

**Affordability of Housing in Tier-2 Cities: Evaluation of
Existing Housing Models and Strategies for Inclusive Access
(Study area- Jabalpur)**

Bachelor of Planning

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Existing Housing Models and Strategies for Inclusive Access
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A Thesis Project

submitted in partial fulfillment of the requirements for the award of the degree of

Bachelor of Planning

By

Rohan Gupta

2211002114

Under the Guidance of

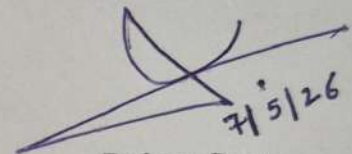
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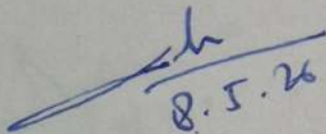
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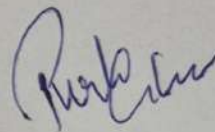
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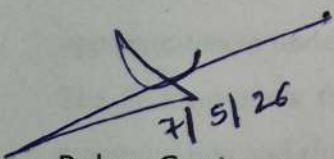
I would like to express my sincere and heartfelt gratitude to my guide, Dr. Krishna K. Dhote, for his invaluable guidance, constant encouragement, and unwavering support throughout the course of this thesis. His deep knowledge, insightful suggestions, and constructive criticism have been instrumental in shaping the direction and quality of this research. His continuous motivation and academic mentorship have not only helped in the successful completion of this study but have also enriched my understanding of the subject.

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ABSTRACT

This study focuses on assessing housing affordability and identifying priority areas for intervention in Jabalpur through a combination of spatial analysis, primary surveys, and data-driven planning techniques. The research aims to examine the existing housing conditions, evaluate the effectiveness of current affordable housing schemes, and propose a sustainable and inclusive housing model. The study is undertaken in the context of rapid urbanization, increasing population pressure, and the growing demand for affordable housing among Economically Weaker Sections (EWS) and Low-Income Groups (LIG) in Jabalpur.

The research is based on both primary and secondary data sources. Primary data was collected through household surveys conducted across selected Affordable Housing in Partnership (AHP) sites to understand socio-economic conditions, accessibility issues, housing satisfaction, and livelihood impacts. Secondary data includes ward-level population statistics, slum data, development plan maps, and housing scheme reports obtained from government sources. The study also incorporates spatial datasets such as density maps, slum distribution, and infrastructure availability to support analysis.

The methodology adopted includes spatial analysis using GIS, weighted overlay (Multi-Criteria Decision Analysis), and field-based survey interpretation. Key parameters such as overcrowding, slum population, slum density, and household density were analyzed and integrated using a weighted overlay technique to generate a composite suitability map. This helped in identifying priority wards requiring immediate housing intervention. The study further evaluates the relationship between housing location, accessibility, and livelihood opportunities to understand the limitations of existing housing policies.

The findings show that housing stress in Jabalpur is concentrated in central areas with high overcrowding and slum population, while many affordable housing projects are located on the periphery, leading to higher travel costs, livelihood disruption, and low occupancy. The analysis highlights a strong link between housing location and affordability, emphasizing the importance of proximity to employment and infrastructure. To address this, the study proposes a Mixed-Income Cross-Subsidized Housing Model, where revenue from LIG, MIG, and HIG supports EWS housing, focusing on location efficiency, livelihood integration, and inclusive planning.

सारांश

यह अध्ययन जबलपुर शहर में आवासीय वहनीयता का आकलन करने तथा हस्तक्षेप के लिए प्राथमिक क्षेत्रों की पहचान करने पर केंद्रित है। इसके लिए स्थानिक विश्लेषण, प्राथमिक सर्वेक्षण और डेटा-आधारित योजना तकनीकों का उपयोग किया गया है। इस शोध का उद्देश्य वर्तमान आवासीय स्थिति का विश्लेषण करना, मौजूदा किफायती आवास योजनाओं की प्रभावशीलता का मूल्यांकन करना तथा एक टिकाऊ और समावेशी आवास मॉडल प्रस्तावित करना है। यह अध्ययन तीव्र शहरीकरण, बढ़ती जनसंख्या और आर्थिक रूप से कमजोर वर्ग (EWS) तथा निम्न आय वर्ग (LIG) के लिए किफायती आवास की बढ़ती मांग के संदर्भ में किया गया है।

यह शोध प्राथमिक और द्वितीयक दोनों प्रकार के आंकड़ों पर आधारित है। प्राथमिक आंकड़े चयनित AHP) परियोजनाओं में किए गए घरेलू सर्वेक्षणों के माध्यम से एकत्र किए गए, जिनसे सामाजिक-आर्थिक स्थिति, पहुंच संबंधी समस्याएं, आवास संतुष्टि और आजीविका पर प्रभाव को समझा गया। द्वितीयक आंकड़ों में वार्ड-स्तरीय जनसंख्या डेटा, स्लम संबंधित आंकड़े, विकास योजना मानचित्र और सरकारी रिपोर्ट शामिल हैं। इसके अतिरिक्त, घनत्व मानचित्र, स्लम वितरण और अवसंरचना उपलब्धता जैसे स्थानिक डेटा का भी विश्लेषण में उपयोग किया गया है।

इस अध्ययन में GIS आधारित स्थानिक विश्लेषण, वेटेड ओवरले तकनीक और सर्वेक्षण विश्लेषण का उपयोग किया गया है। भीड़भाड़, स्लम जनसंख्या, स्लम घनत्व और घरेलू घनत्व जैसे प्रमुख मानकों को एकीकृत कर समग्र उपयुक्तता मानचित्र (Composite Suitability Map) तैयार किया गया, जिससे प्राथमिकता वाले वार्डों की पहचान की गई। साथ ही, आवास के स्थान, पहुंच और आजीविका के बीच संबंध का विश्लेषण कर वर्तमान नीतियों की सीमाओं को समझा गया। अध्ययन के निष्कर्ष बताते हैं कि जबलपुर में आवासीय दबाव मुख्य रूप से शहर के केंद्रीय और आंतरिक क्षेत्रों में केंद्रित है, जहां अत्यधिक भीड़भाड़ और स्लम जनसंख्या पाई जाती है। इसके विपरीत, कई किफायती आवास परियोजनाएं शहर के बाहरी क्षेत्रों में स्थित हैं, जिससे यात्रा लागत में वृद्धि, आजीविका में बाधा और कम आवासीय उपयोग जैसी समस्याएं उत्पन्न होती हैं। विश्लेषण यह भी दर्शाता है कि आवासीय स्थान और वहनीयता के बीच मजबूत संबंध है, तथा रोजगार और अवसंरचना के निकटता आवास चयन में महत्वपूर्ण भूमिका निभाती है। अध्ययन मिश्रित आय वर्ग आधारित क्रॉस-सब्सिडी आवास मॉडल प्रस्तावित करता है, जिसमें LIG, MIG और HIG से प्राप्त आय द्वारा EWS के लिए किफायती आवास उपलब्ध कराते हुए स्थान दक्षता, आजीविका एकीकरण और समावेशी योजना को बढ़ावा दिया जाता है।

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CHAPTER-1: INTRODUCTION

Housing affordability has emerged as one of the most significant challenges facing rapidly urbanizing cities in India. While metropolitan cities have traditionally received attention in housing policy and research, Tier-2 cities are increasingly becoming centers of economic growth, employment generation, and migration. This rapid urban transformation has resulted in a sharp increase in demand for housing, leading to rising land prices, escalating construction costs, and growing inequality in access to formal housing markets. Despite the implementation of various government housing schemes and private housing developments, a substantial proportion of low- and middle-income households continue to struggle to secure adequate and affordable housing.

The mismatch between household income levels and housing costs forces many families to reside in informal settlements, congested rental units, or peripheral areas lacking essential infrastructure. Existing housing models often prioritize quantity over affordability and fail to address location efficiency, transportation costs, and socio-economic realities of residents. Therefore, merely increasing housing supply does not guarantee improved accessibility.

The present study evaluates housing affordability in selected Tier-2 cities by analyzing existing housing delivery models, assessing affordability through economic and spatial indicators, and identifying barriers to formal housing access. The research further proposes planning, financial, and policy interventions aimed at enhancing inclusiveness and sustainability in housing provision. The study seeks to contribute toward the development of context-specific strategies that ensure equitable access to housing for all income groups.

Therefore, the study emphasizes the need for integrated planning strategies that align housing development with urban infrastructure, economic opportunities, and policy support mechanisms. By addressing both direct and indirect aspects of affordability, the research aims to provide a more holistic framework for improving housing outcomes in rapidly growing Tier-2 cities.

1.0 Introduction

Housing is universally recognized as one of the most fundamental human needs and plays a vital role in determining the social, economic, and environmental quality of urban life. Adequate housing not only provides shelter but also ensures access to employment, education, healthcare, and essential services. In rapidly urbanizing regions, the availability of affordable housing becomes crucial to achieving balanced and inclusive urban development.

In recent decades, India's urban growth pattern has shifted from being concentrated solely in metropolitan cities to spreading across Tier-2 cities. These cities are emerging as important economic and administrative hubs due to industrial expansion, improved connectivity, and decentralization of services. Consequently, they are experiencing rapid population growth and increased migration from surrounding rural areas. This growth has significantly intensified housing demand.

However, the housing market in these cities has not evolved in proportion to residents' income levels. Rising land values, speculative real estate practices, and increasing construction costs have made formal housing unaffordable for economically weaker sections (EWS) and lower-income groups (LIG). Although several housing schemes have been introduced by the government, including Pradhan Mantri Awas Yojana, many intended beneficiaries remain excluded due to high costs, poor location of projects, and lack of access to institutional finance.

The rapid urbanization of India's Tier-2 cities has transformed them into vital engines of economic growth, yet it has also precipitated a severe housing crisis. While the Pradhan Mantri Awas Yojana-Urban (PMAY-U) was launched to achieve "Housing for All," the effectiveness of its various implementation verticals has been uneven. Tier-2 cities, characterized by moderate population densities and evolving infrastructure, present a unique landscape where land is more available than in metros, but formal housing markets remain out of reach for many. Among the four PMAY-U models—In-situ Slum Redevelopment (ISSR), Credit Linked Subsidy Scheme (CLSS), Beneficiary-Led Construction (BLC), and Affordable Housing in Partnership (AHP)—the AHP model is designed to leverage private and public sector efficiencies to create large-scale housing stock for the Economically Weaker Sections (EWS). However, while the BLC model has seen widespread success due to its localized and demand-

driven nature, the AHP model continues to struggle with low occupancy and high project curtailment rates in Tier-2 regions.

1.1 Aim

The aim of the study is to evaluate housing affordability in Tier-2 cities by examining the effectiveness of existing housing models and proposing planning and policy strategies that improve accessibility for low- and middle-income households. Our target is to evaluate the causes of low occupancy and implementation failure of the Affordable Housing in Partnership (AHP) model in Tier-2 cities, comparing it against the successful Beneficiary-Led Construction (BLC) model to propose a sustainable, location-efficient, and inclusive framework for affordable housing delivery.

Types of 4 model's in PMAY

1. In-Situ Slum Redevelopment (ISSR)

This model uses land as a resource. It involves redeveloping slum lands with the participation of private developers to provide formal housing to slum dwellers in the same location.

2. Credit Linked Subsidy Scheme (CLSS)

This is a demand-side intervention where the government provides interest subsidies on home loans for EWS, LIG, and MIG categories. It focuses on the financial affordability of purchasing or constructing a house.

3. Affordable Housing in Partnership (AHP)

This is your primary focus. In this supply-side model, the government provides financial assistance to EWS houses being built in partnership with States/UTs or the private sector. It often results in large-scale multi-story apartment complexes.

4. Beneficiary-Led Construction (BLC)

This model provides central assistance to individual eligible families belonging to the EWS category to either construct new houses or enhance existing houses on their own land.

1.2 Objectives

The present study seeks to undertake a comprehensive examination of housing affordability in Tier-2 cities by analyzing its conceptual foundations as well as its practical implications within the urban planning framework. Housing affordability is not merely an economic issue related to price or rent; rather, it is a multidimensional phenomenon shaped by a combination of financial capacity, spatial accessibility, infrastructure provision, and institutional effectiveness. Therefore, the first objective of the research is to critically analyze the concept and determinants of housing affordability and to understand the various economic, social, and spatial factors that influence access to housing in rapidly urbanizing contexts. This involves reviewing theoretical definitions of affordability, studying measurement approaches such as price-to-income ratio, rent-to-income ratio, and residual income methods, and examining how these indicators reflect real household burdens. The study recognizes that affordability is also affected by indirect costs such as transportation, utilities, and maintenance expenses, which are particularly significant for low-income households living in peripheral areas. By establishing a clear conceptual understanding, this objective provides the foundation for the entire research and ensures that affordability is interpreted holistically rather than narrowly as a market price issue.

1. Conceptual Framework and Determinants of Housing Affordability

Housing affordability in Tier-2 cities is a multidimensional phenomenon that goes beyond the simple market price of a unit. It is shaped by a combination of financial capacity, spatial accessibility, and infrastructure provision.

Beyond Price-to-Income Ratios: While traditional measures like the Price- to-Income Ratio (PIR) provide a benchmark for ownership feasibility, they often fail to capture the real household burden in rapidly urbanizing contexts like Jabalpur or Indore.

The "Hidden" Costs of Peripheral Housing: Affordability is heavily influenced by indirect costs, primarily transportation and utility expenses. For low-income households relocated to peripheral AHP sites, the cost of commuting to city centers for work can equal or even exceed their monthly housing payments, leading to "hidden deprivation".

Residual Income Approach: A critical determinant is the amount of disposable income

remaining after housing costs. In many cases, even when a house is technically "affordable" by government standards, the residual income is insufficient to meet basic needs like food, healthcare, and education.

2. Implementation Status and the Vacancy Gap in AHP

The AHP model was designed to increase housing stock through public-private partnerships, but its implementation in Tier-2 cities reveals a significant "occupancy paradox".

Sanctioned vs. Occupied: While thousands of units are sanctioned and completed under the AHP vertical, a substantial proportion remain vacant or "ghost units". This mismatch indicates that merely increasing supply does not guarantee improved accessibility for the EWS and LIG segments.

The Tier-2 Context: Unlike metros, Tier-2 cities like Jabalpur face land constraints due to institutional ownership (e.g., defense land), forcing AHP projects to the far urban fringes. These projects often suffer from low occupancy because they are disconnected from the livelihood hubs where beneficiaries are employed

3. Why the BLC Model Succeeds in Tier-2 Cities

The **Beneficiary-Led Construction (BLC)** model has consistently outperformed AHP in terms of occupancy and social acceptance in Tier-2 regions.

Tenure Security and Social Capital: BLC allows beneficiaries to build on land they already own, ensuring they remain integrated within their existing social networks and support systems. This avoids the social trauma and economic disruption of relocation.

Incremental and Demand-Driven: The model supports the socio- economic reality of the informal workforce, allowing families to build according to their specific needs and financial pace.

Direct Benefit Transfer: The transparency of stage-wise funding linked to geo-tagged construction progress ensures that the subsidy reaches the beneficiary directly, leading to higher completion rates compared to large- scale partnership projects.

4. Barriers to AHP Success: Profit Margins and Location Efficiency

Several structural and institutional barriers impede the success of the AHP model in smaller urban markets:

Inviability Developer Margins: In Tier-2 cities, lower land values compared to metros make it

difficult for private developers to cross-subsidize affordable units through the sale of high-end luxury housing. This leads to limited private sector participation, with only 6–8% of national housing missions involving structured PPP components.

Poor Location Efficiency: To keep costs low, AHP projects are typically sited on the cheapest available land at the urban periphery. These locations lack "location efficiency"—the proximity to employment, schools, and hospitals—making them practically unaffordable for the poor despite the low purchase price.

Infrastructure Lags: Projects are often completed before essential services like water, electricity, and public transport are established, further discouraging residents from moving in.

5. Recommended Policy Interventions for a Viable AHP Model

To revitalize the AHP model in Tier-2 regions, the study proposes shifting from "supply-driven" to "people-centerer" planning:

Land Value Capture (LVC): Implementing LVC mechanisms can help municipal bodies fund the infrastructure required for AHP projects, ensuring that units are serviced and accessible from day one.

Improved Credit Access: A primary barrier for EWS/LIG households is the lack of formal income proof. Policy should focus on "tripartite agreements" between banks, ULBs, and beneficiaries to provide credit guarantees for those in the informal sector.

Transit-Oriented Housing: Integrating AHP sites with public transport corridors can mitigate high commuting costs, making peripheral locations more viable for low-income workers.

Inclusionary Zoning: Mandating a percentage of affordable units within central, well-located private developments can ensure that the poor are not relegated to the urban fringes.

1.3 Need for the Study

Tier-2 cities are increasingly emerging as the primary drivers of India's contemporary

urbanization process. While metropolitan cities historically dominated economic growth and migration patterns, recent decades have witnessed a visible shift toward medium-sized cities that function as regional service centers, industrial nodes, educational hubs, and administrative headquarters. These cities are absorbing a significant share of population growth due to lower living costs, expanding employment opportunities, and improved connectivity through national highways, rail networks, and industrial corridors. Consequently, the scale and pace of urban expansion in Tier-2 cities have accelerated rapidly, creating unprecedented demand for housing and urban infrastructure.

