



Circular labour migration and urban service pressure in India: A comparative analysis of Delhi, Mumbai and Bengaluru

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Abstract

India is urbanising quickly, but the number of people officially counted as city residents does not always show the number of people who are physically present and using city services. One reason is the growth of long-duration circular labour migration. In this pattern, workers spend much of the year away from their rural homes for work and return regularly, while their families often remain in the village. Recent research describes this as permanent circular labour migration. This paper examines what this pattern means for urban service planning in Delhi, Mumbai and Bengaluru. It uses secondary data from the Census of India, the Periodic Labour Force Survey, government reports, international sources and published research. The study compares population change, migration evidence, housing, water, sanitation, waste, transport, health and education. The evidence shows that circular migration creates a challenge for planning systems that rely mainly on usual residence or other fixed population measures. However, the available data do not allow the study to calculate the exact number of circular migrants in each city or to prove that migration alone caused particular service problems. The comparison instead shows that local land markets, housing supply, governance and the type of jobs available can change how population and labour mobility are reflected in urban service pressure. The paper therefore argues for planning systems that pay greater attention to the population actually present in cities, while also recognising the economic value of migration for rural households through work and domestic remittances.

Keywords: Circular labour migration, rural-urban migration, urban services, housing, urban governance, informal settlements, India

Introduction

India is becoming more urban. The World Bank estimates that about 600 million people may live in Indian towns and cities by 2036, equal to about 40% of the population. It also estimates that India needs about US\$840 billion in urban infrastructure investment over the 15 years to 2036 to keep up with growing demand. Urban services such as water, transport, waste management and other basic services will face increasing pressure as cities grow. (World Bank, 2022, 2024) [21, 22]

Population growth alone, however, does not give the full picture of how people use cities. A person can work and live in a city for most of the year without moving the whole household there. This is important in India, where many workers travel from rural areas to cities for work while their families remain in the village. Recent research describes a newer form of this movement as permanent circular labour migration. Workers may stay away from the village for nine to eleven months a year and continue this pattern for several years. (Nijman *et al.*, 2026) [11]

This creates a simple but important planning question: does the population recorded for a city always match the population that is actually present and using its services? The answer is not necessarily. Census and survey systems measure population and migration using defined rules about usual residence and migration. These measures are essential, but they do not provide a regular city-level count of all people who move back and forth for work. The result is a measurement problem, especially when workers spend long

periods in cities but remain closely connected to rural households.

The problem is not that circular migrants are the only reason for pressure on city services. Cities also face pressure from natural population growth, changes in settlement boundaries, reclassification of rural settlements as urban, economic growth, rising incomes, land prices, housing shortages and weaknesses in local government. The purpose of this study is therefore not to claim that migration causes all urban service problems. Instead, it asks how circular labour migration may make population-based planning more difficult and why similar mobility can be linked with different urban outcomes in different cities.

Delhi, Mumbai and Bengaluru are selected because they are major employment centres but have different land, housing and governance conditions. The study compares them using available secondary evidence from 2011 to 2024. The period begins with the 2011 Census because it remains the latest completed full population Census and ends with the latest period for which the main sources used in the paper provide relevant information.

The study has three research questions. First, what does available evidence show about rural-urban and circular labour migration relevant to the three cities? Second, what differences can be seen in housing and other urban services? Third, how do land, housing and governance conditions help explain why the three cities do not show the same outcomes?

Literature Review

1. Rural-Urban Migration and Circular Labour Migration

Migration research in India has long shown that movement for work is often linked with unequal employment opportunities between rural and urban areas. Lee's (1966) ^[7] Push-Pull approach remains useful for explaining why people leave one place and move toward another. Rural unemployment, low farm income and weak local employment can push people to move, while jobs and higher earnings in cities can pull them towards urban areas. However, this approach does not by itself explain whether migration is permanent, temporary or circular.

Indian migration has often differed from the older Western model in which whole households moved to cities and settled there. Srivastava (2011) ^[16] and other studies show the importance of temporary and circular labour migration in India. More recent work argues that this pattern has changed. Nijman, van Duijne and Choithani (2026) ^[11, 20] describe permanent circular labour migration as a form in which workers, mainly men, live and work away from their villages for most of the year and return only for shorter periods. Their study uses geospatial analysis across about 600,000 villages and field research in Bihar and West Bengal. The authors connect this change with falling agricultural employment, changing rural economies and the high cost of permanent urban settlement.

