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Peri Urban Transformation in India: Urban Expansion, Livelihood Vulnerability and Inclusive Development for Achieving Viksit Bharat 2047

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Abstract

Over the last few decades, there has been a significant transformation in the way Indian cities have grown. Currently, municipal boundaries do not reflect the true reality of urbanization in such cities. Fringes have undergone changes in terms of looks, feeling, and even connectivity. Residents in fringe areas exist in limbo, existing in the world that is gradually being transformed and the one that is yet to come into existence. Such areas embody both these worlds but still remain unrepresentative of either. They suffer silently from the growing pains of urbanisation. Arable land gets converted to non-arable. Rural farming economies become jobless as farmland dries up. Migrants and displaced individuals occupy such fringe areas in droves in search of employment opportunities. However, the basic facilities, including roads, school education, clean water, etc., are woefully inadequate compared to the growing number of residents because of urbanisation. Even if some families succeed in improving their economic condition through the increase in property prices and informal occupations, it does not hold true for others. These disadvantaged groups include women, farmers with small land holdings, and workers in the unorganised sector. However, their sufferings fail to make an impact in the development discourse. Viksit Bharat @2047 aims to establish a prosperous nation where everyone enjoys economic benefits equally. Nevertheless, peri-urban regions receive less attention compared to other parts. There is a constant mismatch between urbanization and institutional processes in peri-urban settings. They require proper institutional structures and community-based planning. This paper presents an analysis of peri-urban transformation in Indian cities, specifically Kanpur. This study uses an inclusive growth approach incorporating spatial planning, social equity, and environmental development. Economic growth cannot be limited to city centres. It is essential to understand what happens on the fringe of our cities. It will determine whether development policies work effectively for the marginalised sections that have been neglected for long.

Keywords: *Peri Urban Transformation, Urban Expansion, Livelihood Vulnerabilities, Inclusive Growth, Social Equity, Environmental Development, Viksit Bharat @2047.*

1. Introduction

The rapid urbanization process of India has restructured the geographic space of the Indian subcontinent in that the rate of expansion has continuously surpassed those officially prescribed urban limits. This phenomenon has been occurring particularly in tier 2 cities in India. The economic and demographic concentration had been effectively

constrained within the confines of the officially sanctioned urban boundaries; however, urban expansion in current times occurs mostly peripherally, well beyond the traditional scope of civic administration and infrastructure. Urbanization has thus extended geographically to create a disjointed geography with infrastructure lagging behind the demographical and spatial changes. Peri-urban spaces present a socio-spatially hybrid character due to their position in between rural jurisdictions such as the panchayat system and the urban municipalities, resulting in these peri-urban regions being both poorly planned, highly fragile and seriously under-governed. As a consequence, there emerges an accelerated trend towards the transformation of these lands into commercial and industrial estates as well as housing estates, without planning and control from relevant civic administrations. The peripheries endure tremendous dual pressure: disruption of living conditions and scarcity of basic services due to deficient municipal facilities. As peripheries have remained unincorporated into any holistic municipal plan for development, the expanding population will be unable to cope with the lack of basic services, including piped water, sanitary facilities, and social amenities, thus making them socially and economically vulnerable.

Here Kanpur comes as a prominent model for this peripheral phenomenon. Historically known as the "Manchester of the East" because of its massive leather and textile industrial legacy, it remains Uttar Pradesh's largest industrial city, yet its spatial dynamics have changed drastically. Following the post liberalisation industrial decline in its historic core, labour and population overspills were forced to the urban edges, transforming the outer wards of the KMC. Areas like Kalyanpur, Panki, Bithoor, Chakeri, Derapur, and the Shyamnagar fringe have emerged as intensely active zones of peri urban transition, showing a contrast of heavy industrial estates and struggling agrarian settlements. Kanpur's peri urban crisis is more than spatial or socio economic. It also reveals an often neglected environmental dimension. Along the city's northern boundary, the Ganga and the Pandu River marking its southern edge are both highly stressed by industrial discharges ,largely from the 151 tanneries clustered at Jajmau ,and by over 400 million litres per day of domestic sewage, mostly untreated, discharged from a growing peri urban population (NIUA & NMCG, 2022; Tiwari et al., 2025). This ecological deterioration directly increases the vulnerability of people living at the city's fringe area.

This paper examines peri urban transformation in Kanpur through three interconnected lenses: first, it analyses peri urban expansion and land use change; second, it examines livelihood vulnerability among peri urban communities affected by urbanisation; and third, it assesses infrastructural, governance, and environmental gaps and suggests inclusive development strategies aligned with the vision of Viksit Bharat @2047

2. Objective of the study

1. To analyse peri urban expansion and land use changes in Kanpur.
2. To examine the livelihood vulnerability among peri urban communities which is affected by urbanisation.
3. To evaluate infrastructural, governance, and environmental gaps and also suggest inclusive development strategies.