However, unlike metropolitan areas, Tier-2 cities generally lack robust planning frameworks, institutional capacity, and serviced land supply required to manage this rapid growth effectively. Urban local bodies in these cities often operate with limited technical expertise, inadequate financial resources, and fragmented governance structures. Land management systems remain inefficient, and infrastructure provision frequently lags behind urban expansion. As a result, housing development tends to occur in a reactive and uncoordinated manner rather than through planned and integrated strategies. This creates a situation where housing production may increase numerically, but the quality, location, and affordability of such housing remain inadequate for the majority of residents. Thus, the issue is not simply the shortage of housing units, but the inability of the housing market to provide dwellings that match the economic capacity and livelihood needs of low- and middle-income households.

1. The Planning Paradox in Tier-2 Cities

Tier-2 cities in India are currently in a "transitional" phase. Unlike Tier-1 metros that have established (though often strained) planning frameworks, Tier-2 cities frequently operate with outdated Master Plans and weak enforcement of land- use regulations.

Uncoordinated Production: Housing production in these cities is often reactive rather than proactive. Developers and Urban Local Bodies (ULBs) focus on available land parcels rather than "strategic" land parcels.

The Vacancy Paradox: This results in a massive inventory of "ghost houses." While the government meets its targets on paper (number of units completed), the units remain vacant. The paradox is that while there is a massive shortage of affordable housing, there is an oversupply of finished but uninhabitable units due to their distance from economic hubs.

2. Failure of AHP: The "Supply-Driven" Disconnect

The **Affordable Housing in Partnership (AHP)** model relies on the logic of economies of scale. However, in cities like Jabalpur, this logic fails due to the following reasons:

Location Inefficiency: To keep the "affordable" price tag, AHP projects are pushed to the urban fringes where land is cheap. For a daily wage laborer, moving to an AHP unit 15km away from the city center means spending 30% of their daily income on transport. The "hidden cost" of the location makes the house unaffordable.

Top-Down Design: AHP projects are typically high-rise or mid-rise apartment blocks. This ignores the socio-cultural lifestyle of Tier-2 residents who often use their homes for home-based livelihoods (small shops, tailoring, etc.), which is difficult in a standardized apartment.

Developer Disinterest: In Tier-2 cities, the profit margins for private developers in AHP are razor-thin. Unlike metros, where developers get lucrative Floor Area Ratio (FAR) incentives in exchange for affordable units, the land value in Tier-2 cities is not high enough to make these incentives attractive.

3. The Success of BLC: The "Demand-Driven" Organic Growth

The **Beneficiary-Led Construction (BLC)** model is the most successful vertical in PMAY-U because it aligns with the natural urban growth of Tier-2 cities.

Social & Economic Continuity: Under BLC, the beneficiary builds on their own plot. This means they stay in their existing neighborhoods where they already have "social capital"—neighbours who provide childcare, local shopkeepers who provide credit, and proximity to established workplaces.

Incremental Growth: BLC respects the financial reality of the poor. Residents can build a ground floor today and add a room five years later as their income grows. This "incrementalism" is a hallmark of successful housing for the poor that the rigid AHP model lacks.

Tenure Security as a Catalyst: The BLC subsidy often acts as a formalization tool. By providing a subsidy to build, the state effectively recognizes the beneficiary's right to the land, triggering further private investment by the homeowner.

4. Detailed Research Gap: Metros vs. Transitional Economies

The core of your study lies in this gap. Most housing policies are designed with a "Metro-centric" lens, assuming high land values and high developer capacity.

Institutional Capacity Gap: In metros, ULBs have specialized housing cells. In Tier-2 cities, the same municipal engineers might be responsible for roads, sanitation, and housing, leading to poor project management of complex AHP partnerships.

Market Dynamics: In Tier-1 cities, land is so scarce that people will accept a peripheral AHP unit just to enter the formal market. In Tier-2 cities, the informal land market is still very active and competitive. If the AHP model doesn't offer a better "value proposition" (location + infrastructure) than an informal plot, it will fail.

The Credit Gap: There is a lack of data on how EWS/LIG households in Tier-2 cities access formal finance for AHP units. While BLC is subsidized, AHP units usually require a bank loan, which remains a massive barrier for informal workers in smaller cities.

1.4 Review of Existing Studies

Contemporary scholarship has redefined housing affordability from a simple financial ratio to a multidimensional concept. Traditional indicators such as the Price-to-Income Ratio (PIR) and Rent-to-Income Ratio (RIR), while useful for assessing market access, fail to capture the "hidden" spatial and transportation costs that disproportionately burden low-income households. As a result, recent studies advocate for the Residual Income Approach, which evaluates the income remaining after accounting for housing and essential mobility expenses. This perspective is especially relevant in Tier-2 cities, where relocation to peripheral housing often leads to "hidden deprivation," with households facing increased commuting costs despite residing in subsidized units. The literature also highlights the "Paradox of Vacancy" in India, where a significant number of completed housing units remain unoccupied while housing shortages persist. This issue is particularly evident in the Affordable Housing in Partnership (AHP) model, which tends to be supply-driven and often situates projects on urban fringes to reduce land costs, inadvertently increasing transportation burdens. Additionally, lower land values in Tier-2 cities reduce the effectiveness of cross-subsidization mechanisms, leading to limited developer interest and, in some cases, compromised construction quality.

In contrast, the Beneficiary-Led Construction (BLC) model emerges as a more effective, demand-driven approach for Tier-2 cities. By allowing beneficiaries to construct housing on their own land, BLC preserves social capital, maintains proximity to livelihoods, and ensures tenure security. Its flexibility also supports incremental housing development, enabling households—especially those in the informal sector—to build in phases according to their financial capacity. However, Tier-2 cities face unique spatial and institutional challenges, including weak coordination among planning bodies and utility providers, resulting in inadequate service delivery in newly developed housing areas. Furthermore, constraints such as extensive institutional and defense land ownership push affordable housing projects into less accessible locations. Despite growing research on housing in metropolitan areas, there remains a critical gap in understanding the contrasting performance of AHP and BLC models in Tier-2 contexts. Existing studies lack a framework for developing location-efficient AHP projects tailored to cities with transitional economies and informal labor markets. This study addresses this gap by proposing context-specific strategies such as Land Value Capture and Transit-Oriented Housing to improve affordability and occupancy outcomes.

1.5 Study Area

Jabalpur





Jabalpur (The Case of Institutional Constraints): Jabalpur serves as a critical study area due to its large tracts of defense and cantonment land. This institutional land ownership limits the availability of central land for affordable housing, forcing **AHP projects** to extreme urban fringes. The study will analyze why residents prefer informal settlements near the city center over formal AHP units in peripheral areas like *Lamti* or *Kanchpur*.

Jabalpur represents a typical Tier-2 city undergoing rapid demographic and spatial transformation. The city's population increased from 0.94 million in 2001 to 1.26 million in 2011 and is projected to reach approximately 1.55 million by 2025, reflecting strong urban growth and intensifying housing demand

A substantial proportion of its workforce, nearly 45%, is engaged in informal or unregulated employment, limiting income stability and access to formal housing finance

The city contains between 80 and 85 notified slums, indicating significant intra-urban inequality and persistent dependence on informal settlements

Land availability is constrained due to extensive defence and institutional ownership, restricting the supply of serviced land for affordable housing projects. Peripheral housing schemes under public missions often suffer from low occupancy because of poor connectivity

and limited employment access. Additionally, the absence of a structured rental housing framework and weak PPP capacity within the municipal administration further hinder effective housing delivery

These conditions make Jabalpur a critical case for analyzing affordability challenges and institutional barriers.

Indore



Indore (The Case of Financial Innovation): As a leading city in urban governance, Indore provides a unique look at the **Tripartite Agreement** model. While Indore has seen success in BLC, its AHP projects face challenges with "vertical living" for EWS families. The study will investigate the gap between the high "Sanctioned" numbers and the actual "Livelihood Satisfaction" of relocated residents.

Indore functions as a major commercial, educational, and service-sector hub in central India. Rapid economic expansion has stimulated real estate growth and increased housing demand.

However, rising property values and speculative development have pushed formal housing beyond the reach of lower-income groups. Migrant workers and service-sector employees often depend on shared rentals or informal accommodations. Indore thus illustrates the challenges faced by economically dynamic cities where market-led growth outpaces affordability.

Surat



Surat (The Case of Industrial Integration): Surat is a hub for migrant labor. The city's housing demand is massive but highly mobile. The study will evaluate why the BLC model works for the settled population while the AHP model struggles to provide a viable solution for the industrial workforce, who require "rental" flexibility rather than "ownership" in distant locations.

Surat's economy is driven by textile and diamond industries, attracting a large migrant workforce. This has generated high demand for low-cost rental housing. Formal ownership-based housing remains inaccessible for many workers, leading to dependence on congested rentals and informal settlements. Surat highlights the importance of rental housing and flexible tenure options within affordability strategies.

1.6 Affordability Indicators



The assessment of housing affordability requires the use of multiple indicators that collectively capture both the financial and spatial dimensions of housing access. Relying on a single measure often produces misleading conclusions, as affordability is influenced not only by the direct cost of purchasing or renting a house but also by associated expenses such as transportation, infrastructure access, and daily living costs. Therefore, this study adopts a set

of complementary indicators to evaluate affordability in a comprehensive and realistic manner. These indicators help quantify the relationship between household income, housing expenditure, and location-based factors, thereby enabling an accurate assessment of housing stress among different income groups.

The first and most commonly used indicator is the **Price-to-Income Ratio (PIR)**, which measures the feasibility of home ownership by comparing the average market price of a dwelling with the annual household income. A higher ratio indicates lower affordability, as households must devote several years of income to purchase a house. This indicator is useful for understanding the accessibility of formal ownership-based housing in Tier-2 cities, where rising land values and speculative markets have significantly increased property prices. However, while PIR provides a broad overview of ownership constraints, it does not account for variations in expenditure patterns or non-housing costs.

The second indicator is the **Rent-to-Income Ratio (RIR)**, which evaluates rental affordability by calculating the proportion of monthly income spent on rent. This measure is particularly relevant for migrant workers and low-income households who depend primarily on rental accommodation rather than ownership. If rent exceeds 30–40 percent of income, households are considered to be under rental stress. In many Tier-2 cities, increasing rental demand and limited formal rental supply often result in overcrowded and substandard housing conditions, making this indicator critical for assessing urban housing vulnerability.

To address the limitations of ratio-based measures, the study also employs the **Residual Income Approach**, which is considered more suitable for the Indian context. This method determines the amount of income remaining after housing payments are made and evaluates whether it is sufficient to meet other basic needs such as food, healthcare, education, and transportation. Even when housing appears affordable based on percentage ratios, households may still experience deprivation if their residual income is too low. Therefore, this approach provides a more realistic understanding of actual living standards and financial sustainability.

In addition to direct financial measures, the study incorporates **transportation cost burden and infrastructure accessibility indicators** to capture the spatial dimension of affordability. Housing located on the urban periphery often involves higher commuting expenses and limited access to services, which indirectly increases the cost of living. By accounting for these factors, the analysis ensures that affordability is assessed not merely as a function of price but also of location efficiency.

Together, these indicators provide a holistic framework for evaluating housing affordability and enable a nuanced comparison of different housing models across Tier-2 cities.

1.7 Conclusion

Housing affordability in Tier-2 cities emerges as a deeply structural challenge that extends beyond the mere provision of housing units. The findings of this study demonstrate that increasing supply alone is insufficient to ensure equitable access, particularly for economically weaker sections. Instead, affordability is shaped by the complex interplay of cost, location, infrastructure, and socio-economic realities. The experience of cities like Jabalpur, Indore, and Surat highlights a clear disconnect between centralized housing policies and local urban dynamics. While Pradhan Mantri Awas Yojana - Urban (PMAY-U) has significantly expanded the housing stock, its impact varies across implementation verticals. The research underscores that achieving “Housing for All” requires a shift from a construction-centric approach to one that integrates location efficiency, accessibility, and social continuity into housing strategies.

A critical divergence is observed between the Affordable Housing in Partnership (AHP) and Beneficiary-Led Construction (BLC) models. The AHP model, though designed for large-scale delivery, often fails due to peripheral siting, resulting in high hidden costs and low occupancy, with many projects facing curtailment. In contrast, the BLC model has proven more effective in Tier-2 contexts due to its demand-driven and incremental nature, enabling households to build within existing social and economic networks. To enhance future affordability, this study advocates for systemic reforms, including a transition toward people-centered planning through Transit-Oriented Development, improved institutional mechanisms such as tripartite agreements to enhance financial access, and the strategic use of Land Value Capture to secure well-located land. These interventions collectively emphasize that sustainable housing affordability in Tier-2 cities depends on aligning policy design with ground realities, rather than relying solely on quantitative expansion.

CHAPTER-2: LITERATURE REVIEW

2.0 Introduction

Chapter 1 established the research problem by highlighting the growing concern of housing affordability in Tier-2 cities, with specific reference to Jabalpur. It outlined the aim of assessing affordability levels through income–housing cost relationships and spatial planning perspectives, along with the objectives of evaluating existing conditions, analysing affordability indices, and examining planning implications. Building upon that foundation, this chapter undertakes a comprehensive review of relevant literature to position the study within existing academic and policy discourse.

Housing affordability has emerged as a critical urban challenge globally and particularly in rapidly urbanizing economies such as India. While metropolitan cities have traditionally dominated scholarly attention, Tier-2 cities are increasingly experiencing similar pressures due to population growth, infrastructure expansion, land market dynamics, and rising aspirations for home ownership. Despite comparatively lower property prices than metropolitan areas, lower household incomes and limited formal housing supply in Tier-2 cities create unique affordability challenges that require context-specific investigation.

1. To define and critically examine key concepts of housing affordability, including ratio-based measures such as Price-to-Income Ratio (PIR) and Rent-to-Income Ratio (RIR), as well as advanced approaches like the Residual Income Method (RIM).
2. To summarise empirical research and analytical models used in affordability assessment, including econometric and hedonic price models, demand analysis, and spatial mapping techniques.
3. To examine policy frameworks and housing programs that address affordability challenges, particularly within the Indian urban context, and to understand their theoretical and practical implications.
4. To identify research gaps, especially with regard to micro-level affordability assessment and spatial integration in Tier-2 cities, thereby establishing the need for the present study.

The review synthesises theoretical perspectives, quantitative measurement approaches, and applied urban case studies to provide a robust conceptual and methodological foundation for the research. By analysing global experiences alongside Indian empirical studies, this chapter highlights how affordability is shaped by income distribution, land economics, planning

regulations, housing finance systems, and urban growth patterns.

2.1 International Literature— Concepts, Data and Models

2.1.1 Global Overviews and Standards

International scholarship on housing affordability has largely been shaped by global institutions such as the UN-Habitat and the World Bank, which provide comparative datasets, methodological frameworks, and policy benchmarks across countries.

Building on this foundation, a wide body of research has examined how housing affordability varies across regions, income groups, and urban contexts. Global monitoring reports consistently indicate that housing affordability has deteriorated in many cities due to rapid urbanization, rising land values, and increasing construction costs.

Comparative indicators such as the **Price-to-Income Ratio (PIR)** and **Rent-to-Income Ratio** are commonly used to assess affordability levels across countries. These metrics reveal that in many urban regions, housing costs exceed the threshold of affordability, placing a significant financial burden on households. However, international literature also recognizes the limitations of these indicators, particularly in developing countries where informal housing, variable income patterns, and limited access to formal finance complicate affordability assessments.

In response, recent studies advocate for more **multi-dimensional approaches** to measuring housing affordability. These include residual income methods, which consider the income left after housing expenses, and consumption-based approaches that account for essential household expenditures. Such frameworks provide a more realistic understanding of affordability, especially for low-income households.

Furthermore, global research emphasizes the importance of **location and accessibility** in determining true affordability. Proximity to employment, availability of public transport, and access to social infrastructure significantly influence household expenditure patterns. This has led to the concept of **integrated housing and transport affordability**, highlighting that lower housing costs in peripheral areas may be offset by higher commuting expenses.

Global monitoring reports consistently show that housing affordability has deteriorated in many urban regions. Comparative datasets indicate that the global median Price-to-Income Ratio (PIR) in major cities often ranges around 5–7, while the median Rent-to-Income ratio frequently exceeds 30–35%, signalling widespread housing stress. These thresholds are significant because internationally:

PIR ≤ 3 is generally considered affordable

PIR between 3–5 indicates moderate stress

PIR > 5 suggests serious unaffordability

Similarly, households spending more than 30% of income on housing are considered cost-burdened.

However, global institutions also critique these simple ratio-based standards for several reasons:

1. They do not account for variations in household size and composition.
2. They ignore differences in non-housing expenditure across countries.
3. They overlook informal housing markets common in developing nations.
4. They fail to reflect long-term financing structures such as mortgage tenure and interest rates.

As a result, international literature increasingly recommends multi-dimensional measurement approaches, including residual income and consumption-based affordability analysis, particularly for rapidly urbanising economies.

2.1.2 Models Used Internationally

International research moves beyond descriptive ratios and employs analytical models to better capture affordability dynamics. These models can be grouped into three major categories:

1. Residual Income Method (RIM)

The Residual Income Method (RIM) evaluates affordability by calculating whether a household has sufficient income remaining after meeting essential non-housing expenditures (food, healthcare, education, transport).

Conceptually:

Residual Income

$$= \text{Household Income} - \text{Non Housing Basic Expenditure}$$

If the residual income is insufficient to cover housing costs, the household is considered unaffordable — even if it meets the 30% ratio rule.

International studies, including those supported by the World Bank, argue that RIM is superior because:

It accounts for household composition and size.

It reflects local cost of living differences.

It identifies vulnerability among low-income households more accurately.

It avoids the limitation of uniform thresholds across diverse economies.

For example, in developing countries where informal incomes fluctuate, ratio measures may underestimate stress, whereas RIM captures real consumption pressure.