This recent work is important for the present study because it shifts attention from the question of whether people migrate to the question of what form migration takes. A worker who spends most of the year in a city creates a different relationship with that city from a household that moves there permanently. The worker may need housing, water, transport, health services and other facilities in the city even though the household remains linked to a rural place.

2. Migration and Urban Housing

Housing is one of the clearest areas where mobility and urban inequality meet. Nijman (2010) ^[10] showed that Mumbai's informal settlements cannot be explained simply by the number of migrants arriving. Land prices, limited land supply and restrictions on formal housing also matter. Dupont (2011) ^[6] showed that Delhi's urban growth and relocation policies are shaped by governance and the way different parts of the city are planned. These studies suggest that migration may increase demand for housing, but local housing systems decide how that demand is absorbed.

This point is important for a comparison of Delhi, Mumbai and Bengaluru. If the same increase in labour demand occurs in three cities, the result can differ because land supply, formal housing, rental markets, planning rules and public housing are different. Migration should therefore be treated as one part of a larger urban system rather than as a single explanation for informal settlement.

3. Water, Sanitation, Waste, Transport, Health and Education

Research on Indian cities also shows that access to basic services is unequal. Low-income households and residents of informal settlements can face weaker access to water, sanitation, transport, health care and education. Zerah (2008) ^[23], for example, examined unequal water access in Mumbai. Mohan (2008) discussed the burden of transport

problems on low-income groups. Studies of migrant children have also shown that movement for work can interrupt schooling (ASER Centre, 2018) ^[1].

These findings do not prove that migration itself causes service gaps. Poverty, informal housing, distance from jobs, social exclusion and weak local services can affect migrants and non-migrants at the same time. This is why the present study treats migration as a source of additional demand and a factor that may interact with local conditions, rather than as a single cause of service failure.

4. Research Gap

Three gaps are important. First, research on circular labour migration and research on urban services are often discussed separately. Second, there is no regular recent Census that provides a consistent city-level picture of circular labour migration. Third, studies of individual cities do not always explain why similar mobility processes can lead to different housing and service outcomes across cities.

This study brings these issues together. It does not claim to produce a new national count of circular migrants. Instead, it asks what the available evidence means for urban planning when people may be physically present in cities for long periods without appearing in population measures in the same way as permanent residents. The main contribution is therefore a clearer link between labour mobility, population measurement and urban service planning.

Conceptual Framework

The paper uses four connected ideas. First, Push-Pull Theory helps explain why workers move. Second, permanent circular labour migration explains the form of movement in which workers remain away from the village for much of the year but do not move the whole household permanently. Third, the idea of a population-presence gap explains why the number recorded for a city may differ from the number of people actually present for work and service use. Fourth, local city conditions help explain why the effects are different across places.

The basic relationship can be stated simply: rural employment pressure can encourage labour migration; labour migration can increase the number of people present in cities for long periods; this can add demand for urban services; and the effect of that demand depends on housing supply, land markets, governance and the distribution of jobs.

The paper also uses Sustainable Development Goal 11 as a policy reference. SDG 11 calls for inclusive, safe, resilient and sustainable cities. It is used here as a benchmark for discussing housing and transport, not as a theory of migration or urban growth.

Objectives of the Study

1. To describe available evidence on rural-urban and circular labour migration relevant to Delhi, Mumbai and Bengaluru.
2. To compare selected indicators of housing and urban services in the three cities.
3. To examine how land, housing and governance conditions may shape different urban outcomes.
4. To distinguish evidence that shows an association from evidence that can support a causal explanation.
5. To discuss the costs and contributions of circular labour migration for receiving cities and rural households.

Methodology

1. Research Design

The study uses a comparative secondary-data design. The analysis uses data and research already published by government agencies, international organisations and academic researchers. A secondary-data design is suitable for this study because the main questions concern population trends, public services and city-level systems that are measured by official agencies.

