on the study's stages. Seventy-two companies operating within Mumbai and nearby Mumbai were selected, and 560 executives working at three managerial levels (junior level, middle level, and top-level management) were selected using a stratified random sampling method. From each level, the convenience sampling method was used to choose executives willing and available to be part of the study. The demographic profile of the respondents revealed that out of 560 respondents, 81% were men, and only 19% were women. Most respondents belonged to the Hindu religion, and 81% were married. Of women executives, an estimated 63 % had either one or no children, indicating a preference for small families. Both primary and secondary data were used for analysis.

The study also indicated that women have difficulty returning to their careers if they take breaks due to personal commitments such as raising a family or marriage. Career breaks also compromise their negotiation ability, resulting in pay cuts, lower salaries, and the need to settle at junior levels. Childcare and family care are the primary reasons women take a break or gaps in their working tenure. The outcome of such career gaps makes women lose out on the total work experience compared to men. Thus, the study also indicated that fewer women have total experience of 20 or more years. This lesser tenure or lack of experience also results in the organisation denying women strategic vital positions. Designations such as Chief Technology Officer, Chief Executive Officer or Chairman are held only by men, indicating the presence of a glass ceiling. One of the other reasons why fewer women are in top management positions is that three decades back, fewer women were recruited in industries and that's why currently few women hold key roles. Some of the strategies women executives adopt to address the glass ceiling are strong interpersonal and networking skills, training and development, readiness to face challenges, openness to learn, and strong support from family and seniors, apart from hard work and ambition to excel.

On analysing the perceptions of both men and women on leadership, it was found that men are considered to be emotionally stronger than women and assumed to be more authoritative and influential than women. Thus, even corporations are influenced by the patriarchal structures of society as men are supposed to be more career-oriented while women are not, resulting in fewer promotions for women. Men are considered to have a deep concern for their autonomy and freedom and are considered more ambitious than women. They are deemed suitable for managerial jobs, and respondents prefer male superiors more. Women are regarded as family makers and hold more family responsibilities than men. Respondents have agreed that gender affects promotion decisions. Women working part-time in smaller firms also get much lower wages. The study indicated the presence of modern sexism in organisations wherein, despite harassment and discrimination, there is a denial of the existence of sex discrimination.

Some of the other findings the study highlighted were as follows: While there are no specific gender

hiring policies for recruitment in the manufacturing sector industries, very few women work in this sector, and women's representation is found more in the service sector. Sectors like technology and engineering are also male-centric, with fewer women in management positions. For such occupations, women are not favoured without any scientific reason. So, women executives do not get any chance to prove their efficiency in these sectors. Additionally, few women opt for education in technical fields compared to other fields of education, and this becomes a barrier to career growth as some jobs require technical skills over professional skills. At the junior management level, women are preferred for staff functions such as personnel or training rather than commercial ones. Women's representation is comparatively higher in the private sector than in the public sector. Further, the working environment in the private sector is more competitive than in public sector organisations. The private sector is also notorious for non-adherence to policy recommendations, which is evident regarding maternity leave for women.

The study revealed discrepancies regarding the organisations' paid maternity leave policies. While the Maternity Benefit Act (amended 2017) entitles women to 26 weeks of paid maternity leave, the study revealed that organisations give only three months of paid leave. The short maternity leave is insufficient for infant child care, resulting in women opting out of the workforce. 96 % of respondents mentioned an absolute lack of childcare facilities. The lack of childcare policies such as flexible hours or part-time childcare facilities on-site results in withdrawal from work. Since women are not part of the corporate boards, they cannot influence childcare policies, resulting in the absence of women-centric policies in the workplace. The study also revealed the gender pay gap in management positions and promotions to the next level.