3. Review of literature

The peri urban interface is a shifting edge where the city meets the countryside. Instead of a clear boundary, the peri urban area is dynamic, mixing rural and urban features in an uneven way. Conventional agricultural lands coexist alongside newly constructed housing colonies and unorganised manufacturing units. These areas are ever changing and unstable due to the rapid transformation of farmlands into built up land and the unclear responsibilities between urban and rural authorities. When outward pressure is applied by the city, agricultural land is rapidly commercialized and converted into residential or commercial property. These peri urban areas also serve as destinations for rural migrants who are seeking urban employment but cannot afford inner city housing.

Since peri urban areas are often caught in the grey zone between municipal corporations and rural panchayats owing to the indistinct boundaries between the two, there is a marked governance vacuum which allows unregulated growth that impacts basic facilities adversely. When there is a disturbance in agriculture, it leaves these communities exposed to an informal labour market where they have virtually no job security. With the acquisition of agricultural land, the original settlers of these areas lose both their source of income and means of ensuring their food security. Forced to join the

informal sector without possessing any skills that are essential to be part of the urban informal economy, their sudden shift in occupation is riddled with risks without access to healthcare or social security.

Planners and policymakers have often treated the peri urban periphery as if it does not matter. Such fringe areas fall in between the jurisdictions of these different authorities and thus are hardly ever part of any city planning. This, coupled with their lack of clear governance framework, leaves them bereft of political representation. Lack of any data on the nature of people working in these areas and land ownership makes policy making difficult. The result is a persistent planning blindness where the social and environmental deterioration of the urban fringe is overlooked.

Recent geo spatial studies confirm the acceleration of urban sprawl in Kanpur. Monitoring urban sprawl using geo spatial technology: A case study of Kanpur City, India. (Husain et al. (2023)). Husain et al. (2023) have employed Landsat imagery and Shannon's Entropy models to assess such a phenomenon. Their findings indicate an observable shift from a clustered urban core to a dispersed peri urban zone characterized by fragmentation from 2004 to 2021 (Husain et al., 2023).

This growth has an immediate effect on local ecosystems and socio economic systems. (A sustainable solution to manage ecosystem health of wetlands in urban and peri urban areas of Lucknow district, India using geospatial techniques and community based pragmatic approach. Journal of Cleaner Production, Imdad et al.,(2023)). Imdad et al. (2023) highlight that anthropogenic pressures and rapid urban expansion severely exacerbate livelihood losses and socio economic vulnerabilities for peripheral agrarian and wetland communities (Imdad et al., 2023).

Climate change and river water pollution: An application to the Ganges in Kanpur. Natural Resource Modeling (Batabyal et al., 2023). Furthermore, the environmental economics of Kanpur's periphery are heavily shaped by industrial activities. Batabyal, Kourtit & Nijkamp (2023) demonstrate how chromium laden tannery effluents from the Jajmau cluster create a double crisis of industrial pollution and agricultural vulnerability for small peri urban farmers (Batabyal et al., 2023).

Water quality assessment of river Ganga in downstream area to Kanpur city. Indian Journal of Soil Conservation, (Savita& Dwivedi, 2024). This is evident from studies by Savita & Dwivedi (2024) which have indicated significant increases in levels of Biochemical Oxygen Demand (BOD) and total dissolved solids in the Ganga river, signaling major environmental damage (Savita & Dwivedi, 2024).

Policy and business model innovation in informal industrial clusters of Uttar Pradesh: Implications for peri urban development, (Parveen & Nigam,2024). The study conducted on policy innovations and business models pertaining to informal industrial clusters in Uttar Pradesh forms a basis for analyzing the problems faced by such zones (Parveen & Nigam, 2024).

(A comparative study of power loom industry challenges in Mau and other Indian textile clusters, Parveen & Nigam, 2025). This structural instability in informal textile industries sheds light on the emerging livelihoods challenge faced in the peri,urban area of Uttar Pradesh. Parveen and Nigam (2025) conduct a comparative study of the power loom industry in Mau, Uttar Pradesh, vis-à-vis other prominent textile clusters in India like Bhiwandi, Surat, Erode, and Ichalkaranji. According to their findings, power loom industries in Mau show comparatively lower levels of automation, high operational costs, and susceptibility to technological obsolescence. Such structural inefficiencies render workers vulnerable to a vicious cycle of poor productivity and income generation. This information is highly relevant for understanding the plight of Kanpur's peri urban industrial zones which face similar shortcomings in the informal sector textile and manufacturing industry (Parveen & Nigam, 2025).

Exploring the impact of ODOP initiative on the industrial renaissance of Uttar Pradesh. (Nigam & Parveen, 2026) More recently, research on ODOP and the industrial renaissance of Uttar Pradesh has been uncovering ways to ensure that inclusive growth is directed into the peri urban and transitional regions.

Even with a wealth of information on the individual factors, such as geographical expansion indicators and unique river pollution measures, it appears that there are few studies combining multiple factors to explore how the combination of spatial growth and economic shock exacerbates the livelihood challenges of vulnerable groups and river ecological degradation at the peri urban interface of Kanpur.

This paper seeks to address the current knowledge gaps by examining the intersection of all three factors, making direct links to the three objectives of analyzing peri urban growth, livelihood vulnerability, and infrastructural, governance, and environmental gaps.