The study does not use statistical tests to estimate the causal effect of circular migration on infrastructure. This is because the available data do not provide consistent city-level measures of circular migration and service pressure for the same years. Instead, the study uses descriptive comparison and careful reading of earlier research to identify patterns and possible explanations.

2. Data Sources

The main sources are the Census of India 2011, the Migration in India 2020-21 report based on the Periodic Labour Force Survey, Ministry of Housing and Urban Affairs reports, NITI Aayog material, Central Pollution Control Board reports, World Bank reports, United Nations material and peer-reviewed research. The Census provides

the main historical city-level population and slum information. The PLFS provides national migration information, including reasons for migration. The other sources provide information on housing and selected urban services.

The PLFS 2020-21 is especially important but must be used carefully. It measures migration using the survey's own definitions and does not provide a complete city-level count of long-duration circular labour migrants. For this reason, national PLFS migration figures are used to describe the wider migration pattern, not as direct estimates of the circular migrant population of Delhi, Mumbai or Bengaluru.

3. Selection and Comparison of Evidence

Evidence was included when it came from a recognised government or international source or from relevant academic research. Each indicator was checked for its year, geographical area, unit and definition. Where the geographical area or definition differs across cities, the paper does not calculate a direct growth rate or claim exact comparability. This is important because Delhi, Mumbai and Bengaluru are measured through different administrative and metropolitan boundaries in different sources.

Table 1: Data sources and limitations by indicator area

Area	Main indicator used	Main source	Main limitation
Population	Population estimates	Census 2011; World Bank/UN estimates	Later estimates are not Census counts
Migration	Reasons and national migration estimates	PLFS 2020-21; published research	No consistent city-level circular migrant count
Housing	Slum population/share and housing programme data	Census 2011; MoHUA	Different city boundaries and old Census base
Water	Water shortage and access evidence	NITI Aayog; city studies	Not equally available for all three cities
Waste	Waste generated, collected and treated	CPCB	National figures are not city-specific
Transport	Network and passenger evidence	City transport agencies	Different systems and measures
Health / Education	Access and inequality evidence	NFHS; ASER; research	Limited direct migrant-specific city data

Results

1. Migration and Urban Population

India's urban population increased from about 377 million in 2011 to an estimated 513 million in 2024. This is a large increase, but it should not be treated as migration alone. Urban population growth can also result from natural population increase and the reclassification of settlements from rural to urban. Recent research shows that reclassification can account for a large part of India's urban growth. (Nijman *et al.*, 2026) ^[11]

The PLFS 2020-21 provides useful evidence on why people migrate. Among male migrants nationally, 22.8% reported searching for employment or better employment as their reason for migration. Among female migrants, marriage was the main reported reason, at 86.8%. These figures show the

strong gender difference in migration reasons. They do not, however, measure the total number of circular labour migrants living in particular cities. (MoSPI, 2023; Nawaz & Nasir, 2025) ^[9]

Published estimates of circular labour migration vary widely because the studies use different definitions and methods. The existence of different estimates is itself important. It shows that India does not have a regular, standard national

system for counting all long-duration circular labour migrants. The study therefore does not combine the estimates into one time series or treat them as directly comparable.

2. Three-City Population Context

Table 2: Population change in Delhi NCR, Mumbai Metropolitan Region and Bengaluru, 2011 to latest estimate

City/area used in source	2011 population	Later estimate used in original study	Interpretation
Delhi NCR	about 21.8 million	about 33.8 million	Growth extends beyond Delhi into surrounding cities
Mumbai Metropolitan Region	about 20.7 million	about 21.7 million	Population change is limited by the selected boundary and land constraints
Bengaluru metropolitan area	about 8.7 million	about 14.0 million	Strong growth linked with expansion of service and technology jobs

These figures should not be treated as a perfectly comparable statistical series because the boundaries and methods used for the later estimates are not identical. They are used only to show the broad scale and direction of change. A larger or smaller population increase does not by

itself tell us how much circular migration is present or how much pressure exists on services.