For Tier-2 cities like Jabalpur, where income levels are lower and consumption patterns vary significantly across income groups, RIM provides a more context- sensitive affordability measure compared to PIR alone.

2. Hedonic Price Models

Hedonic pricing models are widely used in international urban economics to analyse how different housing attributes influence property prices. The model decomposes housing prices into components such as:

Location (distance to CBD, transport access)

Unit size and built-up area

Quality of construction

Infrastructure availability (water, sewerage, roads)

Neighbourhood characteristics

Mathematically, housing price is expressed as a function of its attributes:

$$P = f(\text{size, location, amenities, infrastructure, socio} \\ \text{– economic factors})$$

These models help estimate:

The implicit value of specific housing features

Demand elasticities

Willingness-to-pay variations across income groups

Internationally, hedonic models are used to simulate policy interventions such as:

Increase in Floor Area Ratio (FAR)

Transit-oriented development

Infrastructure upgrades

Inclusionary zoning

In growing cities, land price variations and infrastructure improvements significantly affect affordability. Hedonic modelling can help identify which factors most strongly influence housing costs in Jabalpur's residential areas.

3. Installment / Mortgage-Payment Models

In countries with developed mortgage markets (e.g., USA, China, South Korea), researchers adjust affordability calculations by incorporating:

Loan tenure (20–30 years)

Interest rates

Down payment requirements

EMI (Equated Monthly Installment) burden

Instead of simply using purchase price divided by income, these models calculate:

EMI/Monthly Household Income

This approach captures long-term repayment capacity, which is especially relevant in economies where homeownership is heavily financed through credit.

In East Asian literature, affordability indices are adjusted for:

Interest rate fluctuations

Housing loan accessibility

Household savings behaviour

Such models show that two cities with similar PIR values may have different affordability levels depending on financing conditions. In India, where housing finance access varies across

income groups, incorporating EMI-to-income ratios alongside PIR improves accuracy — particularly for formal housing markets.

2.2 National (India) Literature — Scope and Findings

2.2.1 National Overviews and Policy Studies

Recent Indian studies and policy reports indicate that housing affordability has declined across urban India due to property price growth exceeding income growth. In many major cities, the **Price-to-Income Ratio (PIR)** ranges between 6–8, which is above globally accepted affordability thresholds. Similarly, EMI-to-income ratios have increased, placing financial pressure on middle- and lower-income households.

Research highlights structural challenges such as limited serviced land, high development costs, regulatory delays, and unequal access to housing finance. Government initiatives like **Pradhan Mantri Awas Yojana (PMAY)** aim to improve affordability through subsidies and credit-linked schemes, but studies note that affordability gaps persist, especially for EWS and LIG groups.

Overall, affordability concerns are no longer confined to metropolitan cities and are increasingly visible in Tier-2 cities due to rapid urban growth and rising land values.

2.2.2 Indian Models and Empirical Studies

Hedonic Models in Indian Cities

Empirical studies in cities such as Lucknow apply **hedonic regression models** to estimate how housing attributes (size, location, amenities, infrastructure) influence property prices. These studies show that location and service access significantly affect housing costs, and low-income households are more vulnerable to price increases linked to urban development.

Residual Income Method (RIM) in India

Recent research, including World Bank-supported studies, applies the **Residual Income Method (RIM)** to Indian cities. By subtracting basic non-housing expenses from household

income, RIM provides a more realistic assessment of affordability than PIR alone. Findings suggest that many households classified as “affordable” under ratio methods still experience financial stress when essential living costs are considered.

Micro-Level Studies in Jabalpur

Local studies on **Jabalpur** highlight variations in housing conditions, presence of slums, and unequal distribution of infrastructure across neighbourhoods. These studies reveal significant intra-city disparities but do not fully integrate income- based affordability measures with spatial planning analysis.

2.3 Important Recent Journal Articles, Reports and Books

2.3.1 UN-Habitat (2019) — The Global Housing Affordability Challenge

The UN-Habitat report provides a comprehensive global overview of housing affordability conditions across developed and developing countries. The primary aim of the study is to benchmark affordability using internationally comparable indicators such as the Price-to-Income Ratio (PIR) and Rent-to-Income ratios, and to assess the extent of housing stress worldwide. Using cross-country data compilation and policy analysis, the report finds that median PIR values in many cities exceed acceptable thresholds, signalling widespread affordability challenges. Importantly, the report critiques the over-reliance on fixed ratio standards and recommends complementing them with broader consumption- based and distribution-sensitive approaches. This study establishes the global conceptual framework within which the present research is positioned.

2.3.2 World Bank (2023) — Towards a More Nuanced Approach to Measuring Housing Affordability

This publication critically evaluates conventional affordability indicators and proposes improved measurement frameworks. The aim of the study is to move

beyond simplistic ratio-based definitions and incorporate household-level vulnerability considerations. Through extensive literature review, case comparisons, and methodological evaluation, the World Bank recommends combining PIR and Expenditure-to-Income measures with the Residual Income Method (RIM). The report highlights that affordability must reflect differences in household size, consumption needs, and income distribution. The findings directly support the need for a multi-indicator approach in the present study.

2.3.3 Karmali, N. M. (2022) — Housing Demand and Affordability in India

Karmali's working paper focuses specifically on measuring housing demand and affordability in the Indian context. The study aims to test alternative affordability measurement techniques using national datasets and case-based analysis. By applying the Residual Income Method, the study demonstrates that ratio-based measures often underestimate affordability stress among lower-income households. It further identifies significant variation across cities and income groups, indicating that affordability must be examined at a city-specific level. This research is particularly relevant to the present thesis as it validates the application of RIM in Indian urban settings.

2.3.4 Magic Bricks (2024) — Housing Affordability in Major Indian Cities

The Magic Bricks industry report provides recent empirical evidence on affordability trends in Indian cities between 2020 and 2024. The objective of the report is to assess market affordability using property listing prices, income estimates, and EMI-to-income calculations. The study finds that PIR and EMI burdens have increased in most major urban centres, indicating declining affordability conditions. While industry reports rely on market data and must be interpreted cautiously, they provide contemporary insights into price-income trends and help contextualise broader academic findings within current market realities.

2.3.5 Ram, P. (2016) — The Provision of Affordable Housing in India

academic article examines the structural and policy dimensions of affordable housing supply in India. The aim of the study is to analyse how market mechanisms and government interventions influence housing provision for low-income groups. Through policy review and literature synthesis, the study concludes that private market mechanisms alone are insufficient to address affordability challenges, particularly for economically weaker sections. It emphasises the importance of state intervention, regulatory reform, and targeted subsidies. The study provides theoretical support for understanding supply-side constraints in Indian housing markets.

2.3.6 Hedonic and Econometric Studies in Indian Cities (Lucknow and Other Mid-Sized Cities)

Several empirical studies in Indian cities have applied hedonic regression models to analyse housing price determinants and demand behaviour. The aim of these studies is to estimate how housing attributes such as size, location, infrastructure, and neighbourhood characteristics influence property values. Using household surveys combined with transaction or listing data, researchers find that amenities and spatial accessibility significantly affect willingness-to-pay. These studies reveal that low-income households are disproportionately affected by rising attribute-linked costs, often leading to exclusion from formal housing markets. Such findings highlight the importance of incorporating spatial and attribute-based analysis into affordability research.

2.4 Models & methods used across the literature (and their suitability for this thesis)

2.4.1 Price-to-Income Ratio (PIR)

- **Use:** Quick comparative metric between cities/years.
- **Strengths:** Simple, widely reported.
- **Weaknesses:** Ignores distribution, mortgage terms, household composition.

Suitability: Use PIR to present broad comparisons (national & international) but complement with RIM and local measures.

2.4.2 Expenditure-to-Income / EMI-to-Income (EIR)

Use: Assess ongoing burden (rent/EMI).

Notes: For India, EMI calculations must use realistic mortgage terms and interest rates; industry reports often use list prices which may bias results.

2.4.3 Residual Income Method (RIM)

- **Use:** Determine if after-housing income covers necessities.
- **Strengths:** Accounts for household needs and local cost of living; better for policy targeting.
- **Suitability:** Highly recommended for micro-level (ward/neighbourhood) analysis in Jabalpur.

2.4.4 Hedonic Price Modelling

- **Use:** Estimate how attributes (size, distance to CBD, services) affect price and infer affordability impacts of spatial factors.
- **Data needs:** Property transactions / listing data and attribute variables.
- **Suitability:** Use if transaction/listing data for Jabalpur or comparable Tier- 2 cities is available; can be used to estimate local willingness to pay and simulate affordability under different supply scenarios.

2.4.5 Spatial Analysis / GIS

- **Use:** Map affordability spatially (hotspots of unaffordability, low-income settlements vs. proposed built-up in master plan).
- **Suitability:** Essential for your thesis because your study area is a mapped residential area in Jabalpur and you have the master plan base map

2.5 Empirical findings from selected studies

Internationally, median PIRs and rent burdens indicate an affordability crisis in many

cities; ratio thresholds are useful but incomplete. (UN- Habitat; World Bank).

India shows rapidly declining affordability in many urban centres; industry and academic studies show property price growth > income growth (2020–2024), raising PIR and EMI pressures. Industry data should be triangulated with household income data.

Hedonic and econometric studies in Indian mid-sized cities find amenity and locational factors strongly affect prices, while low-income households are often excluded from formal ownership markets.

City-specific (Jabalpur) studies document intra-city disparities and slum/dilapidated housing concentrated in older parts of the city; these provide important micro-level data that your thesis can build on Load-bearing citation 5: Jabalpur housing condition studies and their relevance for spatial affordability mapping.

2.6 Research gaps and how the study addresses them

From the reviewed literature, the following gaps emerge (and form the justification for your thesis):

Limited micro-level studies in Tier-2 cities — Many affordability studies focus on metros; Tier-2 cities like Jabalpur are under-studied. (Gap addressed by this thesis.)

Insufficient spatial integration — Few studies combine master plan proposals and spatial overlays with affordability indices. Your thesis will overlay the Jabalpur master plan (existing & proposed built-up) with affordability measures.

Over-reliance on single metrics — Many studies use PIR alone; there is need to combine PIR, EIR, RIM and local cost of living measures. Your methodology will implement a combined approach (PIR + EIR + RIM + spatial mapping)

Lack of local policy linkage — Studies often stop at measurement. Your thesis will evaluate policy implications in the light of existing schemes such as Pradhan Mantri Awas Yojana (PMAY) and local planning measures.

CHAPTER 3: STUDY AREA, METHODOLOGY AND ANALYSIS

3.1 Introduction

This chapter presents a comprehensive analysis of the selected study area, Jabalpur, along with the research methodology adopted for assessing housing affordability. While the previous chapters established the theoretical framework and research gap, this chapter focuses on translating those concepts into empirical investigation. It includes an in-depth examination of spatial patterns, housing characteristics, affordability indicators, and institutional mechanisms influencing housing delivery. The chapter integrates both quantitative and qualitative approaches to understand the ground realities of housing affordability in a Tier-2 city context and to evaluate the effectiveness of existing housing models, particularly under the Pradhan Mantri Awas Yojana (PMAY-U).

3.2 Study Area Profile: Jabalpur

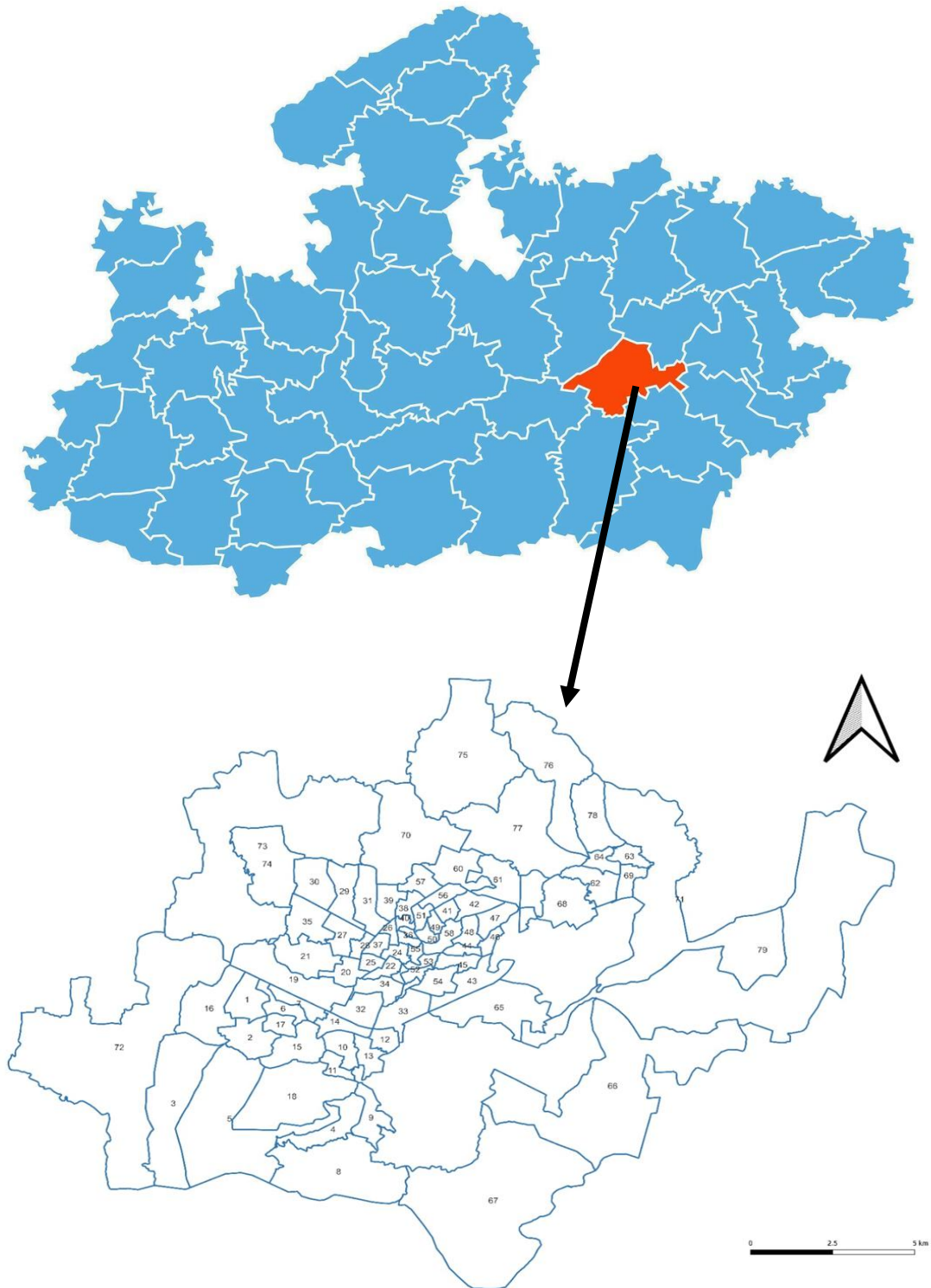
Jabalpur, located in the state of Madhya Pradesh, is a prominent Tier-2 city that serves as an important administrative, military, and regional economic hub in central India. Situated along the Narmada River and surrounded by the Vindhya ranges, the city exhibits a unique geographical setting that influences its spatial growth patterns. Over the past two decades, Jabalpur has experienced significant population growth, with its population projected to reach approximately 1.6 million by 2026. The city covers an administrative area of about 263.49 square kilometers and is divided into 79 wards, reflecting its complex urban governance structure.

The rapid urban expansion of Jabalpur has resulted in increasing demand for housing, particularly for economically weaker sections and lower-income groups. A notable feature of the city is the high proportion of informal housing, estimated at around 45 percent of the total housing stock, which indicates a substantial gap between housing demand and formal housing supply. Additionally, the presence of large tracts of defence and institutional land restricts the availability of centrally located land for residential

development, pushing new housing projects towards the urban periphery. These characteristics make Jabalpur an ideal case for studying housing affordability challenges in Tier-2 cities.

In addition to rapid population growth, Jabalpur is undergoing a gradual transformation in its economic structure, with increasing diversification in sectors such as trade, services, small-scale industries, and education. The city functions as a regional service center for surrounding districts, attracting a daily influx of workers and migrants in search of employment opportunities. This continuous inflow of population places additional pressure on the existing housing stock and urban infrastructure. However, the pace of formal housing development has not kept up with this demand, leading to the expansion of informal settlements in centrally located areas where livelihood opportunities are easily accessible. This reflects a clear preference among low-income groups to reside closer to employment zones, even under substandard living conditions.

Furthermore, the city faces significant challenges in terms of infrastructure provision, including water supply, sanitation, transportation, and solid waste management, particularly in high-density and slum-dominated areas. Peripheral development, though offering relatively cheaper land, often lacks adequate connectivity and basic services, making it less attractive for economically weaker sections. As a result, there exists a mismatch between housing supply and user preferences, contributing to issues such as low occupancy in newly developed housing schemes. These challenges highlight the need for a more integrated and location-sensitive planning approach that aligns housing development with infrastructure, accessibility, and livelihood opportunities, ensuring sustainable and inclusive urban growth in Jabalpur.