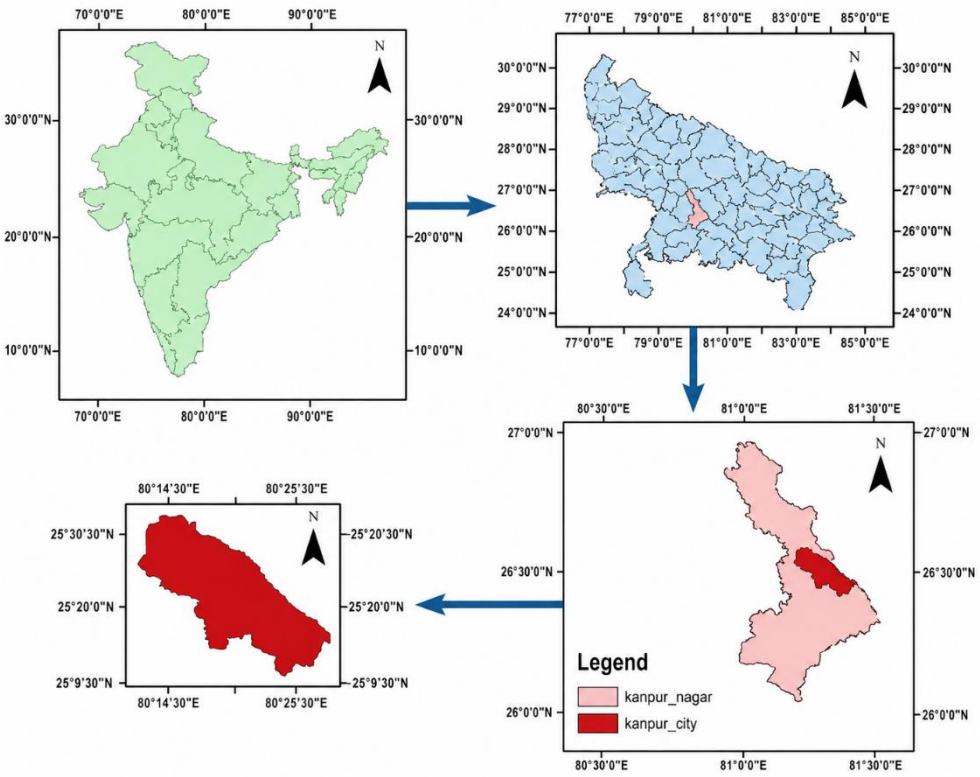
4. Study Area

4.1 Industrial History of Kanpur

Kanpur's urban layout can only be understood with its powerful industrial legacy. From the mid 19th century, the city functioned as a major commercial and military hub, later evolving into the "Manchester of the East." It had become India's second most industrialised city after Calcutta by the early 20th century, built around large cotton and woollen textile mills like Elgin Mills (1864), Cawnpore Woollen Mills (later Lal Imli, 1870), and Victoria Mills (1885). Alongside textiles, Kanpur developed a globally recognised leather and saddlery industry, especially in the Jajmau area situated on the southern bank of the Ganga. By employing hundreds of thousands of workers, this cluster grew into one of Asia's largest tanning belts.

Kanpur's formal manufacturing base began to decline sharply after economic liberalisation. Dozens of major textile and heavy industry units were declared 'sick' and later shut down, throwing hundreds of thousands of workers out of jobs. This industrial collapse triggered a major shift in the city's economic structure, moving away from large scale, relatively stable factories toward a scattered and largely informal urban economy. Many workers were pushed toward the city's edges as inner city industries decayed, where cheaper housing and small scale informal manufacturing offered fragile but essential livelihoods.

Map 1: Kanpur in India



***Source**: From Gupta, R., & Singh, D. (2023). Impact of Urbanization on Groundwater Level in Kanpur City, Uttar Pradesh. Engineering Research Transcripts, 5, 11 19.*

4.2 Spatial Expansion Beyond the Core City

Kanpur has grown from its core location in the past. Civil lines, Satti Chaura, and Massacre Ghat are some of the most suitable examples. Continuous expansion has occurred in Kanpur, which was happening since then, towards the southwest side. The presence of the Ganga river on the northern end and a major cantonment area on the eastern side has also played an instrumental role. Thus, linear expansion towards the southwest direction has characterized the growth of Kanpur City.

The Kanpur Development Authority (KDA) has always been taking initiatives to accommodate the expansion through its extended jurisdiction. Urbanization has increased from a mere 8,236 ha in 1946 to 29,670 ha in 1962. The metropolitan area has become bigger, covering approximately 89,131.15 ha by the late 1990s (KMC, 2006). More recently, the KDA has proposed bringing around 80 surrounding villages into the Greater Kanpur metropolitan area under the Draft Master Plan 2031. This move pushes the city's functional limits further into the peri urban edge and has fueled speculative real estate activity across landscapes that were once primarily agricultural.