3. Housing and Informal Settlements

Table 3: Slum population and share by city, Census 2011

City	2011 slum population	Share reported in Census 2011	Main point
Mumbai (Greater Mumbai)	about 5.1 million	41.3%	Very high informal-settlement share; land and housing supply are important
Bengaluru (municipal area)	about 1.6 million	19.0%	Informal housing exists alongside rapid economic and spatial growth
Delhi (NCT)	about 1.8 million	11.0%	Recorded slum share is lower, but measurement and unauthorised-colony issues matter

Census 2011 data on slums reveal a wide gap among the three cities. Mumbai's recorded slum share was the highest, with Bengaluru next and Delhi lowest. Migration alone cannot explain this gap. Land supply, housing prices, planning rules and governance all shape where low-income households end up living, as earlier research on Mumbai and Delhi has shown (Nijman, 2010; Dupont, 2011) ^[6, 10].

Since 2015, housing policy has expanded considerably. PMAY-U has sanctioned more than one crore houses across the country, and government figures now show over 99 lakh houses completed. Affordable rental housing is also part of the programme, aimed at supporting urban migrants and low-income workers. Yet national totals like these cannot tell us whether circular migrants in Delhi, Mumbai or Bengaluru specifically have had their housing needs met.

4. Water, Sanitation and Waste

Not every Indian city or neighbourhood gets equal access to water. Several major cities, including Delhi and Bengaluru, showed serious water stress according to NITI Aayog's Composite Water Management Index. Because this index is older and has not been updated regularly, it should be read as a picture of past conditions rather than a current measure for 2024.

Low-income residents of informal or unauthorised settlements in Mumbai and Delhi often rely on water sources that are less reliable or more costly. Many circular migrants live in exactly these kinds of settlements, so this issue is relevant to them too. Still, no data exists to calculate how much extra water demand circular migrants specifically add in each city.

On waste, the Central Pollution Control Board recorded about 150,847 tonnes of solid waste generated daily across India in 2020-21. Of this, about 146,053 tonnes were collected, 70,973 tonnes treated, 40,863 tonnes landfilled, and 39,010 tonnes went unaccounted for. (Central Pollution Control Board, 2021) ^[4]

5. Transport, Health and Education

All three cities have expanded their transport systems, though not in the same way. Delhi relies on a large metro network, Bengaluru has grown its metro alongside the city's outward spread, and Mumbai still depends heavily on its suburban railway. City size, geography, investment levels and settlement patterns all explain these differences, and the evidence here says nothing about which system works better because of migration.

Access to health and education is also unequal across urban areas. Studies at both the national and city level point to

gaps between planned and unplanned settlements, along with difficulties faced by migrant children whose families relocate for work. Mobility can make it harder to access services that depend on a stable address, but poverty and informal housing create similar problems even for families that never migrated. For this reason, the paper treats migrant status as one possible factor among several, not as the sole cause.

6. Domestic Remittances and Rural Contributions

Circular migration has benefits as well as costs. Van Duijne (2026) ^[20] estimates that domestic remittances sent by circular labour migrants to rural households may have reached about US\$36 to US\$48 billion in 2024. This is an estimate, not an official annual national count. The estimate is important because it shows that the same labour movement that creates demand for services in cities can support food, housing, education and other spending in rural households.

This creates a two-way relationship between rural and urban areas. Workers depend on urban employment, while their families and villages can depend on income earned in cities. Urban policy should therefore avoid treating circular migration only as a problem. Better planning should reduce the costs faced by migrants while recognising their contribution to both urban production and rural household income.

Discussion

1. What the Evidence Supports

The evidence supports three main points. First, circular labour migration is an important part of India's changing rural-urban relationship. Recent research shows that long-duration circular migration has become closely linked with the movement of labour away from agriculture. Second, conventional population statistics cannot provide a complete picture of all people who spend long periods in cities for work. Third, urban outcomes differ because migration interacts with local housing, land and government systems.

The evidence does not support a simple claim that circular migration caused the level of slum formation, water shortage or transport pressure seen in any one city. These outcomes have many causes. The more careful argument is that long-duration labour mobility can add demand for urban services while local systems decide how that demand is absorbed.

2. Why the Three Cities Differ

Mumbai shows why land and housing supply matter. A city with limited land and expensive formal housing can have a

large informal housing sector even when population growth appears modest. Delhi shows the importance of fragmented planning across a large urban region. Growth can move into surrounding areas, making the relationship between the main city and its labour market more complex. Bengaluru shows how rapid growth in technology and service jobs can attract different groups of workers and spread development across a wider area.