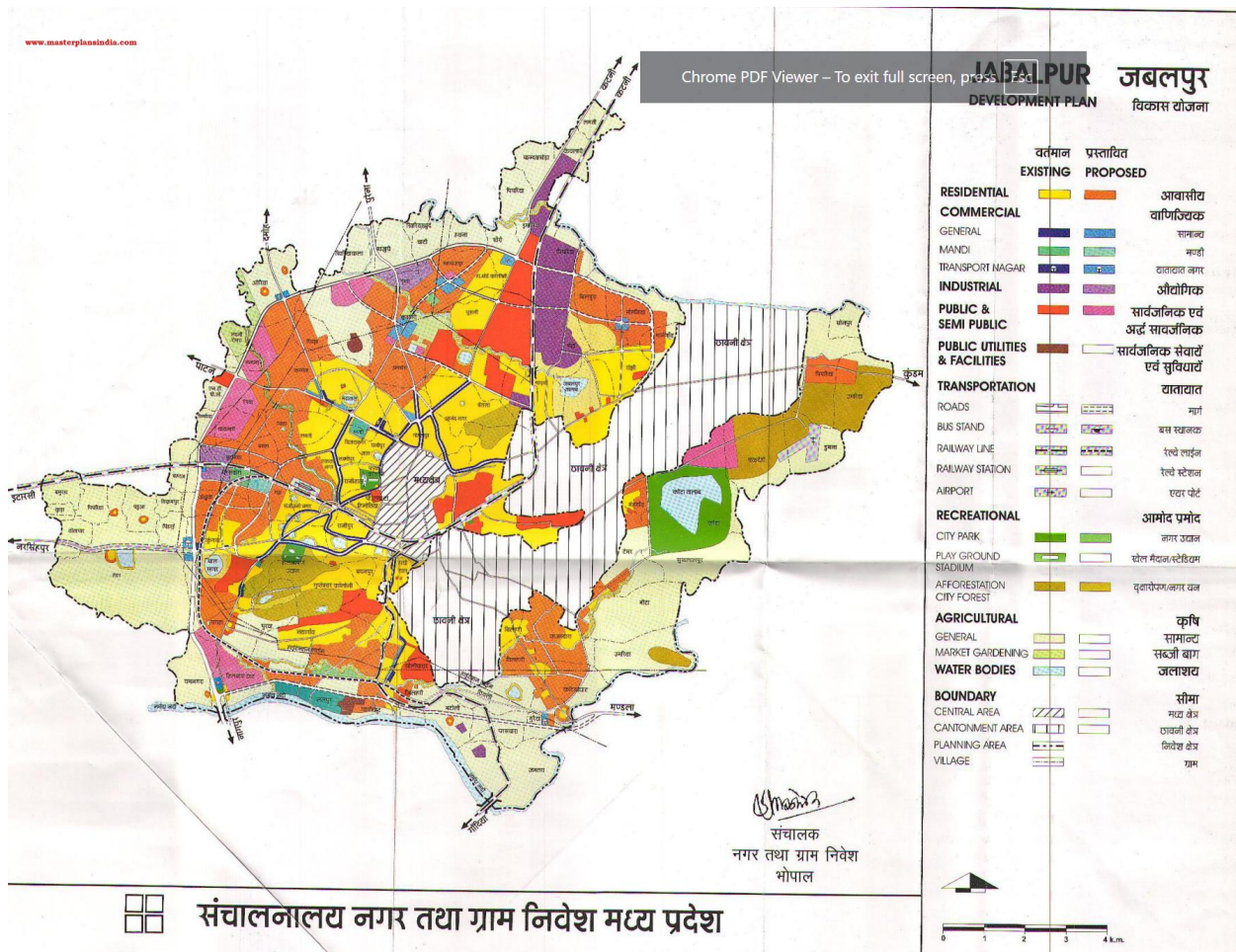
Map no 1. Ward map of Jabalpur, Source- GIS

3.3 Rationale for Selection of Study Area

The selection of Jabalpur as the study area is based on its representation of a transitional Tier-2 urban environment where rapid urbanization coexists with structural planning constraints.

Unlike metropolitan cities, Jabalpur reflects a unique combination of moderate land availability, institutional land restrictions, and evolving housing markets. The city demonstrates clear evidence of both formal and informal housing systems operating simultaneously, which provides an opportunity to analyse the effectiveness of government-led housing schemes.

Furthermore, the implementation of Affordable Housing in Partnership (AHP) projects in Jabalpur has revealed significant challenges, particularly in terms of low occupancy rates and peripheral location issues. The coexistence of vacant formal housing and active informal settlements highlights a critical paradox that necessitates deeper investigation. These factors collectively justify the selection of Jabalpur as a representative case for examining affordability issues and policy performance in Tier-2 cities.



Map no 2. Land use map of Jabalpur, Source- Directorate of Town & Country Planning
Why Jabalpur?

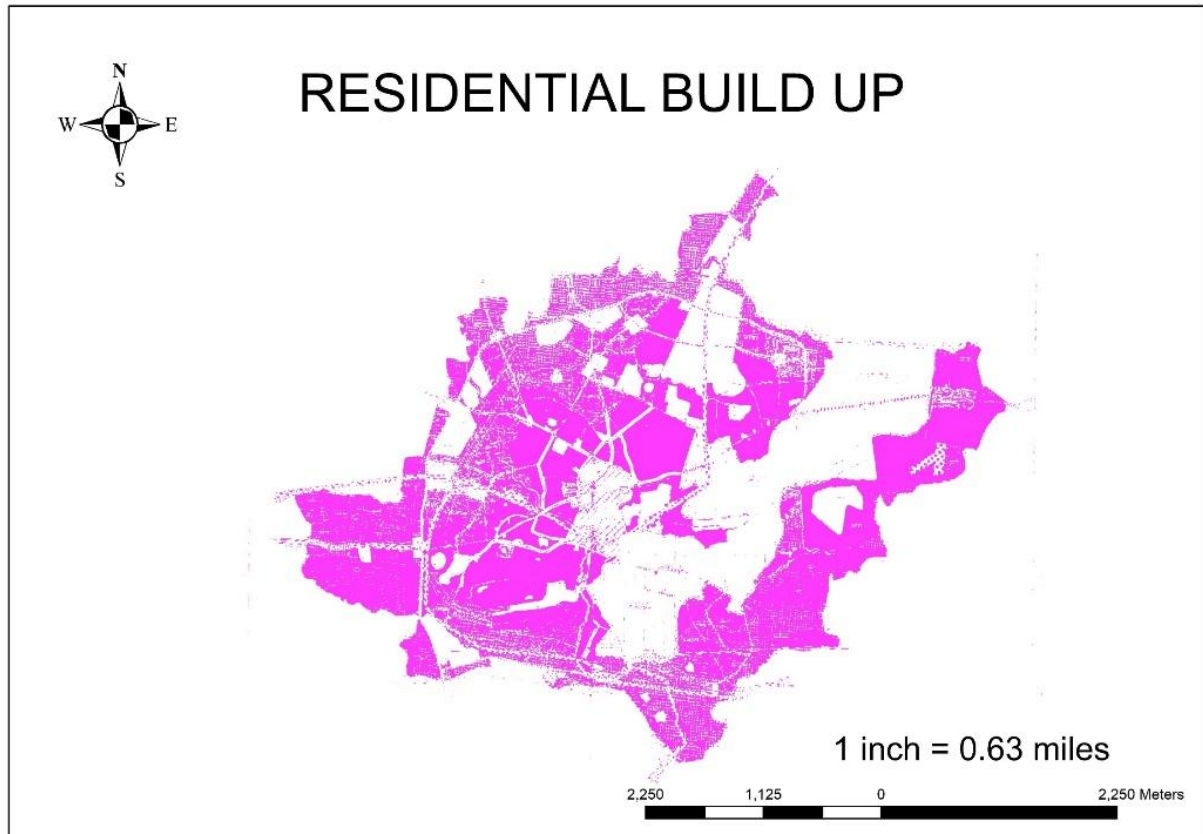
Jabalpur represents a typical Tier-2 transitional city where:

Rapid urban expansion is occurring

A large proportion of land is under defence and institutional ownership

Informal settlements coexist with formal housing projects

Peripheral expansion is increasing



Map no 3. Build up area map, Source- GIS

Existing Residential Area: Approximately 6,100 hectares (~24% of the total planning area).

3.4 Research Methodology

The research methodology adopted for this study follows a systematic and multi-layered approach to ensure a comprehensive understanding of housing affordability. The study begins with the identification of the core problem, which focuses on the mismatch between housing supply and affordability in Tier-2 cities, with particular emphasis on the limitations of the AHP model in Jabalpur. This is followed by an extensive literature

review that establishes the conceptual framework and identifies gaps related to spatial and livelihood integration in housing policies.

The study area selection involves identifying specific AHP project sites within Jabalpur, including both completed and under-construction projects, to enable comparative analysis. Data collection is carried out using both primary and secondary sources. Primary data includes household surveys conducted at selected sites, interviews with municipal officials, and field observations, which provide insights into user experiences and institutional perspectives. Secondary data sources include census information, master plan documents, housing statistics, and satellite imagery.

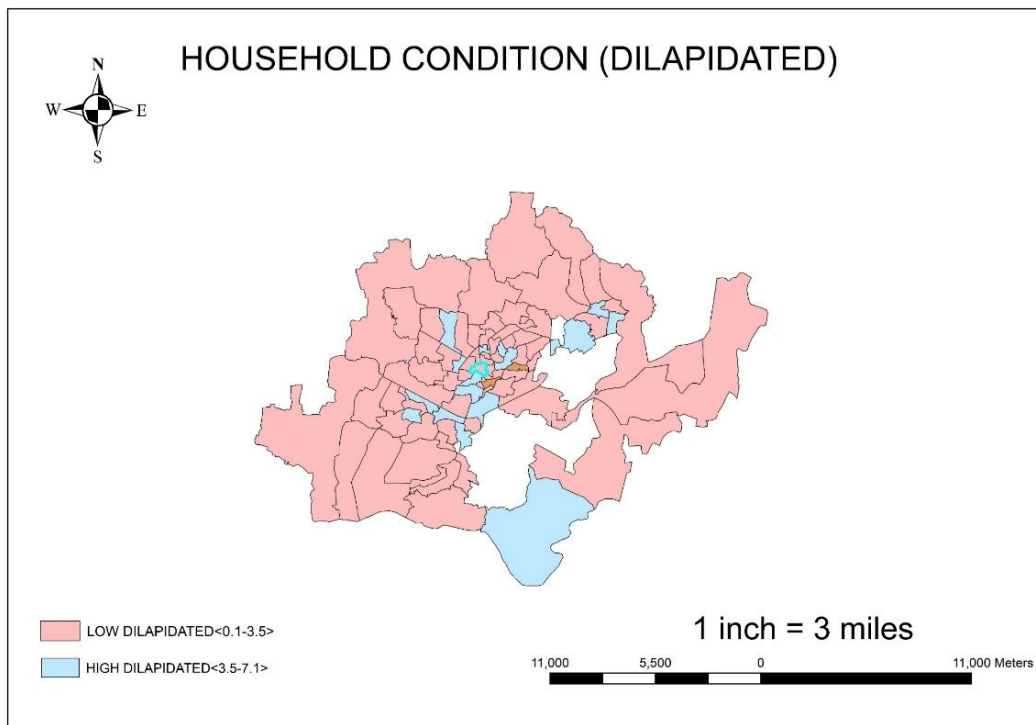
The analysis is conducted using a combination of affordability assessment methods such as the Price-to-Income Ratio (PIR) and the Residual Income Method (RIM), along with spatial analysis techniques using GIS to understand location and accessibility patterns. Additionally, qualitative analysis is employed to interpret survey responses related to travel, livelihood, and satisfaction. Comparative analysis between AHP and BLC models further strengthens the evaluation framework, allowing for a holistic understanding of housing delivery mechanisms.

3.5 Spatial Analysis of Housing in Jabalpur

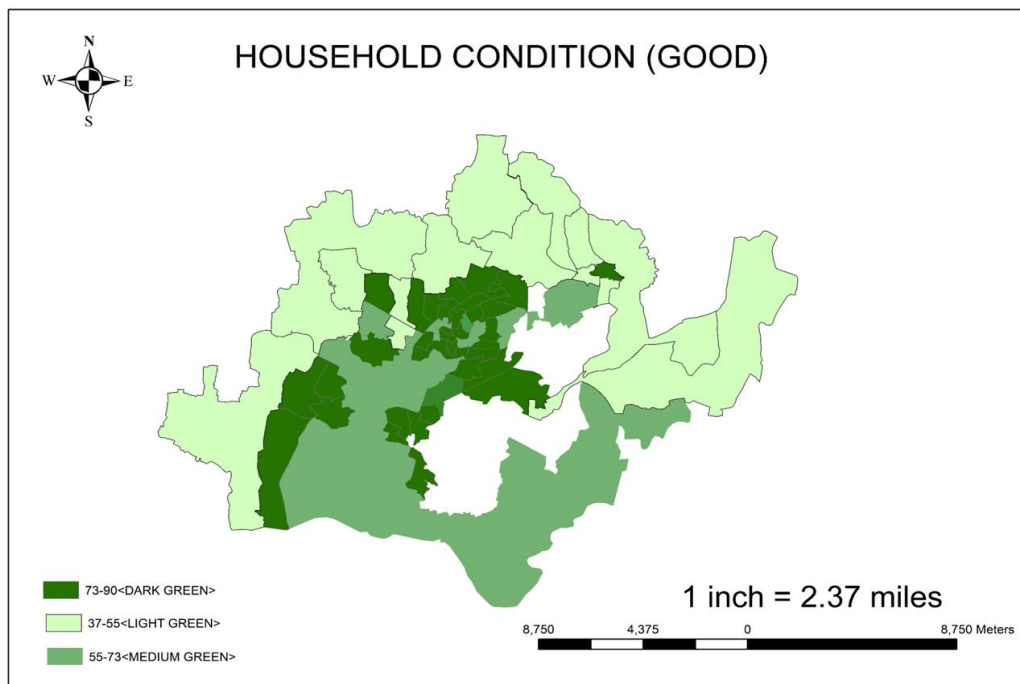
The spatial analysis of housing in Jabalpur reveals significant variations in housing quality and distribution across different parts of the city. Central areas of the city exhibit a higher concentration of good-quality housing, with a large proportion of houses falling within the highest quality category. In contrast, peripheral areas, particularly in the northern and eastern parts of the city, show a relatively lower percentage of good housing and a higher presence of livable and dilapidated structures.

This uneven distribution of housing conditions highlights the spatial inequality that exists within the city. While central areas benefit from better infrastructure, accessibility, and services, peripheral zones often lack adequate connectivity and basic amenities. The concentration of lower-quality housing in these areas indicates that urban expansion is not accompanied by proportional infrastructure development. As a result, residents in peripheral areas face both physical and economic disadvantages, which directly impact

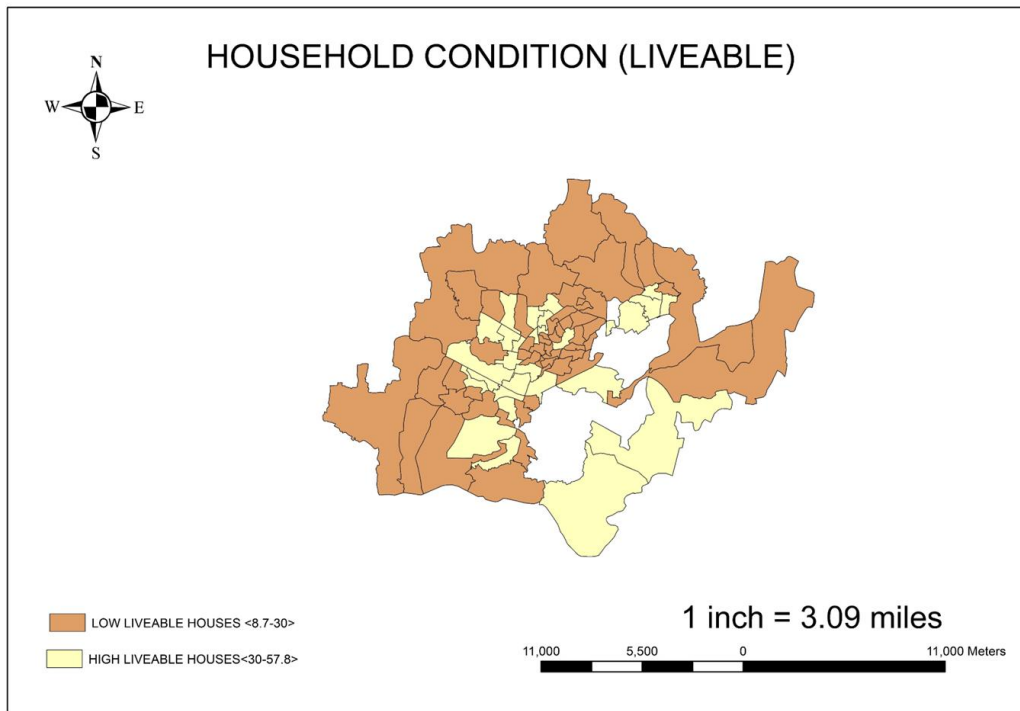
housing affordability.



Map no 4. Dilapidated Housing map, Source- GIS



Map no 5. Good housing condition map, Source- GIS



Map no 6. Livable condition of housing, Source – GIS

3.6 Housing Characteristics and Statistics

The analysis of housing characteristics in Jabalpur provides important insights into the nature of the housing market and its relationship with affordability. The city is predominantly characterized by small to medium-sized housing units, with two-room houses forming the largest share of the housing stock. When combined with one-room and three-room units, these categories account for nearly three-fourths of the total housing, indicating that compact housing typologies dominate the city.