Table 1: *Evolution of Land Use Structure in Kanpur (1961 Proposed 2021)*

Land Use Category	1961 (%)	1998 (%)	Proposed 2021 (%)
Residential	31.77	62.93	41.67
Commercial	1.86	3.28	2.61
Industrial	6.42	6.93	5.55
Public & Semi Public	6.59	6.90	6.14
Traffic & Transportation	8.71	10.37	9.98
Recreational	1.19	6.84	9.56

Source: KMC 2006

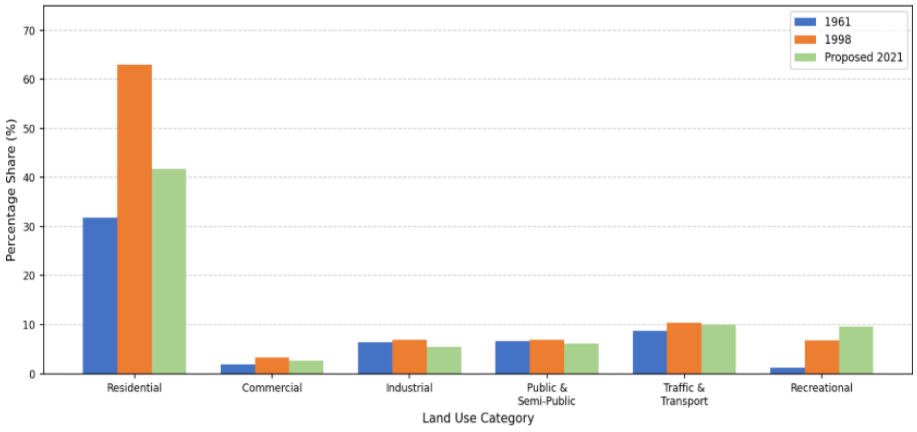


Figure 1*: Evolution of Land Use Structure in Kanpur (1961 Proposed 2021) Source: KMC 2006*

4.3 The River Boundary and Environmental Pressure

An aspect of Kanpur's peri urban landscape that is often overlooked is how its two rivers both shape and are shaped by the city's growth. The Ganga runs along the city's northern edge, while the Pandu marks its southern boundary. Both rivers have increasingly become dumping grounds for the city's waste rather than natural barriers to urban sprawls. According to the Urban River Management Plan (URMP), Kanpur generates over 400 million litres of domestic sewage each day, a large share of which flows into these rivers without proper treatment because existing Sewage Treatment Plant (STP) capacity is insufficient (NIUA & NMCG, 2022).

The Jajmau industrial belt, located in the peri urban southeast where more than 151 tanneries operate, has a particularly severe ecological impact. These units discharge effluents containing chromium, high BOD loads, and other toxic chemicals into the Ganga, often well above permissible limits. Climate change and river water pollution: An application to the Ganges in Kanpur. Natural Resource Modeling, (Batabyal et al., 2023) Research by Batabyal, Kourtit & Nijkamp (2023) shows that small and marginal farmers on the peri urban fringe around Jajmau face direct livelihood losses because tannery effluents contaminate both soil and irrigation water, creating a double crisis of industrial pollution and agricultural vulnerability (Batabyal et al., 2023). Within the KMC boundary alone, there are over 70 waterbodies, many

of which are severely degraded due to encroachment, solid waste dumping, and untreated industrial wastewater consequences of unregulated peri urban growth as identified by the URMP (NIUA & NMCG, 2022).

4.4 Key Peripheral Growth Corridors

Kanpur's outward expansion is clearest along its major peripheral growth corridors, each with its own mix of rural and urban traits.

Kalyanpur (west): This corridor is marked by fast paced residential growth and institutional development, anchored by large educational institutions such as IIT Kanpur and the HBTU area. Kalyanpur has turned into a busy mixed use zone shaped by students and professionals seeking suburban housing.

Panki (industrial frontier): Panki functions as the city's main industrial belt, dominated by a 284 MW thermal power station and several industrial estates set up to decentralise manufacturing. This area is dotted with labour colonies and informal settlements of housing workers who support Kanpur's remaining industrial activities.

Bithoor (north, Ganga banks): Historically and religiously significant, Bithoor is now under intense urban pressure. Speculative real estate projects and tourism driven development are reshaping a landscape that once had a strong rural and cultural character. Bithoor requires streamside forest protection because of its ecological and cultural sensitivity, as highlighted by the URMP (NIUA & NMCG, 2022).

Chakeri (east): Chakeri's growth is tied to transport connectivity, situated near the civilian airport and a military airstrip. The promise of better links has led to new residential clusters, logistics hubs, and warehousing zones spreading across formerly rural land.

4.5 Outer Wards of KMC as Peri Urban Zones

Many former villages and semi rural tracts were officially brought under the city's administrative boundary as the Kanpur Municipal Corporation expanded to include 110 wards. Although this administrative merger has not led to more equitable urban development, on paper these outer wards are part of the city, but in practice they remain rural in character and poorly serviced (KMC, 2006). As these regions experience rapid influx of migrants as well as people displaced from the pricey inner parts of the city, their population density is also growing at a fast pace but the municipal facilities do not match these developments. Consequently, a heterogeneous urban landscape emerges with agricultural land patches, unorganized slums, and polluting industries existing together in one place.