Some of the limitations of the study, which the authors have also stated, are that the study is limited to only the Mumbai region and thus becomes the starting point for further research in other areas of the country to understand whether similar findings come up in different parts, too. Further, longitudinal studies are required to see the career growth of junior executives. An interesting angle for further research that can be explored is whether women in management positions lead organisations differently or have a differential impact on organisational performance. Through quantitative analysis, the book verifies each variable and has a solid empirical base. However, some of the drawbacks are that the initial section dwells on basic concepts of Radical feminism, Liberal feminism and Marxist feminism, Eco-feminism and Socialist feminism, which distracts the readers from the original theme of the study. Nevertheless, this is a brilliant attempt by the authors to bring forth critical issues and the need for more gender-positive policies, a solid political will which can influence the organisational set-up. The authors have backed their study findings with relevant literature reviews wherever required, making it an intellectual treat.

This book will help the students and researchers of Management, Women Studies, Gender Economics, Social Work, Sociology, etc., to understand the issues in the Indian corporate world. The audience of this book could also be the leaders, think tank heads and relevant experts of industries and policy experts.

Women's economic empowerment has a direct relationship with the country's progress, and measures such as reduction of gender wage gaps, provision of a secure and safe environment, positive career growth, skill development, and women-centric policies can go a long way in improving women's representation in management.

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ROUND & ABOUT

Mr. Fazalahmed Khan
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Mumbai Gets Another Sibling!

Mumbai has an interesting history - starting off as a group seven islands to the crowning glory of financial capital, cultural and services hub in the country. In the 1960s, when the industrial and commercial activities reached a high point, and tackling the continued influx of people into it from all over India, the Government had decided to decongest Mumbai (1971) by setting up a satellite town of Navi Mumbai. Thereafter Mumbai got second sibling when setting up NAINA city was notified in 2013. Navi Mumbai airport is likely to start operations in April 2025. Infrastructure development is in full swing, and investments are moving in NAINA.

After the inauguration of MTHL (Atal Setu), a vast area is opened up with a huge potential on account of easy accessibility of the area with Mumbai. The Government of Maharashtra has issued GR on 15 October 2024 to appoint MMRDA as the New Town Development Authority for the proposed Third Mumbai. Thus, Mumbai got its third sibling. These three siblings are going to make Mumbai Metropolitan Region a pride of place in the country taking the area to new heights of development. According to the GR, the Third Mumbai primarily includes areas falling within the influence zone of the MTHL. The Third Mumbai spans 324 sq.km and consists of 124 villages. MMRDA envisions the development of this area as a sustainable, livable, greenfield business hub. The new city will feature smart city amenities, mixed-use spaces and integrated residential areas, all aimed at fostering job creation and economic growth in the Mumbai Metropolitan Region.

[References: Government website and The Times of India, Mumbai, 22 October 2024]

New Fire Safety Regulations of Government of Maharashtra

Mumbai has more and more high-rise buildings having more than 20, 30, 40, 50 floors. The rationale for allowing such an abundant FSI in the city is not entirely convincing. It is best left to the wisdom of the authorities.

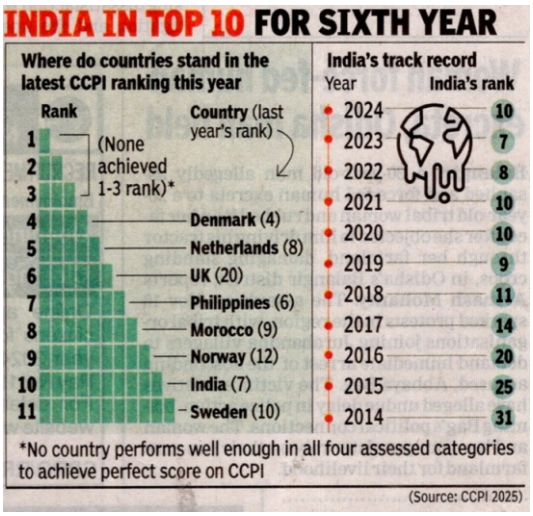
It is not uncommon to read in the newspaper about fire accidents in high-rise buildings. Most of the time it is also reported that the refuge areas meant to be available for the residents to take refuge were found covered/used for other purposes.