Average Distribution of Dwelling Rooms in Jabalpur Wards

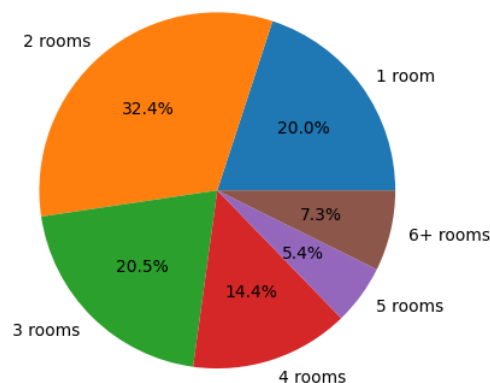


Fig.no.1 Pie chart of dwelling rooms in jabalapur, Source- Census of India 2011

Affordability of housing in tier 2 city (Study area Jabalpur)

Average Household Size Distribution in Jabalpur

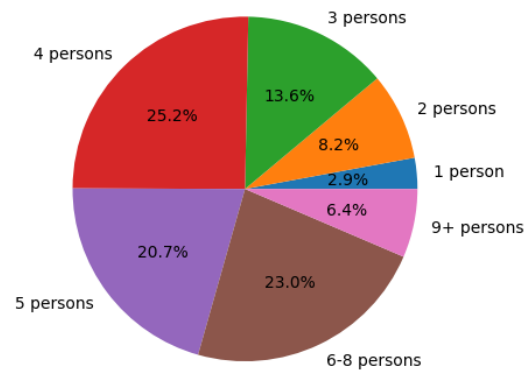


Fig.no.2 Pie chart of Household size in jabalapur, Source- Census of India 2011

In terms of tenure, the housing market in Jabalpur is largely ownership-driven, with approximately 75 percent of households living in owned houses, while rental housing constitutes a smaller share. This reflects a cultural and economic preference for ownership, which is further reinforced by government policies promoting homeownership. However, the dominance of ownership-based housing also limits flexibility for migrant and low-income populations who rely on rental accommodation.

Housing Tenure Distribution in Jabalpur (Ownership vs Rental)

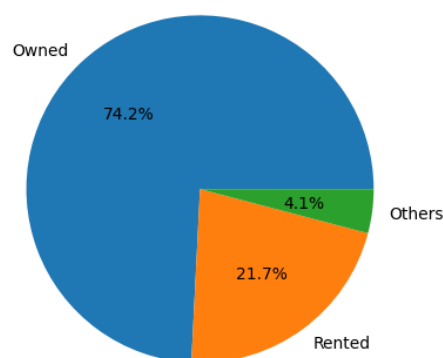


Fig.no.3 Pie chart of Housing tenure in jabalapur, Source- Census of India 2011

Housing Condition Distribution in Jabalpur

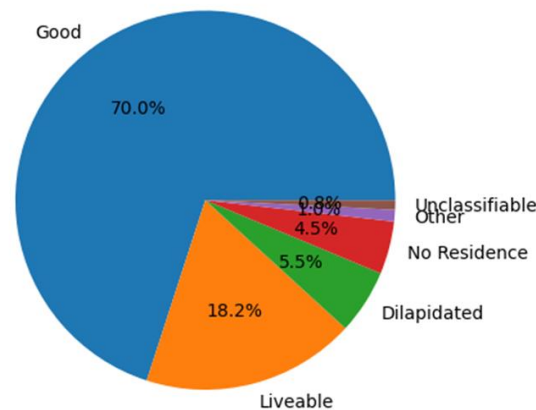


Fig.no.4 Pie chart of Housing condition in jabalapur, Source- Census of India 2011

The household size distribution indicates that a majority of households consist of four to eight members, suggesting the need for flexible and expandable housing designs. Additionally, while a significant proportion of houses are classified as being in good or livable condition, this does not necessarily translate into affordability. The findings suggest that physical housing quality alone is not sufficient to address affordability challenges, as factors such as location, accessibility, and cost play a crucial role.

3.7 Overview of PMAY-U and Housing Models

The Pradhan Mantri Awas Yojana (PMAY-U) is a flagship government initiative aimed at achieving “Housing for All” through multiple implementation models, including In-Situ Slum Redevelopment (ISSR), Credit Linked Subsidy Scheme (CLSS), Affordable Housing in Partnership (AHP), and Beneficiary-Led Construction (BLC). Among these, the AHP model focuses on large-scale housing production through partnerships between government agencies and developers.

Affordability of housing in tier 2 city (Study area Jabalpur)

AHP PROGRESS REPORT										
S.No.	Name Of Site	Sanctioned Units				Estimated Cost(in cr.)	Work Progress			
		EWS	LIG	MIG	Total		Physical Progress			
							Complete	Under Progress		
							No.	EWS	LIG	MIG
1	Mohaniya	912	48	48	1008	95.39	240	672	48	48
2	Kudwari	576	144	144	864	99.12	192	384	144	144
3	Tewar (Package-A)	864	0	0	864	79.09	48	816	0	0
4	Paraswada (Package-A)	864	0	0	864	91.78	0	864	0	0
5	Paraswada (Package-B)	240	264	264	768	91.14	0	240	264	264
6	Tilhari (Package-A)	528	144	144	816	83.15	0	528	144	144
Total		3984	600	600	5184	539.67	480	3504	600	600

Table no.1 AHP progress report, Source-Nagar Nigam Jabalpur

In the context of Jabalpur, however, the implementation of the AHP model reveals several challenges. Despite a significant number of units being sanctioned and constructed, there exists a considerable gap between the number of completed units and those actually occupied. High vacancy rates and low conversion of beneficiaries into actual residents indicate that the model is not effectively addressing the needs of the target population. This suggests that the issue is not merely related to housing supply but also to factors such as affordability, location, and accessibility.

Sr. NO.	EWS						
	Name of Site	Sanctioned Unit	Complete unit	Possession Issued	No of Booking	Cancellation	Remaining booking after cancellation
1	2	3	4	5	6	7	8
1	MOHANIYA	912	240	117	304	139	165
2	KUDWARI	576	192	126	247	81	166
3	TEWAR	864	48	37	124	34	90
4	PARASWAD A-A	864	0	0	9	5	4
5	PARASWAD A-B	240	0	0	2	2	0
6	TILHARI	528	0	0	100	22	78
Total		3984	480	280	786	283	503

Table no.2 EWS Houses build on AHP sites, Source- Nagar Nigam Jabalpur

3.8 Site-Level Analysis of AHP Projects

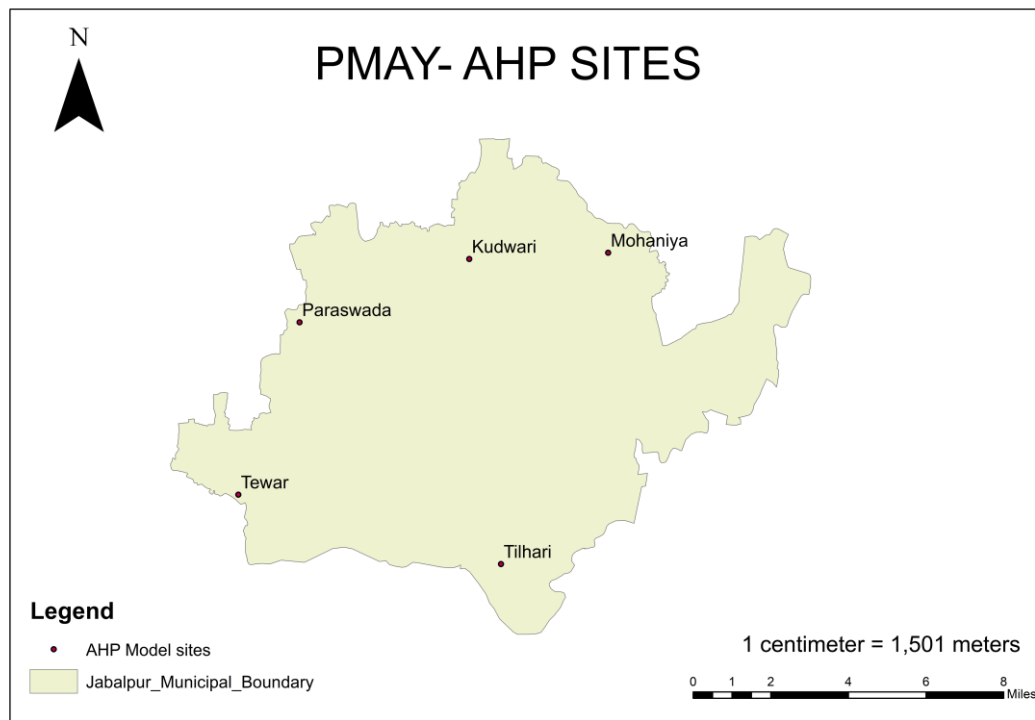
The detailed analysis of selected AHP project sites in Jabalpur highlights several critical issues affecting their performance. Completed sites such as Kudwari and Tewar exhibit visible vacancy despite being fully constructed, indicating a lack of demand or inability of beneficiaries to occupy the units. Residents who have shifted to these sites report increased travel distances and higher commuting costs, which negatively impact their daily lives.

The Mohaniya site presents even more severe challenges, as it is located approximately 12 kilometers away from the city center. Residents relocated to this site face significant livelihood disruptions due to loss of proximity to employment opportunities. In some cases, the relocation has led to reduced income and increased financial stress.

 NAGAR PALIKA NIGAM JABALPUR OFFICE - HOUSING SCHEME Old Civil Lines, Three Patti Chowraha, Jabalpur - 482002								
 Pradhan Mantri Awas Yojana (PMAY-AHP)								
MIG - LIG - EWS CATEGORIES SALE PRICE								
Sl.	Project Location	Residential Scheme	MIG	LIG	EWS			
		Plot	Cost	Cost	Subsidy on Cost	Subsidy (End Use) (End Use)	Subsidy (Self Use) (Self Use)	Subsidy Flat Flat Cost
1	Gohliya	9 Acres	18,30,603/-	15,24,635/-	8,38,950/-	1,50,000/-	1,50,000/-	5,38,950/-
2	Tilheri (Phase-1)	12 Acres	18,30,603/-	15,24,635/-	8,71,500/-	1,50,000/-	1,50,000/-	5,71,500/-
3	Paraswada (Phase-1)	12 Acres	-	-	9,53,400/-	1,50,000/-	1,50,000/-	6,53,400/-
4	Paraswada (Phase-2)	12 Acres	18,30,603/-	15,24,635/-	8,86,200/-	1,50,000/-	1,50,000/-	5,86,200/-
5	Tewar (Phase-1)	12 Acres	-	-	9,40,800/-	1,50,000/-	1,50,000/-	6,40,800/-
6	Kudwari	8.3 Acres	18,30,603/-	15,24,635/-	9,33,450/-	1,50,800/-	1,50,000/-	6,33,450/-

Table no.3 Sale prize PMAY, Source- Nagar Nigam Jabalpur

Under-construction sites such as Tilhari and Paraswada are also located in peripheral areas, suggesting that similar issues may arise in the future. Overall, the site-level analysis indicates that the location of AHP projects plays a crucial role in determining their success or failure.



Map no 7. AHP Sites, Source- GIS

GEO TAG PHOTOS

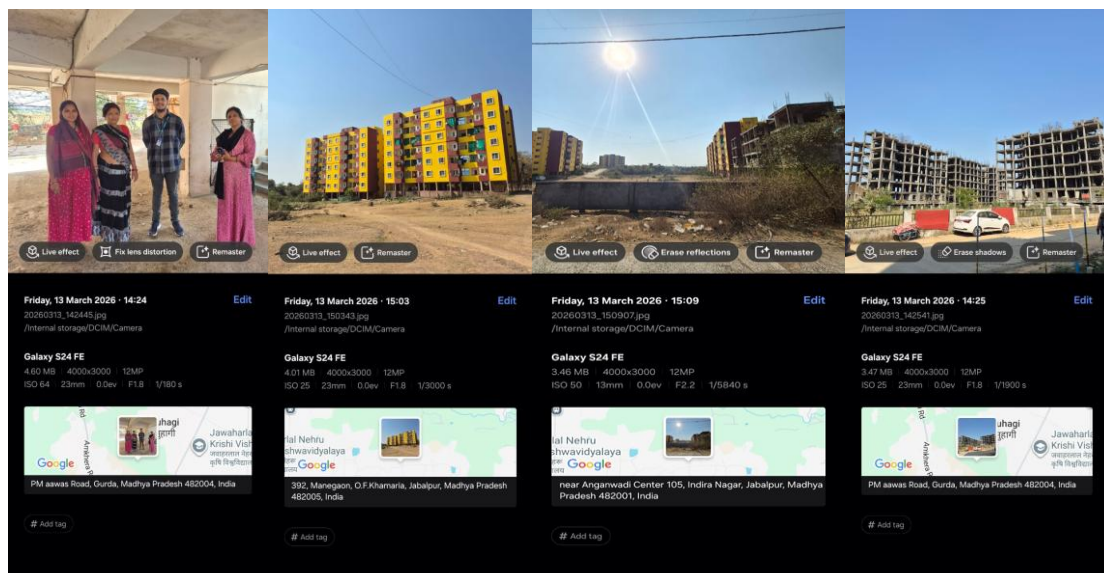


Fig no 4. Geo tag photos, Source- On spot clicked photos

3.9 Institutional Analysis

The institutional analysis based on interactions with Nagar Nigam officials provides insights into the implementation framework of AHP projects. The projects are primarily

developed on government-owned land, which facilitates faster approvals but often results in peripheral site selection due to land availability constraints. The absence of strong private sector participation further limits the efficiency of project execution.

Financially, the total construction cost of a housing unit is approximately ₹9 lakh, while the government subsidy covers only about ₹3 lakh. The remaining cost is borne by the beneficiaries, which creates a significant financial burden, particularly for economically weaker sections. This gap between cost and subsidy is identified as a major factor contributing to low occupancy rates.

Additionally, although basic infrastructure is provided in most projects, delays in service provision and limited accessibility reduce their attractiveness. The institutional findings highlight that affordability is not only a function of cost but also of financial accessibility and implementation efficiency.

CHAPTER 4: KEY FINDINGS AND ISSUES

4.1 Introduction

This chapter presents the key findings derived from the analysis conducted in the previous chapter and identifies the major issues affecting housing affordability in Jabalpur. It further proposes planning and policy strategies aimed at improving the effectiveness of housing delivery models. The chapter integrates survey results, spatial analysis, and institutional insights to provide a comprehensive understanding of the challenges and potential solutions.

The findings reveal that housing affordability in Jabalpur is influenced by multiple interconnected factors, including rising land prices, inadequate supply of formal affordable housing, and limited access to institutional finance for economically weaker sections (EWS) and low-income groups (LIG). Spatial analysis highlights uneven distribution of housing and infrastructure, with peripheral areas lacking basic services and connectivity, thereby increasing the overall cost burden on residents. Additionally, issues such as informal settlements, regulatory constraints, and delays in project implementation further aggravate the housing crisis.

Based on these observations, the chapter outlines a set of strategic interventions focusing on inclusive planning, efficient land management, and strengthening institutional frameworks. It emphasizes the need for promoting affordable housing through policy incentives, public-private partnerships, and better utilization of available land resources. Furthermore, the chapter suggests improving infrastructure provision, enhancing access to credit, and streamlining approval processes to ensure timely delivery of housing projects. These recommendations aim to create a more equitable and sustainable housing environment in Jabalpur.

4.2 Key Findings

The findings of the study reveal that while the AHP model has succeeded in improving the physical quality of housing, it has failed to ensure overall affordability and livability for beneficiaries. A majority of the surveyed households previously resided in slums or rented accommodations located closer to their workplaces. After relocation to AHP sites, these households experienced a significant increase in travel distance and transportation

costs, which placed an additional financial burden on them.

The study also finds that indirect costs, particularly related to commuting, significantly affect affordability. Although the housing units are subsidized, the overall cost of living increases due to their peripheral location. This indicates that affordability cannot be assessed solely on the basis of housing price but must also consider associated costs.

Another critical finding is the disruption of livelihoods caused by relocation. Many beneficiaries rely on informal and location-based employment, which becomes inaccessible after shifting to distant housing sites. This results in reduced income and economic instability. Furthermore, the design of AHP housing units does not support home-based work, which is a common livelihood strategy among low-income households.

Despite improvements in basic infrastructure such as water supply and electricity, issues related to construction quality and lack of flexibility in design persist. The overall satisfaction levels among residents are low, with many expressing a preference for smaller houses in central locations rather than larger units in peripheral areas.

4.2.1 Socio-Economic and Accessibility Findings

The survey reveals that a majority of beneficiaries previously lived in slum (basti) conditions or rented accommodations. This indicates that the Affordable Housing Program (AHP) has been effective in targeting the urban poor and informal settlers.

However, accessibility remains a major concern. Residents reported increased travel costs (approximately ₹100 per day) and described commuting as “very difficult,” primarily due to the peripheral location of housing sites. The dependence on private modes such as bikes and autos further highlights the lack of efficient public transport connectivity.

Financially, many households experience burden due to EMIs and maintenance costs, with several beneficiaries relying on self-funding. This suggests that housing is not entirely affordable when indirect costs such as transportation and maintenance are considered.

In terms of livelihood, a significant decline in income was observed post-relocation. Many residents engaged in home-based work reported loss of customers and reduced earnings, indicating disruption of livelihood opportunities.

4.3 Housing, Infrastructure, and Satisfaction Findings

The survey findings indicate that housing design is not suitable for larger families, as most units are small 2-room structures with limited flexibility for expansion. Construction quality is another concern, with issues such as cracks and leakages reported by residents. Basic infrastructure such as water supply, electricity, and roads has improved compared to previous living conditions. However, while social infrastructure like schools, hospitals, and markets is available nearby, it is not sufficient to compensate for the increased distance from workplaces.

Overall satisfaction levels reveal that location plays a more important role than housing quality. Many beneficiaries expressed a preference for smaller houses within the city rather than larger units in peripheral areas. The presence of vacant flats further indicates a partial failure of the AHP in addressing location preferences and actual needs of residents.