4.6 Population Pressure

The magnitude of the demographic changes which lead to such expansion in cities like Kanpur is quite immense. In particular, a population increase of approximately 35% was registered for the Kanpur Nagar district between 1991 and 2001 reaching around 2.5 million people. The influx is primarily driven by sustained in-migration, where people enter the city from areas less developed and dominated by agriculture, mostly coming from eastern parts of Uttar Pradesh and the Bundelkhand area, particularly Unnao, Fatehpur, and Banda. As the inner city is becoming congested, crowded, and increasingly expensive, the incoming migrants, along with those who have been displaced from the core, end up moving to peripheral towns, imposing huge demographic pressures on outer wards, which lack adequate capacity to accommodate such burdens.

5. Research Methodology

The present research follows a mixed method approach to analyze Kanpur's peri-urban phenomena in three inter-related aspects: spatial expansion and urbanization process, vulnerability of livelihoods in peri-urban populations, and infrastructure and environmental deficits.

Monitoring urban sprawl using geo spatial technology: A case study of Kanpur City, India. (Husain et al. (2023). The assessment of spatial expansion and urban sprawl patterns relies on secondary geographical data, especially results generated from the analysis of satellite images from Landsat 5 Thematic Mapper and Landsat 8 Operational Land Imager between 2004 to 2021 (Husain et al., 2023). The diffusion of the built-up areas is understood through Shannon's Entropy indices and multi-ring buffer (MRB) analysis (Husain et al., 2023). The changes in land use patterns from 1961,

1998 and the Proposed 2021 scenario periods have been analyzed through the City Development Plan data (KMC, 2006).

The vulnerability of the livelihoods has been investigated using census data, municipal records and the socio economic profile data obtained through the Kanpur City Development Plan (KMC, 2006) together with the empirical data related to chromium pollution and agriculture livelihood vulnerability from Batabyal, Kourtit & Nijkamp (2023) and the wetlands ecosystems from Imdad et al. (2023).

Infrastructural, governance, and environmental gaps are assessed through a critical review of contemporary policy frameworks, primarily the Urban River Management Plan (URMP) formulated by the National Institute of Urban Affairs (NIUA) and the National Mission for Clean Ganga (NMCG) (NIUA & NMCG, 2022), alongside the urbanisation review linking river management to Viksit Bharat by Tiwari, Singh & Chaurasia (2025).

6. Results and Discussion

6.1 Spatial Expansion and Land Use Change

The outer wards of Kanpur are undergoing a spatial reorganisation that is, in many aspects, irreversible. A close analysis of land use patterns shows a massive shift from agricultural land to residential and commercial real estate. Satellite imagery and spatial metrics indicate that Kanpur's built up area expanded by 33.7 square kilometres between 2004 and 2021. This data hows that the city is absorbing its surrounding agricultural hinterland (Husain et al., 2023).

Over this period of time, peripheral zones have seen a decline in native green cover and farming based land use. Some restricted vegetation increased by 10.5 square kilometres within protected military or institutional areas. The broader peri urban fringe witnessed large patches of farmland being cleared for urban sprawl (Husain et al., 2023).

Table 2: *Spatial Urban Sprawl and Density Metrics in Kanpur (2004 2021)*

Metric / Indicator	2004	2011	2021
Shannon's Entropy Value	1.70	1.80	1.84
Growth Pattern (Outer Zones)	Dispersing	Highly Dispersing	Highly Dispersing
Built up Area Increase (Cumulative km^2)	Base	+22.92	+33.7

Source: *Husain et al. (2023)*

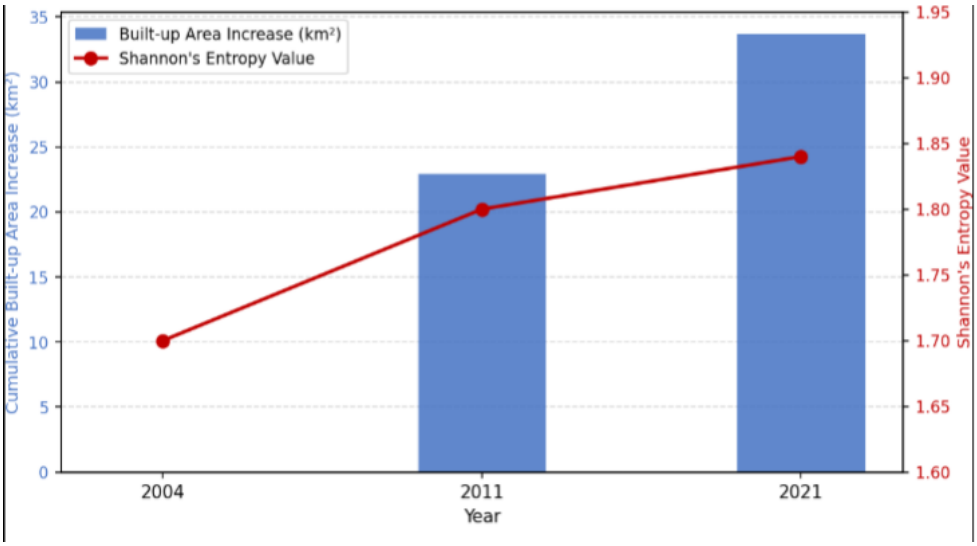


Figure 2: Spatial Urban Sprawl and Density Metrics in Kanpur (2004 2021) Source: *Husain et al. (2023)*

This transformation is driven by unplanned housing colonies and unauthorised construction. Compounded with speculative development outpacing formal KDA mapping and planning exercises due to weak regulatory oversight in transition zones. The erosion of the agricultural identity in the outer wards is a structural change rather than a merely

visual one. The landscape has moved toward a highly dispersed and fragmented morphology, undermining both ecological functions and the social linkage of peri urban communities.