A PIL was filed in the High Court inter alia, raising questions on discrepancies in planning, design, certification of electrical installations, lack of ensuring and checking compliances, etc. urging for the proper fire safety regulations. After considering the issues raised and the reply of the government and the municipal corporation, the High Court asked the Government for finalizing specific fire safety rules for manmade disasters. The government issued a notification on 10 October 2024 by amending its regulations for manmade disasters.

As a part of the amended regulations, buildings would be required to incorporate special provisions, including fire towers with a minimum two-hour fire resistance, a firemen's evacuation lift, and a ventilated lobby as part of the fire escape staircase. High-rise buildings, particularly those 90 meters or taller, would need to provide break tanks with fire pumps every 65 meters from the ground, with water tank systems located on service floors or floors with refuge areas.

[References: Government website and The Times of India, Mumbai, 22 October 2024]

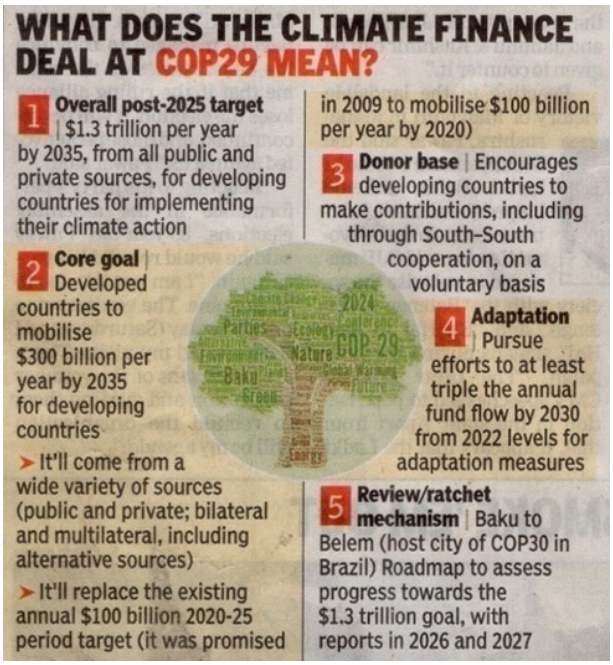
India continues to be in Top 10 for Climate Change Performance



The Climate Change Performance Index (CCPI) is released by Greenwatch, New Climate Institute and CAN International by tracking the performance of the countries. CCPI uses a standardized framework to compare the climate performance of 63 countries and the EU, which together account for 90% of the global greenhouse gas (GHG) emissions. The climate mitigation performance is assessed in four categories: GHG emission, renewable energy, energy use, and climate policy.

[Reference: The Times of India, Mumbai, 21 November 2024]

Climate Finance Deal at COP 29 - Too Little!



One of the agenda items at COP 29, held at Baku, Azerbaijan between 11-22 November 2024, was to mobilize adequate funds for helping developing countries implement their updated climate actions. COP 29 was widely dubbed as finance COP. The developing countries including India had expected that success of the COP will depend on whether the countries are able to raise the floor of annual climate finance from the existing $100 billion to $ 1 trillion as a New Collective Quantified Goal (NCQG). However, the talks at the COP concluded with a weak outcome on climate finance making rich nations to mobilize merely $300 billion per year by 2035 for developing countries from a wide variety of sources including public and private, rather than as public finance as was demanded.

Poor nations were disappointed at such a low deal. India's negotiator, Chandni Raina, during the plenary session raised the issue that "Developed countries are taking the lead for a mobilization goal of a mere sum of $300 billion and that too to be reached by 2035, that is almost 11 years later, and that too from a wide variety of sources…..". "We are disappointed with the outcome which clearly brings out the unwillingness of developed country parties to fulfill their responsibilities," she said. Speakers from other developing countries, including Bolivia and Nigeria took a similar line.

[References: Various media reports including The Times of India, Mumbai, 25 November 2024]

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