4.4 Major Issues Identified

The analysis highlights a set of interrelated issues that collectively undermine the effectiveness and long-term success of Affordable Housing in Partnership (AHP) projects in Jabalpur. Among these, **location inefficiency** emerges as the most critical concern. A majority of housing projects are developed on the urban periphery where land is relatively cheaper, but these locations are significantly distant from employment hubs, educational institutions, healthcare facilities, and established markets. As a result, beneficiaries are compelled to spend more time and money on daily commuting. Increased travel costs—often amounting to a substantial share of household income—combined with poor public transport connectivity, make these housing units functionally unaffordable despite being subsidized. The lack of accessibility also leads to social isolation and reduced quality of life, discouraging occupancy in many cases.

Financial constraints further exacerbate the problem. Although government subsidies aim to make housing accessible for economically weaker sections (EWS) and low-income groups (LIG), they often fall short of covering the full cost of construction and associated expenses. Beneficiaries are required to contribute through loans or personal savings, which creates a heavy financial burden, especially for households with unstable or informal

incomes. In addition to initial costs, recurring expenses such as maintenance charges, utility bills, and transportation costs add to the financial stress. For many families, this cumulative burden outweighs the perceived benefits of formal housing, leading to delayed occupancy, renting out of units, or even complete abandonment.

Another major issue identified is **livelihood disruption**. Many beneficiaries previously lived in locations closer to their workplaces or operated small-scale, home-based businesses. Relocation to peripheral housing sites breaks these economic linkages, resulting in loss of customers, reduced income opportunities, and in some cases, complete unemployment. The absence of nearby commercial spaces, markets, or informal economic zones within housing projects further limits opportunities for income generation. This disconnect between housing and livelihood is particularly critical for vulnerable groups who rely on proximity and social networks for their survival.

The **design and planning of housing units** also present significant limitations. Most AHP units follow a standardized approach, typically consisting of small two-room units with minimal flexibility. Such designs fail to accommodate the needs of larger or joint families, which are common in the Indian context. Additionally, there is little or no provision for incremental expansion, which is an important aspect of affordability for low-income households. The inability to modify or expand living spaces reduces long-term usability and satisfaction among residents, making the housing less adaptable to changing family needs.

Finally, **institutional and implementation challenges** play a crucial role in limiting the success of AHP projects. Weak coordination among government agencies, delays in approvals and fund disbursement, and lack of effective monitoring mechanisms often lead to project delays and compromised construction quality. Limited participation from the private sector reduces innovation and efficiency in project execution. Moreover, the absence of a holistic, integrated planning approach—linking housing with transport, infrastructure, and economic development—results in fragmented outcomes that fail to meet the actual needs of beneficiaries.

Overall, these issues indicate that affordability is not merely a function of housing cost but is deeply influenced by location, accessibility, livelihood integration, design flexibility, and institutional efficiency. Addressing these interconnected challenges is essential for improving the effectiveness and sustainability of affordable housing initiatives in Jabalpur.



Image 1. Under constructed sites



Image 2. Under constructed site

4.5 Survey Analysis and Interpretation of Primary Data

A primary household survey was conducted across selected Affordable Housing in Partnership (AHP) sites in Jabalpur to understand the socio-economic conditions, accessibility issues, housing quality, and overall satisfaction of beneficiaries. The survey covered key aspects such as previous living conditions, travel patterns, financial affordability, infrastructure availability, and livelihood changes after relocation.

4.5.1 Socio-Economic Background

The survey indicates that most beneficiaries previously lived in rented accommodations within the city. The primary motivation for shifting to AHP housing was the aspiration to own a house. This reflects the success of the scheme in promoting homeownership among lower-income groups. However, the transition from central locations to peripheral housing sites has significantly altered their living conditions.

4.5.2 Accessibility and Transportation Issues

Accessibility emerged as a major concern. Respondents reported dependence on private modes such as bikes or cycles for daily commuting due to lack of reliable public transport. The average additional travel cost was reported to be around ₹1000 per month, which places a financial strain on households. Furthermore, long distances (6–12 km) from workplaces were perceived as “very difficult,” indicating poor location planning and connectivity.

4.5.3 Financial Affordability

Financial challenges were evident among beneficiaries. Many respondents reported difficulties in accessing bank loans due to documentation issues. Although some households were able to manage EMI payments, others found it burdensome relative to their income levels. This highlights that housing affordability is not limited to initial cost but includes financing barriers and recurring expenses.

4.5.4 Housing Quality and Basic Services

In terms of housing quality, responses were mixed. While basic infrastructure such as water and electricity was available, issues related to construction quality—such as cracks and leakages—were reported. Water supply was not consistently available for 24 hours,

and maintenance of facilities such as lifts (in upper-floor units) was unreliable. These factors reduce the overall satisfaction of residents.

4.5.5 Social Infrastructure and Safety

The availability of schools, hospitals, and markets within a 1–2 km radius was reported in some cases; however, this was not consistent across all sites. Safety perceptions were generally positive, with most residents feeling secure living in the area. However, limited access to daily necessities and services adds to inconvenience.

4.5.6 Livelihood and Income Impact

A significant finding of the survey is the negative impact on livelihoods. Some respondents were engaged in home-based work such as small businesses or services. After relocation, many reported a decrease in income due to loss of customers and increased distance from market areas. This indicates a lack of integration between housing and livelihood opportunities.

4.5.7 Overall Satisfaction and Occupancy

Despite improvements in formal housing conditions, overall satisfaction levels remain moderate to low. Many respondents expressed a preference for smaller houses located within the city rather than larger units in peripheral areas. The presence of vacant or locked flats further supports this observation, suggesting issues of non-occupancy.

4.5.8 Infrastructure Improvement Assessment

When compared to previous living conditions, respondents reported only minor or no improvement in infrastructure such as roads, street lighting, and drainage. In some cases, conditions were perceived to be worse than before, indicating gaps in planning and implementation.

Affordability of housing in tier 2 city (Study area Jabalpur)

PMAY-AHP Resident Survey: Jabalpur

Project Location: 101 Forest (Mohaniya / Tilhari / Kudwari / Tewar / Paraswada)

Building/Flat No: 13326 Date: 13/3/22

Beneficiary Name
Archana Gotiya

I. Previous Living Status

1. Where did you live before moving here?

☒ In a rented room in the city

☐ In a slum area (Basti)

☐ In a village near Jabalpur

2. Why did you decide to move to this project?

☒ To own my own house

☐ For better facilities (Water/Electricity)

☐ I was displaced from my previous home

II. Location & Transport (The "Distance" Problem)

3. How do you go to work every day?

☒ Own Bike/Cycle

☐ City Bus/Auto

☐ Walking

4. How much extra money do you spend on travel every month compared to your old house?

☐ Amount in ₹: 100

5. Is the distance from the city (e.g., 12km) a major problem for your family?

☒ Yes, it is very difficult

☐ It is manageable

☐ No problem

III. Financial Affordability

6. Was it easy to get a bank loan for this house?

☐ Yes, very easy

☒ No, faced many problems with documents

☐ I did not take a loan (Self-funded)

7. Are you able to pay the monthly EMI/Maintenance easily?

☒ Yes

☐ No, it is a big burden on my salary

8. Did you have to pay any "hidden" or "extra" money to get possession?

☒ Yes / No

IV. Building Quality & Facilities

9. Are you happy with the construction quality (walls, roof, tiles)?

☒ Good / Average / Poor (Cracks/Leakage)

10. Do you get enough water and electricity every day?

☒ 24 Hours / Only for a few hours / Very irregular

11. If you live on the upper floors, is the lift working?

☒ Works well / Often broken / No lift facility

V. Social Needs

12. Is there a school and hospital nearby (within 1-2 km)?

☒ Yes / No

13. Is there a market nearby for daily milk and vegetables?

☒ Yes / No

14. Do you feel safe living here at night?

☒ Yes / No

VI. Overall Satisfaction

15. If you had a choice, would you prefer a smaller room inside the main city or this flat far away?

☒ Smaller room in city / This flat far away

16. Are many flats in your building still empty (locked)?

☒ Yes, many / Only a few / All are full

17. What is the biggest problem you face living here?

water
light
bandh
Security

Image 3. Survey Questions

Affordability of housing in tier 2 city (Study area Jabalpur)

18. Would you recommend this project to your friends or relatives?

☐ Yes / ☒ No

Vii. Livelihood Activity in the House

19. Do you currently carry out any work or business inside your home to earn money (e.g., small shop, tailoring, tuition, food preparation)?

☒ Yes

☐ No

20. If yes, has your work or income improved since moving into this AHP house?

☐ Improved (more space/better environment)

☒ Decreased (lost old customers/too far from the market)

☐ Stayed the same

Viii. Infrastructure Improvement

21. Compared to where you lived before, do you feel there is a real improvement in the infrastructure (like quality of roads, streetlights, and drainage) in this colony?

☐ Significant Improvement

☐ Minor Improvement

☒ No Improvement / Worse than before

Image 4. Survey questions

4.5.9 Conclusion from Survey

The survey clearly demonstrates that while AHP projects have succeeded in providing formal housing, they fall short in terms of location suitability, accessibility, livelihood support, and overall affordability. The findings emphasize that housing should not be viewed in isolation but as part of an integrated urban system that includes transport, employment, and social infrastructure. Addressing these issues is essential to improve occupancy rates, beneficiary satisfaction, and the long-term success of affordable housing schemes.

4.6 Interpretation of Findings

The findings clearly indicate that the AHP model operates as a supply-driven approach

that prioritizes the construction of housing units over the actual needs of beneficiaries. The model does not adequately consider the socio-economic realities of low-income households, particularly their dependence on location-based livelihoods and informal employment.

The concept of affordability, as revealed through this study, extends beyond the cost of housing to include factors such as accessibility, transportation, and income stability. Therefore, housing that is affordable in monetary terms may still be unaffordable in practical terms if it imposes additional costs or disrupts livelihoods. This highlights the need for a more integrated and people-centered approach to housing planning.

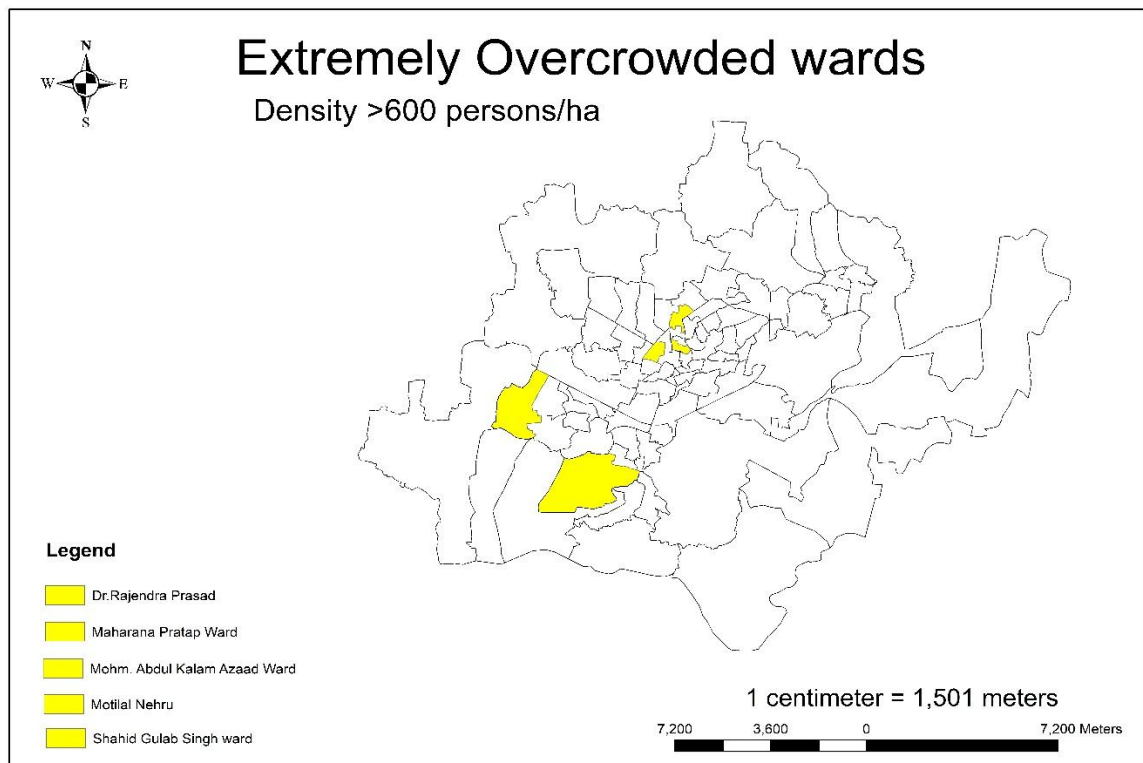
CHAPTER 5: WEIGHTED OVERLAY ANALYSIS FOR PRIORITIZATION OF WARDS

5.0 Analysis of Population Density and Slum Characteristics

Before applying the weighted overlay method, a detailed analysis of population density and slum characteristics was carried out to understand the spatial distribution of housing stress in Jabalpur. This analysis forms the foundation for identifying critical areas requiring intervention and provides the base data for the multi-criteria evaluation.

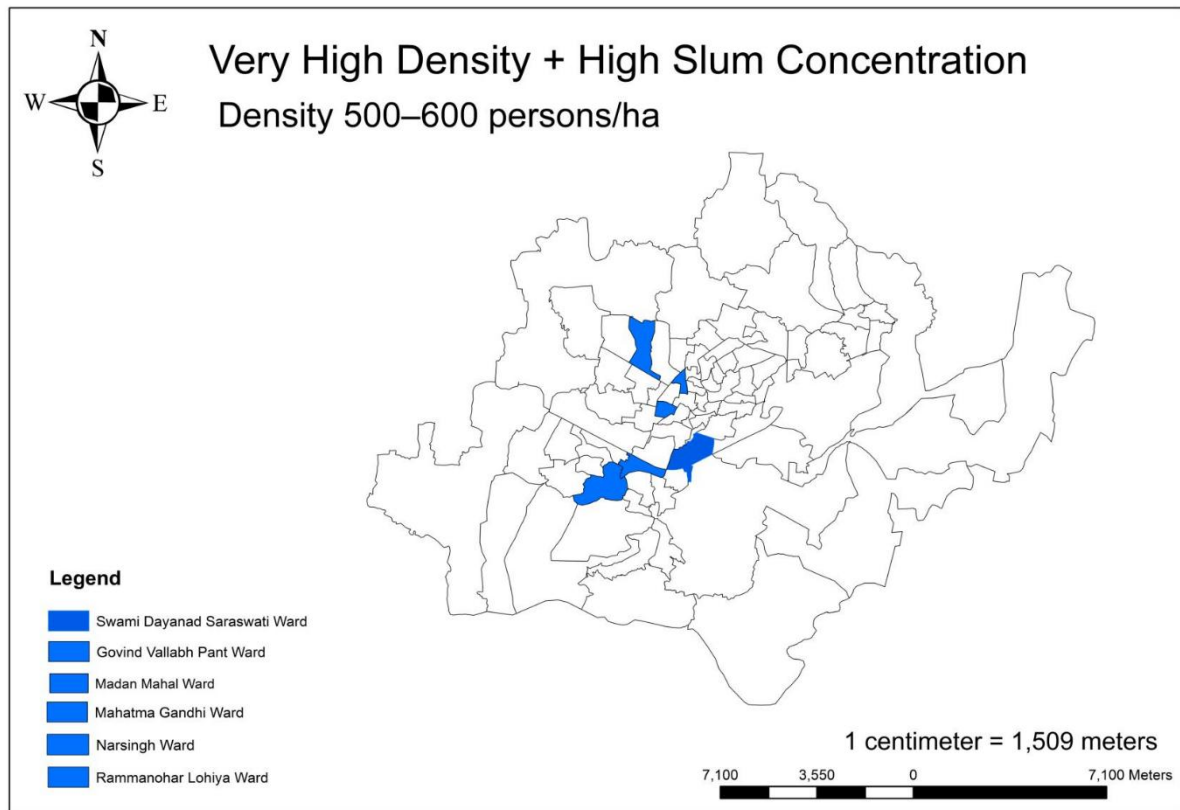
The study of ward-wise population density reveals that housing stress is highly concentrated in specific parts of the city, particularly in the central and older developed areas. These areas exhibit extremely high population densities, often exceeding 600 persons per hectare, which indicates severe overcrowding and inadequate availability of living space. Along with high density, these wards also show a significant proportion of slum population, highlighting the presence of economically weaker sections living under constrained conditions.

According to the classification, wards were grouped into different categories based on density and slum characteristics. The most critical category includes wards with extreme overcrowding and a very high slum population share, often exceeding 50–65% of the total population. These wards represent the worst housing conditions in the city and are primarily located in the core urban areas. For instance, Ward 37 exhibits the highest density of approximately 798 persons per hectare along with around 65% slum population, making it the most critical zone. Other wards such as 16, 18, 23, 36, and 38 also fall into this category and require immediate planning attention.