6.2 Livelihood Vulnerability

The spatial reconfiguration of Kanpur's periphery has produced serious socio economic consequences, making livelihoods fragile for three broad groups in the outer wards.

i) Small and marginal farmers: The process of urbanization becomes a threat to the existence of small and marginal farmers who live in the peripheral areas around the wards. Extensive amounts of agricultural land get sold in distress situations or get acquired by the government through compulsory acquisition because of expansion programs by the KDA and increasing costs of real estate properties. This leads to a breakdown of the economic basis of their livelihoods and even long-term food security issues. As soon as the farmers lose control over their lands, they are faced with a drastic change from being self-reliant cultivators to precarious wage earners in the urban labor market. The lack of rehabilitation and recompense for their losses causes severe disruptions and alienation.

Monitoring urban sprawl using geo spatial technology: A case study of Kanpur City, India. (Husain et al. (2023). In addition, the environmental contamination worsen the situation further.

According to research conducted by Batabyal, Kourtit & Nijkamp (2023), peri urban farmers have a difficult experience as a consequence of their proximity to the Jajmau tannery complex; their agricultural fields get polluted with effluent waters with high levels of chromium content, rendering it impossible to cultivate land any longer, and at the same time, the process of urbanization strips off their possession of land.

ii) Women: Women in Kanpur's peri urban wards carry an uneven share of the social and economic costs of this transformation. They face a dual burden, managing demanding, largely unpaid domestic and care work under worsening civic conditions, while being pushed into the informal economy to support household survival. Women are confined to low paid and precarious occupations mostly being engaged as domestic servants for the nouveau riche residing in the new residential colonies constructed around their village territories. Vulnerability further worsens owing to their exclusion from property ownership and various other livelihood projects of the state. Limited access to Self Help Group (SHG) and formal credit is reported for this poorly governed peripheral part of the city (Imdad et al., 2023). The vulnerability also extends to female education where due to poor transportation links, lack of safety and domestic responsibilities compel young girls to leave schools prematurely.

iii) Unorganised sector / migrant workers: The outer wards of KMC act as an entry point for a large influx of migrants from economically distressed, agrarian districts of eastern UP and Bundelkhand, including Unnao, Fatehpur, and Banda. These migrants swell the ranks of Kanpur's unorganised sector because they are typically excluded from the formal economy and unable to afford rents in the inner city. They are channelled into construction, brick kilns, waste related work, and small scale trade, providing the cheap manual labour that fuels the city's physical expansion. This segment deals with little or no job security, occupational safety, or social protection. Many settle in sprawling jhuggis and unauthorised colonies along the city's edge due to economic necessity, forming pockets of extreme deprivation within the rapidly advancing urban frontier.

Table 3: *Socio Economic and Employment Profile of Kanpur's Peripheral Slum Settlements*
Source: *KMC (2006)*

Livelihood Category	% of Employed Workforce	Characteristics
Self Employed / Casual Labour	39.25%	Precarious daily wages, petty trade, severe lack of social safety nets
Private Jobs	25.98%	Low tier informal sector, unregulated domestic work for women
Government / Semi Govt Jobs	34.77%	Often lower tier municipal contract work
Unemployed (Eligible Workforce)	> 24.00%	High structural unemployment due to industrial decline