These differences mean that the same national migration process does not create the same local result. The effect depends on where workers can find housing, how far they live from jobs, how services are organised and whether government bodies plan for the whole urban labour market or only for separate administrative areas.

3. A Population-Presence Gap

The main contribution of this paper is the idea of a population-presence gap. A city's official population is not always the same as the number of people physically present for work and daily service use. Circular labour migration can widen this gap because workers may spend most of the year in a city without moving the whole household there permanently.

This does not mean that every circular migrant is missing from every population statistic. Different surveys and administrative systems capture mobility in different ways. The point is narrower: no single conventional resident population figure should be assumed to represent all short-term and long-duration movement connected with a city's labour market. Planning systems that use only fixed population counts may therefore miss some demand that comes from mobile workers.

4. Implications for Migration and Urban Theory

Push-Pull Theory remains useful for explaining why people move, but it is not enough to explain the form of movement. Permanent circular labour migration helps explain why workers may spend much of the year in cities while their families remain in villages. The population-presence gap then connects this form of mobility to urban planning.

The study also adds a useful point to the idea of premature urbanisation. The issue is not only that cities may grow faster than infrastructure. The problem may also include difficulty in knowing how many people are actually present at different times. This makes planning harder when mobility is high.

Policy Implications

Three policy directions follow from the evidence.

1. Urban planning should use more than fixed resident population counts. Cities should improve information on temporary and long-duration workers, especially in sectors that depend heavily on migrant labour.
2. Affordable rental housing should be treated as an important part of migrant policy. Workers who do not move their families permanently still need safe and affordable places to live near jobs.
3. City services should be planned around real patterns of work and movement. Water, transport, sanitation and health planning should consider major employment areas and migrant-heavy settlements.
4. Urban policy should be linked with rural employment policy. Reducing distress-driven migration requires

better rural work opportunities, especially where agricultural employment is declining.

5. Policies should differ by city. Mumbai's land and housing limits, Delhi's regional governance structure and Bengaluru's fast-changing job market require different responses.
6. Data systems should improve. Future surveys should collect more information on duration of stay, place of work, place of usual residence and repeated movement between rural and urban areas.

Limitations and Future Research

This study has important limitations. It does not provide a new count of circular migrants in Delhi, Mumbai or Bengaluru. It also cannot estimate the exact additional demand for water, housing, transport or other services created by circular migrants. The absence of a new full Census limits city-level comparisons after 2011. In addition, published data use different geographical boundaries and definitions.

Future research should collect city-level data that record both place of usual residence and place of work. Longitudinal studies could follow migrant workers over several years and measure where they live, how long they stay, which services they use and how often they return home. Such data would allow researchers to test whether cities with more long-duration circular migration actually face greater service pressure after other factors are taken into account.

Conclusion

This study examined circular labour migration and urban service pressure in Delhi, Mumbai and Bengaluru using secondary evidence. The main finding is not that circular migration alone causes urban infrastructure problems. The stronger finding is that long-duration circular migration creates a challenge for planning systems that rely mainly on fixed population and residence measures.

Workers may spend most of the year in cities while their households remain in villages. They therefore have a strong connection with both rural and urban places. Their presence creates demand for housing, transport, water and other services in cities, while their earnings can support rural households through domestic remittances. The size and effect of this demand depend on local land markets, housing systems, jobs and governance.

The comparison of Delhi, Mumbai and Bengaluru shows why there is no single migration policy that can solve urban service problems. Mumbai's land and housing constraints, Delhi's large and divided urban region, and Bengaluru's rapid job-led growth create different conditions. Urban planning should therefore pay greater attention to people who are actually present and working in cities, while also recognising the rural economic role of migration.

The paper's main contribution is to connect circular labour migration with the difference between population counted and population present. Better data on mobility and better links between rural and urban planning are needed if Indian cities are to provide services that match the people who actually use them.

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Author Contributions

All the authors have contributed equally to the research and preparation of the manuscript.

Conflict of Interest

The authors declare no conflict of interest.

Declaration of Artificial Intelligence (AI) Assistance

Grammarly was used to correct grammar during the writing process; no other generative AI or AI-assisted technologies were used.

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