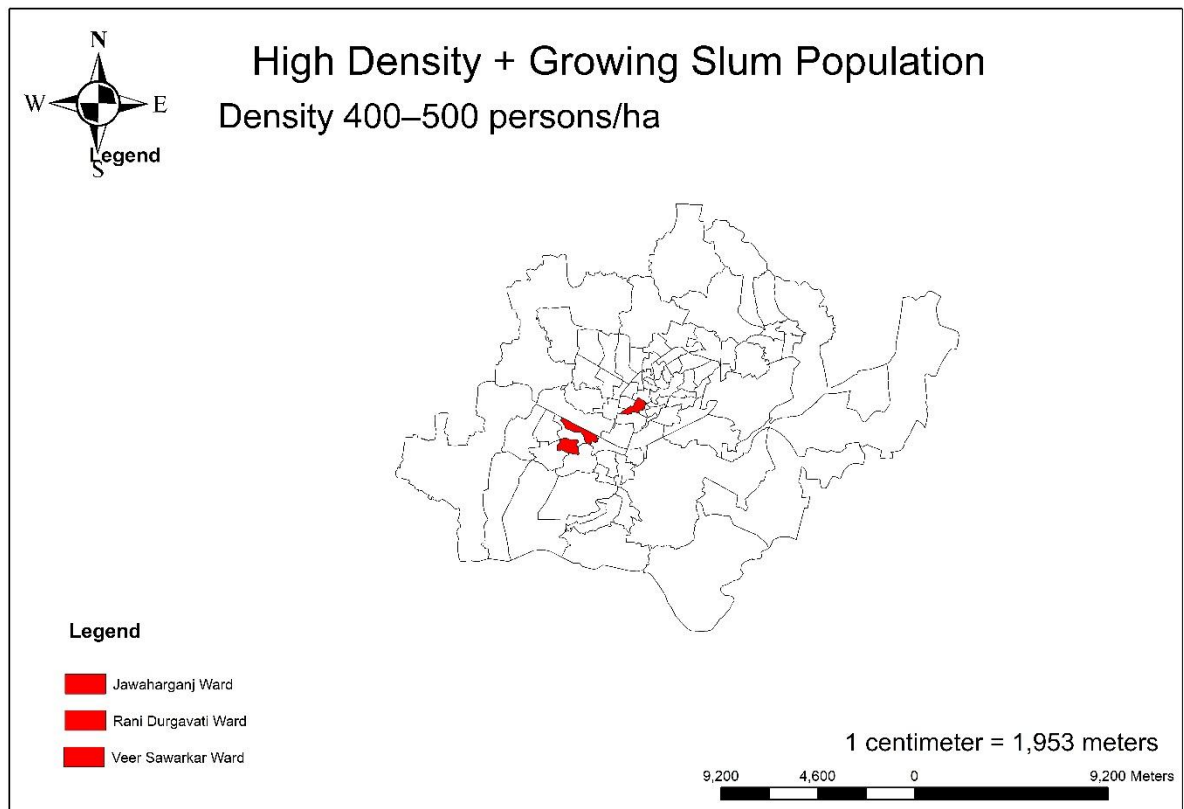
Map no.8 Extreme Overcrowding, Source- GIS

The second category consists of wards with very high density (500–600 persons per hectare) and a high concentration of slum population. These areas, including wards such as 14, 15, 25, 26, 29, and 33, represent secondary clusters of housing stress. Although slightly less critical than the first category, these wards still experience severe infrastructure pressure due to high population concentration and inadequate service provision



Map no. 9 Very high density +High slum concentration, Source- GIS

The third category includes wards with high density ranging from 400 to 500 persons per hectare and a growing slum population. These areas, such as wards 7, 17, and 22, represent emerging zones of concern where informal settlements are expanding rapidly. If not addressed through timely planning interventions, these wards may transition into high-stress zones in the future.



Map no.10 High density+growing slum population, Source- GIS

Further analysis of slum population distribution (as shown in Table 5) indicates that a significant number of wards fall under moderate to high slum concentration categories. Approximately 18 wards have slum population ranging between 30–45%, while 19 wards fall under the medium category (15–30%). Only a limited number of wards exhibit low slum presence, indicating that informal settlements are widespread across the city

Table 5
Jabalpur city: Ward-wise distribution of slum population, 2011

S. No.	Class	Percentage of slum population	Numbers of ward	Total
1.	Very high	Above 60	27, 29, 36	3
2.	High	45-60	10, 32, 33, 41	4
3.	Moderately high	30-45	1, 5, 12, 17, 18, 23, 39, 40, 44, 46, 48, 53, 55, 58, 62, 64, 66, 69	18
4.	Medium	15-30	4, 6, 7, 8, 15, 19, 24, 31, 34, 37, 43, 47, 49, 57, 59, 61, 67, 68, 70	19
5.	Low	Below 15	2, 3, 9, 11, 14, 16, 20, 21, 22, 25, 26, 28, 30, 45, 50, 52, 54, 56, 60, 63	20
6.	Slum not reported	13, 35, 38, 42, 51, 65		6
	Total			70

Source: HFAPoA report, Jabalpur Municipal Corporation, 2019

Table no 4. Slum population ward wise, Source- Nagar Nigam

The spatial maps of slum population proportion and density (Figures 6, 7, and 8) further reinforce these findings. The maps show that the highest concentration of slum population and density is located in the central parts of Jabalpur, forming a distinct cluster of housing stress. Similarly, slum household density maps indicate significant pressure at the household level, particularly in inner-city areas where space constraints are severe.

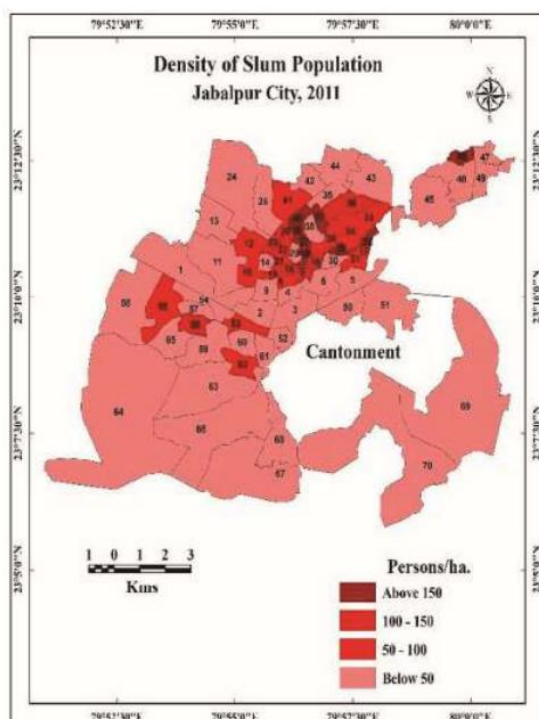


Fig. 7.

Source: Jabalpur Municipal Corporation, 2011

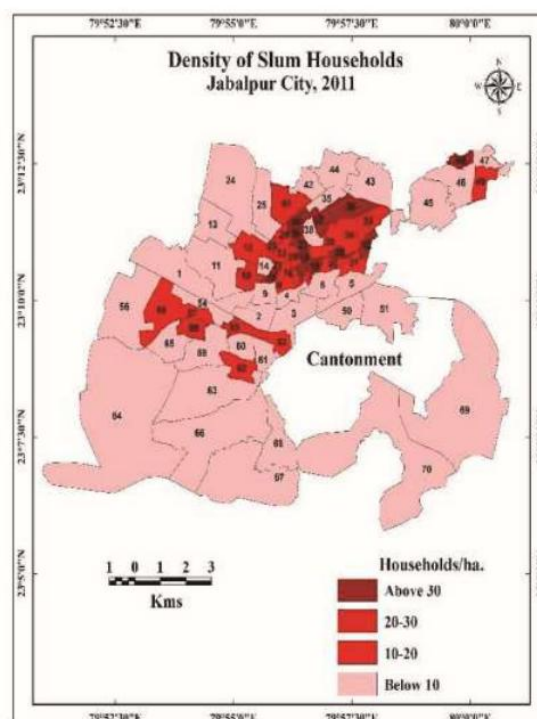


Fig. 8.

Map no.11 Slum house hold density, Source- Municipal corporation 2011

Overall, the analysis highlights that housing stress in Jabalpur is not uniformly distributed but is concentrated in specific high-density wards with significant slum populations. These findings emphasize the need for targeted interventions rather than a uniform city-wide approach. The insights derived from this analysis serve as the basis for the subsequent weighted overlay method, which integrates these parameters to identify priority areas for affordable housing interventions.

5.1 Introduction

This chapter presents a detailed application of the **Weighted Overlay Analysis**, a widely used **Multi-Criteria Decision Analysis (MCDA)** technique, to identify and prioritize wards requiring immediate intervention for affordable housing in Jabalpur. The need for such an analytical approach arises from the complex and multi-dimensional nature of housing affordability, which is not determined by a single factor but by a combination of spatial, social, and economic conditions. Traditional methods often fail to capture this complexity, whereas the weighted overlay method enables the integration of multiple indicators into a single, comprehensive framework.

In this study, the analysis incorporates key socio-spatial parameters such as overcrowding levels, slum population distribution, slum density, and household density. These indicators collectively represent the intensity of housing stress and the concentration of vulnerable populations within different wards. Each parameter reflects a specific dimension of the housing problem—for instance, overcrowding indicates physical congestion, while slum population highlights socio-economic vulnerability. By assigning appropriate weights to these parameters based on their relative importance, the method ensures a balanced and realistic assessment of housing conditions.

The weighted overlay process involves standardizing and scoring each parameter, followed by combining them using predefined weights to generate a **composite suitability index** for every ward. This index provides a quantitative basis for comparing different areas and identifying zones with the highest need for intervention. The resulting classification categorizes wards into priority levels such as high, moderate, and low

priority, thereby simplifying decision-making for planners and policymakers.

Furthermore, this approach allows for a spatial visualization of housing stress through thematic and composite maps, making it easier to identify patterns, clusters, and critical zones within the city. The integration of Geographic Information Systems (GIS) enhances the accuracy and effectiveness of the analysis by enabling spatial layering and visualization of multiple datasets.

The primary objective of this chapter is to move beyond descriptive analysis and provide a **data-driven, evidence-based framework** for planning affordable housing interventions. By systematically identifying priority areas, the study aims to support more targeted, efficient, and equitable allocation of resources. Ultimately, the weighted overlay analysis serves as a crucial tool for guiding urban planners in addressing housing shortages, improving living conditions, and promoting inclusive urban development in Jabalpur.

5.2 Methodology

The methodology adopted for this study is based on the Weighted Overlay Analysis, a systematic approach under Multi-Criteria Decision Analysis (MCDA), used to evaluate and integrate multiple factors influencing housing affordability and urban congestion. This method enables the combination of diverse socio-spatial indicators into a single analytical framework, allowing for a comprehensive assessment of housing stress across different wards of Jabalpur.

At the core of this methodology is the identification of key parameters that directly or indirectly influence housing conditions. These parameters were selected based on their relevance to urban housing issues, particularly in the context of slum concentration, density, and overcrowding. Each parameter was assigned a specific weight to reflect its relative importance in contributing to overall housing stress. The assignment of weights ensures that more critical factors, such as overcrowding, have a greater influence on the final outcome compared to less dominant variables.

Selection of Parameters and Justification of Weights

The following four parameters were used in the analysis:

Extreme Overcrowding (30%)

This parameter carries the highest weight as it directly represents the level of congestion

and shortage of adequate living space. High overcrowding is a clear indicator of housing stress and poor living conditions, making it the most significant factor in the analysis. 2.

Slum Population (25%)

This parameter reflects the concentration of economically weaker sections within a ward. A higher slum population indicates greater demand for affordable housing and highlights socio-economic vulnerability.

Slum Population Density (25%)

This measures the intensity of population concentration within slum areas. High density in slums signifies severe pressure on limited infrastructure and services, thereby increasing the urgency for intervention.

Slum Household Density (20%)

This parameter captures the pressure at the household level by indicating the number of households per unit area. It helps in understanding micro-level congestion and living conditions within slum settlements. The distribution of weights (30%, 25%, 25%, and 20%) ensures a balanced representation of both physical and socio-economic aspects of housing stress, while giving slightly higher importance to overcrowding due to its direct impact on livability.

5.2.1 Classification and Standardization of Data

To enable comparison across wards, each parameter was classified into three categories based on severity levels:

High Severity

Moderate Severity

Low Severity

These categories were standardized by assigning numerical scores ranging from 1 to 3. This process of standardization converts different types of data into a uniform scale, making it possible to integrate them into a single composite index.

Scoring Criteria

High Severity → Score 3

Represents critical conditions requiring immediate intervention

Moderate Severity → Score 2

Indicates developing or intermediate levels of housing stress

Low Severity → Score 1

Reflects relatively stable conditions with minimal urgency

This scoring system simplifies complex data into measurable values while maintaining the relative differences between severity levels.

Integration Process

Once all parameters were assigned weights and scores, they were combined using a weighted linear combination technique. Each ward received a score for every parameter, which was then multiplied by its respective weight. The sum of these weighted scores resulted in a composite suitability score for each ward.

This approach ensures that:

Multiple dimensions of housing stress are considered simultaneously

More critical factors have a greater influence on final outcomes

The analysis remains transparent and replicable

5.3 Suitability Index Calculation

The suitability index is a crucial component of the weighted overlay analysis, as it quantitatively represents the level of housing stress in each ward. It is derived by combining multiple parameters—each reflecting a specific aspect of housing conditions—into a single composite score. This approach ensures that decision-making is based on a balanced evaluation of all relevant factors rather than relying on a single indicator.

To compute the suitability score, each parameter (overcrowding, slum population, slum density, and household density) was first assigned a standardized score ranging from 1 to 3 based on its severity level. These scores were then multiplied by their respective weights, reflecting their relative importance in determining housing stress. The weighted values were finally summed to obtain the composite suitability score for each ward.

The formula used for calculating the suitability index is as follows:

Suitability Score

$$\begin{aligned} &= (\text{Overcrowding} \times 0.30) + (\text{Slum Population} \times 0.25) \\ &+ (\text{Slum Density} \times 0.25) + (\text{Household Density} \times 0.20) \end{aligned}$$

This formula ensures that parameters with higher importance (such as overcrowding)

contribute more significantly to the final score, while still incorporating the influence of other critical factors.

Step-by-Step Calculation (Example: Ward 30)

To illustrate the calculation process, Ward 30 is taken as an example:

Overcrowding Score = 2 (Moderate)

Weighted value = $2 \times 0.30 = 0.60$

Slum Population Score = 3 (High)

Weighted value = $3 \times 0.25 = 0.75$

Slum Density Score = 2 (Moderate)

Weighted value = $2 \times 0.25 = 0.50$

Household Density Score = 2 (Moderate)

Weighted value = $2 \times 0.20 = 0.40$

Total Suitability Score

$$0.60 + 0.75 + 0.50 + 0.40 = 2.25$$

5.3.1 Interpretation of the Score

The final score of **2.25** places Ward 30 in the **High Priority Category**. This indicates that the ward experiences a combination of moderate to high housing stress factors, particularly a high concentration of slum population along with significant levels of overcrowding and density.

Although Ward 30 may not exhibit extreme conditions in all parameters, the cumulative effect of multiple stress indicators results in a high overall priority. This demonstrates the effectiveness of the weighted overlay method in capturing the combined impact of different variables, rather than focusing on a single dominant factor

5.4 Ward Classification

1. High Priority Category (Score: 2.25 – 3.00)

The High Priority category includes wards that exhibit the most critical housing conditions

and require immediate attention. The wards falling under this category are 14, 16, 20, 22, 23, 28, and 29.

These wards are characterized by extreme overcrowding, where population density exceeds sustainable limits, leading to inadequate living space and poor environmental conditions. They also have a high concentration of slum population, indicating a large proportion of economically weaker sections living in informal settlements. The combination of high density and slum prevalence results in severe pressure on basic infrastructure such as water supply, sanitation, and road networks.

Another important characteristic of these wards is their proximity to livelihood opportunities, as most of them are located in central or inner-city areas. This makes them socially and economically significant, as residents depend on nearby employment zones for their daily income. However, this also contributes to congestion and limits the availability of land for redevelopment.

Due to these conditions, these wards are identified as critical intervention zones, where strategies such as in-situ slum redevelopment, infrastructure upgradation, and high-density affordable housing need to be prioritized.

2. Moderate–High Priority Category (Score: 1.75 – 2.24)

The Moderate–High Priority category includes wards 27, 30, 31, 33, 34, and 35. These wards represent areas with significant housing stress, though not as severe as the high-priority zones.

These wards are characterized by high population density and a moderate to high presence of slum population, indicating substantial demand for affordable housing. Infrastructure in these areas is often under strain, though conditions may be relatively better compared to high-priority wards.

These areas also show potential for planned housing expansion and intervention, as they may have relatively more available land or lower congestion compared to core city areas. Therefore, they are suitable for both redevelopment and new housing projects, including affordable housing schemes and mixed-use developments.

Planning interventions in these wards should focus on controlled densification, infrastructure improvement, and integration with transport networks, ensuring that future growth is managed efficiently.

3. Moderate Priority Category (Score: 1.25 – 1.74)

The Moderate Priority category includes wards 6, 9, 12, 13, 19, 21, 25, 32, and 54. These wards represent areas with medium levels of housing stress and are often transitional or developing zones.

These wards are characterized by moderate population density and a growing slum presence, indicating emerging pressure on housing and infrastructure. While current conditions may not be critical, these areas are vulnerable to future deterioration if not managed properly.

These wards can be identified as preventive planning zones, where early intervention can help avoid the formation of dense slum clusters and overcrowded conditions. Planning strategies in these areas should focus on:

- Ensuring adequate infrastructure provision

- Promoting planned residential development

- Regulating informal growth

Timely action in these wards can significantly reduce future housing challenges and improve overall urban sustainability.

4. Low Priority Category (Score: 0.75 – 1.24)

The Low Priority category includes wards 1, 2, 3, 4, 5, 7, 8, 10, 11, 15, 17, and 18. These wards exhibit relatively stable housing conditions with low levels of overcrowding and minimal slum presence.

These areas typically have lower population density, better availability of land, and comparatively well-developed infrastructure. As a result, they experience less housing stress and do not require immediate intervention.