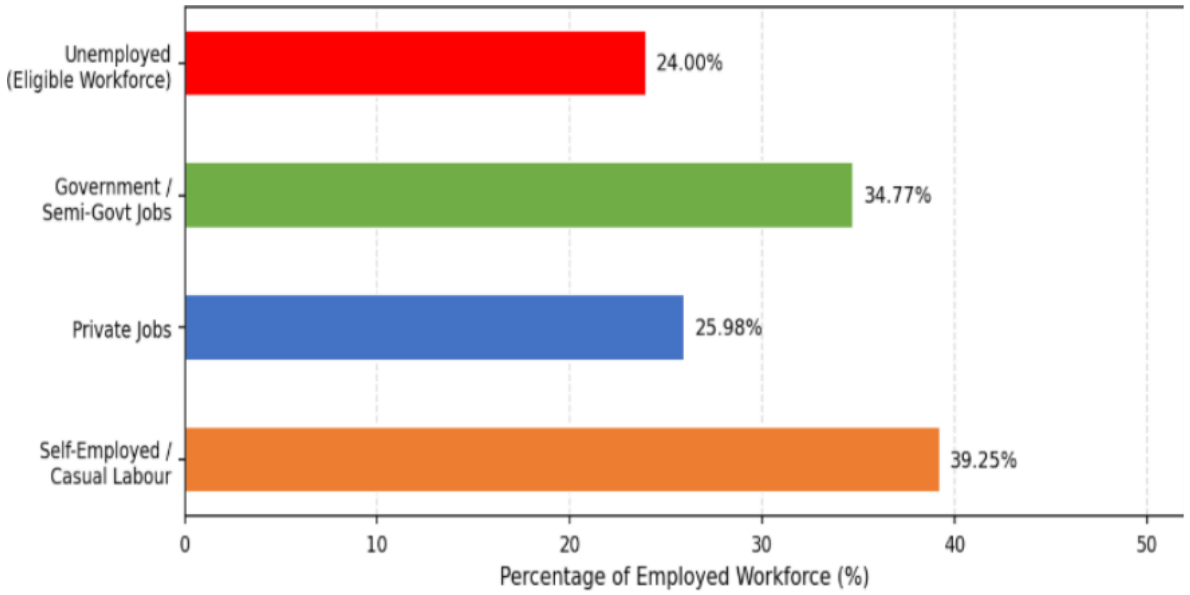


Figure 3: *Socio economic and Employment Profile of Kanpur's Peripheral Slum Settlements*
Source: *KMC (2006)*

6.3 Service and Infrastructure

Deficits in Outer Wards Outer wards of Kanpur suffer severe shortages in basic civic infrastructure, sharply lowering the quality of life and limiting the human capital potential of peripheral communities, despite the fact that many outer wards are now legally part of the Kanpur Municipal Corporation (KMC, 2006).

Water supply: A chronic problem in the city's fringe areas is access to safe and reliable drinking water. Expanding outer wards are often left outside the main municipal grid because piped water networks are irregular and patchy. Households rely heavily on hand pumps tapping into increasingly contaminated groundwater, or on costly and unreliable municipal water tankers. The city's overall water demand far exceeds supply, and peripheral wards are among the last to receive any improvements in service (NIUA & NMCG, 2022).

Sanitation: The shift from rural to urban has not been matched by corresponding gains in sanitation infrastructure. Open defecation is still common in officially KMC classified fringe villages and unauthorised colonies. Efforts to make these outer wards Open Defecation Free (ODF) have been slow and uneven. According to the URMP, a large portion of the 400 million

litres of sewage generated daily in Kanpur is neither collected nor treated, and peri urban wards are especially weak in Faecal Sludge and Septage Management (FSSM) infrastructure (NIUA & NMCG, 2022).

Roads: Although major arterial roads and expressways that link the city to national corridors pass through the periphery, the internal micro infrastructure is extremely poor. In many peripheral settlements, lane connectivity is limited to unpaved, deeply rutted, and waterlogged tracks. The connectivity till last kilometres isolates these communities from formal markets, emergency services, and reliable transport.

Education: In the outer wards, educational infrastructure has not kept pace with rapid demographic growth. Government schools in these areas are understaffed, underfunded, and often lack basic functional facilities. Dropout rates are noticeably higher in these peripheral zones than in the urban core, and girls' schooling is particularly affected by the combination of poor facilities, distance, and domestic pressures.

Healthcare: There is a lack of availability and/or accessibility of health care facilities in the peri-urban area. There is a clear gap between the Primary and Community Health Centres and the newer settlements that have come up in the peri-urban areas. Also, high prevalence rates of diseases directly related to contamination of drinking water, inadequate sanitation, and environmental pollution in peripheral populations are evident.

6.4 Peri Urban Planning Recognition

The only way for a sustained process of development in Kanpur to begin is if there are clear demarcations of peri-urban areas in all future development/master planning processes for the city. There should be better institutional coordination in the planning process between the KDA and KMC, where expansion of basic services can keep pace with growth in physical terms. It is important that infrastructure be planned in peripheral wards as per the new Kanpur Master Plan 2041. In such a plan, land-use planning guidelines will accommodate existing settlement patterns and ensure protection of buffer areas, particularly the river frontage of Ganga and Pandu, and not simply convert agricultural land into real estate developments as in the current master plans (NIUA & NMCG, 2022).

6.5 Livelihood Sensitive Planning There is an urgent need for urban expansion strategies to adopt livelihood-sensitive planning policies that seek to mitigate economic shocks to the peripheral population. In cases where the displaced farmers receive compensation for loss of livelihood, there should be efforts to offer them opportunities for transitioning into new livelihoods through skills training and provision of employment within the urban area. The municipality must make efforts to ensure that the informal workers in the outer wards, such as casual workers, construction workers, and house helps, become formalised and registered with the municipality. It is imperative to promote women's economic empowerment. This can be achieved through the deliberate effort to increase the spread of SHGs and other financial schemes towards the outer KMC wards so that women can have enough leverage to navigate the peri-urban transition process. Policy research on innovative business models of informal industrial clusters in Uttar Pradesh offers valuable insights into developing transition programs (Parveen & Nigam, 2024).

This can be reinforced by the work of Parveen and Nigam (2025) that highlights through comparative analysis of power loom industry in Mau and other Indian textile clusters that informal manufacturing enterprises in Uttar Pradesh are under compounded constraints in terms of obsolete technology, insufficient power availability, and financial exclusion that requires direct intervention through skill development and infrastructure development for livelihood security of peri urban industrial laborers (Parveen & Nigam, 2025).

6.6 Service Infrastructure Prioritization

The delivery of basic civic amenities must keep pace with population growth at the city's edge, rather than arriving years or even decades late. The municipal administration should focus on providing water supply, sanitation facilities, and road infrastructure within the outer KMC wards in collaboration with initiatives like AMRUT 2.0 and Smart City Mission. The URMP's recommendation on implementing DEWATS and restoring water bodies presents a scalable model of development that connects environmental management with service delivery (NIUA & NMCG, 2022). The schools and the health clinics have to keep up with the moving population and be incorporated as essential elements of resilience, not as postponed additions.

6.7 Governance and Institutional Reform

In relation to the institutional uncertainty in the peripheral areas of Kanpur, there needs to be clarity on governance issues. The boundary demarcations need to be explicitly established for each ward that comes under the jurisdiction of KMC, KDA, and adjoining Gram Panchayat of the outer wards to ensure that this vicious cycle of responsibility sharing is broken to improve service delivery. In order to have informed decision making processes, the municipal corporation needs to develop reliable data collection systems for each ward regarding demographic trends, informal employment, and infrastructure deficiencies. Participatory community planning also needs to be made part of the process in peripheral wards to ensure that the most disadvantaged groups of women, farmers, and migrants shape policy decisions.

6.8 Environmental Governance and River Sensitive

Development Peri-urban Planning in Kanpur cannot take place without consideration of the relationship of the city to the two rivers it has. Ganga and Pandu are to be viewed as live environmental resources, not mere bordering waterways for waste disposal. There is an obvious strategy for their preservation, which is set out by the URMP (NIUA & NMCG, 2022): Riparian buffer zones must be created along both rivers; illegal occupation of the floodplains must be stopped via law and planning; and the Jajmau industrial estate must adhere to strict environmental regulations, including the much-needed rehabilitation of the CETP. As the data on alarming spikes in BOD and total dissolved solids levels further downstream prove, the measures are needed right away (Savita & Dwivedi, 2024).

6.9 Linkage with Viksit Bharat @2047

The concept of inclusive development in peri urban zones is intrinsically linked to the national vision of Viksit Bharat @2047. This is not the marginalization of India's development but its core testing ground. The aim of achieving a GDP of 30 trillion dollars will never be achieved if the outer wards of the industrial hubs do not become part of macro-level development plans, remaining impoverished and informal (Tiwari et al., 2025). With women-led development, environmentally conscious infrastructure projects, planning sensitive to river environments, and formalized employment opportunities, peri urban zones provide an ideal environment to anchor such goals, assuming there is enough political will. Research on ODOP and the rebirth of industry in Uttar Pradesh is particularly promising when it comes to attracting investments towards transitional peri urban zones (Nigam & Parveen, 2026). With the right amount of targeted financial and administrative resources invested in peri urban zones, these vulnerable areas can be turned into powerful drivers of development.

7. Conclusion

The outer wards of Kanpur municipal corporation embody this demographic transformation in many ways. The transition of zones such as Kalyanpur, Panki, and Chakeri represents an uneven, extremely rapid, and constricted urbanization experience at the urban fringe. Immediately after the city aggressively penetrates its rural backdrop, it creates an unstable environment where the concept of urban modernity faces a clash with structural inadequacies, socio-economic disturbances, and ecological pressures.

All the three previously mentioned research objectives have been considered in the current study. Firstly, an assessment of peri-urban expansion and change in land use of Kanpur indicates that the built-up area of the city grew by 33.7 km^2 from 2004 to 2021. This process is fueled by unstructured residential and commercial development, resulting in the fast consumption of agricultural countryside (Husain et al., 2023; KMC, 2006). Secondly, an evaluation of livelihood vulnerability amongst peri-urban communities affected by urbanization indicates that women, small, and marginal farmers and unorganized migrants bear the brunt. They are losing traditional means of subsistence, and are forced into an insecure, environmentally hazardous, and institutionally ignored informal sector (Batabyal et al., 2023; Imdad et al., 2023). Third, an analysis of infrastructural, governance, and environmental deficiencies highlights persistent weaknesses in water access, sanitation, transportation links, educational facilities, and health- care delivery. Moreover, governance voids between the KMC, KDA, and Gram Panchayats also feature prominently, along with severe deterioration of rivers due to untamed flow of waste from sewers and tanneries (NIUA & NMCG, 2022; Savita & Dwivedi, 2024). Various

strategies of inclusive development have been suggested including livelihood-oriented planning, infrastructure-focused policymaking, participatory governance systems, and river-sensitive landuse planning.

The environmental problem of degrading rivers, shrinking water bodies, and polluted ground water is interconnected with the social problems prevailing in peri-urban Kanpur. It is only another side of the same problem. Both social and environmental dimensions stem from one common pattern that has developed over decades of uncontrolled growth, unsustainable urbanization, and inequitable expansion.

The vision of Viksit Bharat @2047 is based on the principle that benefits of economic development should extend to each citizen rather than remain the privilege of the central areas of urban settlements. Thus, inclusive development cannot be limited to the old historic nucleus of a city. On the contrary, it must focus precisely on outer wards and peri-urban settlements. Whatever occurs at the fringes of Kanpur today would determine whether or not development plans for India in 2047 would be an inclusive plan or something restricted to the privileged centers of Indian cities.

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