However, these wards still play an important role in the overall urban structure. They can be considered as potential zones for future housing development, particularly for planned expansion and affordable housing projects, provided that connectivity and infrastructure are adequately developed.

Planning strategies in these areas should focus on:

- Maintaining existing infrastructure quality

Encouraging planned and regulated development

Preventing unplanned urban sprawl

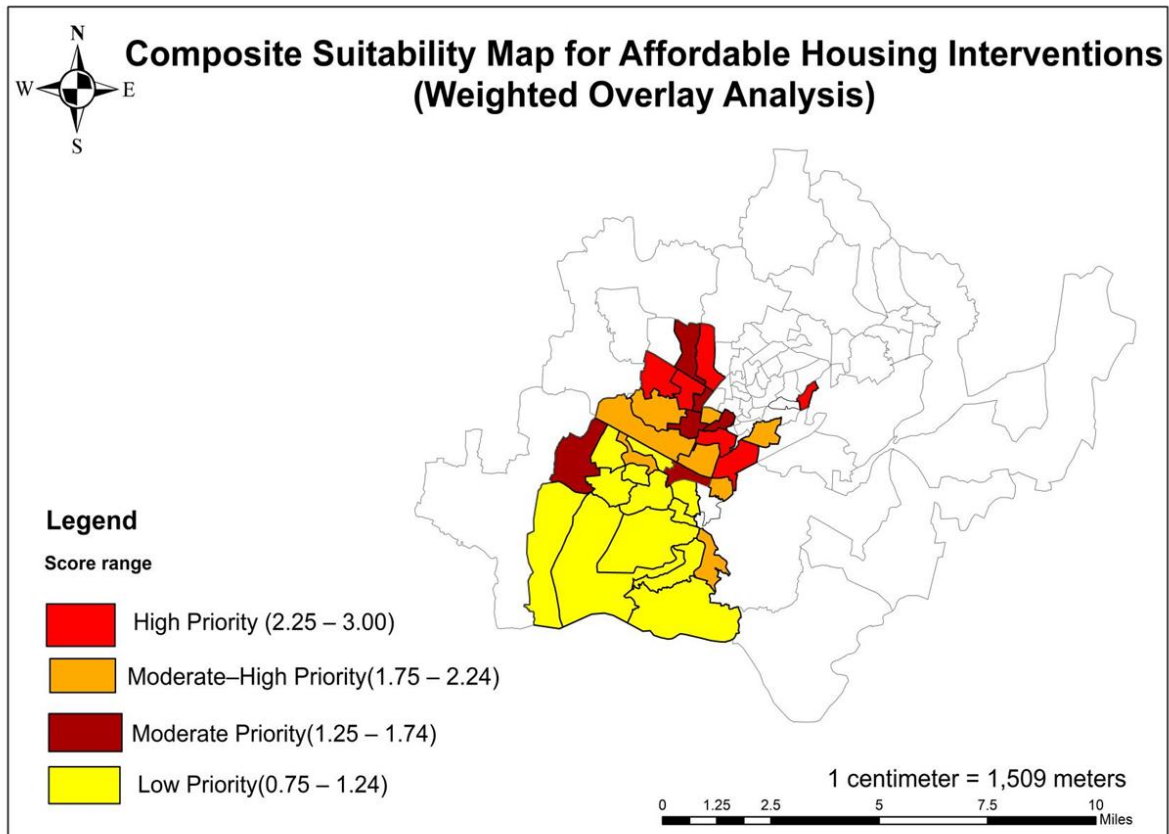
Category	Score Range	Wards Included	Key Characteristics / Interpretation
 High Priority	2.25 – 3.00	14, 16, 20, 22, 23, 28, 29	Extreme overcrowding; high slum population; high density; strong livelihood proximity; critical intervention zones
 Moderate-High Priority	1.75 – 2.24	27, 30, 31, 33, 34, 35	High density; moderate-high slum concentration; suitable for expansion of housing interventions
 Moderate Priority	1.25 – 1.74	6, 9, 12, 13, 19, 21, 25, 32, 54	Medium housing stress; developing pressure zones; suitable for upgrading and preventive planning
 Low Priority	0.75 – 1.24	1, 2, 3, 4, 5, 7, 8, 10, 11, 15, 17, 18	Low overcrowding; low slum presence; relatively stable

Table no.5 Ward classification, Source- self made

5.5 Composite Suitability Map

The Composite Suitability Map represents the final outcome of the weighted overlay analysis and serves as a comprehensive spatial tool for identifying priority areas for affordable housing interventions in Jabalpur. This map integrates all selected parameters—overcrowding, slum population, slum density, and household density—into a single visual framework, thereby providing a clear and holistic understanding of housing stress across different wards.

The map categorizes wards into different priority levels using a color-coded scheme, making it easier to interpret spatial patterns and identify critical zones. It not only highlights areas with the highest need for intervention but also helps in understanding the relationship between housing conditions and urban structure.



Map no.12 Composite suitability map, Source-GIS

1. Spatial Distribution of Priority Areas

The composite map clearly reveals that high-priority wards are predominantly concentrated in the central and inner-city areas of Jabalpur. These areas correspond to the older parts of the city, where development has occurred over a long period without adequate planning controls. As a result, these zones exhibit:

Extremely high population densities

Large concentrations of slum settlements

Limited availability of open spaces

Overburdened infrastructure systems

These central wards act as economic hubs, which further intensifies population concentration due to proximity to employment opportunities.

2. Link with Employment and Infrastructure

Another significant observation from the map is that high-priority areas coincide with

zones of strong livelihood proximity. These wards are located close to:

Commercial centers

Markets and business districts

Industrial and service sector employment zones

This explains why, despite poor living conditions, these areas continue to attract and retain population. Residents prefer to live closer to their workplaces to minimize travel time and cost. Additionally, these areas often have relatively better access to basic infrastructure such as roads, public transport, schools, and healthcare facilities, even though the existing infrastructure is under heavy stress due to overuse.

This highlights an important planning insight: location plays a more critical role than housing quality alone in determining residential preference.

3. Peripheral Areas and Low Priority Zones

In contrast, the map shows that peripheral wards fall under low or moderate priority categories, even though they have more available land for development. These areas typically have:

Lower population density

Minimal slum concentration

Relatively less pressure on infrastructure

However, despite these advantages, such areas are often less preferred for housing due to:

Distance from employment centers

Poor public transport connectivity

Lack of social and economic infrastructure

This explains why many affordable housing projects developed in peripheral locations face issues such as low occupancy rates and reduced beneficiary satisfaction.

5.6 Key Findings

The weighted overlay analysis and supporting spatial data reveal several important insights regarding the distribution of housing stress and the effectiveness of current housing strategies in Jabalpur. These findings highlight critical gaps between planning

approaches and actual ground realities.

1. Housing Stress is Highest in Central Wards, Not in Peripheral Areas

The analysis clearly indicates that the highest levels of housing stress are concentrated in central and inner-city wards, rather than in the outer or peripheral areas. These central zones are characterized by:

- Extremely high population density
- Limited availability of land
- Aging infrastructure
- High concentration of slum settlements

Despite poor living conditions, these areas continue to attract residents due to their proximity to employment opportunities and essential services. This creates a continuous cycle of congestion and overcrowding. On the other hand, peripheral areas, although having more available land and lower densities, exhibit comparatively lower housing stress. This finding challenges the common planning approach of focusing housing development on city outskirts.

2. Strong Correlation Between Slum Concentration and Overcrowding

A significant relationship is observed between slum population concentration and overcrowding levels. Wards with a high percentage of slum population also tend to have higher population densities and household congestion. This indicates that:

- Informal settlements are often located in already dense areas
- Limited land availability forces more people to occupy smaller spaces
- Infrastructure in such areas is under severe pressure

This correlation reinforces the idea that slum conditions are not only a socio-economic issue but also a spatial and density-related problem. Addressing one aspect without the other may not yield effective results.

3. Mismatch Between Housing Supply and Demand Patterns

The study highlights a major disconnect between the location of existing affordable housing projects and the actual demand patterns. Most housing schemes, particularly under AHP, are developed in peripheral areas where land is cheaper and more readily available. However, these locations are often far from:

- Employment centers
- Markets and commercial areas
- Educational and healthcare facilities

As a result, beneficiaries are reluctant to shift or continue living in these housing units due to increased travel costs and livelihood disruptions. This leads to issues such as:

- Low occupancy rates
- Vacant or locked housing units
- Reduced effectiveness of housing schemes

This finding clearly indicates that housing affordability is influenced more by location than by cost alone.

4. Need for In-Situ Redevelopment Instead of Relocation

The analysis strongly suggests that in-situ redevelopment and upgrading of existing settlements is more effective than relocating residents to distant peripheral areas. Since most high-stress zones are located in central wards with strong livelihood linkages, relocating residents disrupts their economic and social networks.

In-situ approaches offer several advantages:

- Retention of livelihood opportunities
- Reduced commuting costs
- Better utilization of existing infrastructure
- Improved social cohesion and community stability

Such interventions may include:

- Slum upgrading
- High-density affordable housing redevelopment
- Infrastructure improvement within existing settlements

This approach ensures that development is both inclusive and sustainable, addressing housing issues without displacing vulnerable populations.

5. Overall Interpretation

These findings collectively highlight that housing affordability is a multi-dimensional issue, influenced by location, density, livelihood, and infrastructure. The results emphasize the need to shift from a land-driven planning approach to a demand-driven and location-sensitive approach.

By aligning housing policies with actual spatial and socio-economic conditions, urban planners can ensure more effective and equitable housing solutions in Jabalpur.

5.7 Conclusion

The weighted overlay analysis carried out in this study provides a systematic, scientific, and data-driven framework for identifying priority areas requiring affordable housing interventions in Jabalpur. By integrating multiple socio-spatial parameters such as overcrowding, slum population, slum density, and household density, the analysis moves beyond conventional approaches and offers a more comprehensive understanding of housing stress across the city. The use of a composite suitability index ensures that decision-making is based on objective criteria rather than isolated observations, thereby improving the reliability and accuracy of planning outcomes.

The results of the analysis clearly indicate that housing stress is highly concentrated in central and inner-city wards, where population density, slum concentration, and infrastructure pressure are significantly higher. These areas, despite facing severe congestion and poor living conditions, continue to attract residents due to their proximity to employment centers, markets, and essential services. This highlights a critical insight that housing demand is strongly influenced by location and livelihood accessibility, rather than just the physical availability of housing units.

In contrast, the current trend of developing affordable housing projects in peripheral areas—primarily driven by the availability of cheaper land—does not align with the actual needs and preferences of beneficiaries. Such developments often lead to issues like increased commuting costs, livelihood disruption, and low occupancy rates. The findings therefore emphasize the need to shift the planning approach from peripheral expansion to central city interventions, where housing demand is highest and socio-economic linkages

are strongest.

Furthermore, the study underscores the importance of adopting in-situ redevelopment and upgrading strategies in high-priority areas. Instead of relocating residents to distant locations, improving existing settlements within the city can ensure better integration with livelihoods, reduce financial burdens, and enhance overall quality of life. This approach also promotes more efficient use of existing infrastructure and supports sustainable urban growth.

The application of the weighted overlay method also demonstrates its effectiveness as a planning tool. It allows for the integration of diverse datasets, facilitates spatial visualization through maps, and supports the classification of areas based on priority levels. Such an approach can be replicated in other cities facing similar housing challenges, making it a valuable contribution to urban planning practice.

In conclusion, the findings of this chapter highlight the need for a more integrated, location-sensitive, and people-centric approach to affordable housing planning. By aligning housing policies with spatial realities and socio-economic needs, planners can ensure more equitable distribution of resources, higher occupancy rates, and improved living conditions. Ultimately, the adoption of such data-driven strategies can significantly enhance the effectiveness, sustainability, and inclusiveness of housing policies in Jabalpur.

CHAPTER 6: PROPOSED MIXED-INCOME CROSS-SUBSIDIZED HOUSING MODEL

6.1 Introduction

This chapter presents a comprehensive and integrated housing proposal designed to address the key issues of affordability, accessibility, and livelihood disruption identified through the analysis in previous chapters. The findings clearly indicate that conventional affordable housing approaches—particularly those focused on peripheral development—have not been fully effective in meeting the needs of economically weaker sections due to poor location, lack of connectivity, and limited access to employment opportunities. In response to these challenges, this chapter proposes a Mixed-Income Cross-Subsidized Housing Model as a more sustainable and inclusive alternative.

The proposed model is based on the principle of financial cross-subsidization, wherein housing for Economically Weaker Sections (EWS) is supported through surplus revenue generated from the sale of housing units for Low Income Group (LIG), Middle Income Group (MIG), and High-Income Group (HIG) within the same development. By integrating different income groups within a single project, the model ensures that the cost burden on EWS beneficiaries is significantly reduced, thereby improving true affordability. At the same time, it enhances the financial viability of the project by leveraging market-driven demand for higher-income housing.

A key objective of this approach is to promote inclusive and sustainable urban development. Instead of segregating income groups into different locations, the model encourages social integration by creating mixed-income communities where residents have equitable access to infrastructure, services, and public spaces. This not only improves social cohesion but also enhances the overall quality of life for all residents.

Unlike conventional housing schemes that often relocate low-income populations to distant peripheral areas in search of cheaper land, this proposal emphasizes location-sensitive planning. It prioritizes sites that are well-connected to employment centers, commercial areas, and essential services such as schools, healthcare facilities, and public transport. This ensures that residents, particularly those from economically weaker sections, can maintain their livelihoods without incurring additional travel costs or time burdens.

Furthermore, the model directly addresses the issue of livelihood disruption, which has emerged as a major concern in existing housing projects. By situating housing within or near active economic zones and incorporating provisions for small-scale commercial activities and home-based work, the proposal supports income generation and economic stability for residents. This integrated approach recognizes that housing is not merely a physical structure but is closely linked to economic and social well-being.

The proposed model also aims to tackle the problem of low occupancy and vacant housing units, which has been observed in several affordable housing schemes. By aligning housing supply with actual demand patterns—particularly the preference for locations closer to city centers—the model enhances acceptance among beneficiaries and ensures better utilization of housing stock.

In addition, the proposal promotes efficient land use and optimized development patterns by utilizing available Floor Space Index (FSI) and adopting a compact, high-density yet livable urban form. This approach not only maximizes land efficiency but also supports the development of well-serviced, vibrant neighborhoods.

Overall, this chapter introduces a holistic, demand-responsive, and financially viable housing strategy that integrates affordability, location, livelihood, and inclusivity into a single planning framework. The Mixed-Income Cross-Subsidized Housing Model thus serves as a practical and scalable solution for addressing urban housing challenges in Jabalpur and similar cities.

6.2 Planning Concept and Approach

The proposed housing model is grounded in the principle of cross-subsidization, which serves as the financial backbone of the development. Under this approach, housing units for higher income groups—namely LIG, MIG, and HIG—are developed and sold at prevailing market rates. The surplus revenue generated from these units is then strategically utilized to offset the cost of housing for Economically Weaker Sections (EWS). This mechanism ensures that EWS housing can be provided at highly subsidized rates or even free of cost, without placing excessive financial burden on the government. At the same time, it maintains the economic viability and attractiveness of the project for private sector participation.

Beyond the financial structure, the planning concept is rooted in creating a balanced,

integrated, and inclusive urban environment. Unlike traditional models that segregate income groups spatially, this approach promotes the development of mixed-income communities, where residents from different socio-economic backgrounds live within the same neighborhood. Such integration not only reduces social inequality but also fosters a sense of community, improves access to shared amenities, and enhances overall urban inclusivity.

A key aspect of the planning approach is efficient land utilization. Given the limited availability of urban land, especially in central areas, the model adopts an optimized Floor Space Index (FSI) to achieve higher density without compromising livability. This allows for accommodating a larger population within a compact area while ensuring the provision of adequate open spaces, circulation networks, and essential services. The design follows a compact and cluster-based development pattern, which improves accessibility, encourages walkability, and reduces land wastage.

The model also emphasizes the integration of housing with physical and social infrastructure. Essential facilities such as schools, healthcare centers, parks, community spaces, and local commercial areas are incorporated within the development to create a self-sufficient neighborhood. This ensures that residents do not have to travel long distances to access basic services, thereby improving convenience and quality of life. Additionally, proper road networks and internal circulation systems are planned to enhance connectivity within the site and with the surrounding urban fabric.

Another critical component of the approach is location efficiency and accessibility. The proposal prioritizes sites that are well-connected to employment centers, markets, and public transport networks. By doing so, it significantly reduces the travel time and cost burden on residents, particularly those from low-income groups who are highly sensitive to transportation expenses. This directly addresses one of the major shortcomings identified in existing affordable housing projects, where peripheral locations lead to increased commuting costs and reduced occupancy.

Furthermore, the model acknowledges that affordability is not limited to the initial cost of housing but also includes indirect costs such as transportation, time spent commuting, and loss of livelihood opportunities. By integrating housing with employment zones and allowing for small-scale commercial activities within the development, the proposal supports livelihood generation and economic stability. Provision for home-based work and neighborhood-level economic activities further strengthens this integration.

Overall, the planning concept adopts a holistic approach, where financial feasibility, social inclusion, spatial efficiency, and economic sustainability are interlinked. It shifts the focus from merely providing housing units to creating livable, inclusive, and economically vibrant communities. This approach ensures that affordable housing is not only accessible but also sustainable in the long term, making it a more effective solution for addressing urban housing challenges in Jabalpur.

6.3 Land Use Distribution

The proposed development is planned over a 10-hectare site (100,000 sqm), with a carefully structured land use distribution that balances residential needs, infrastructure requirements, and community amenities. The allocation of land is designed to support the mixed-income housing concept while ensuring functional efficiency, social inclusivity, and overall livability of the neighborhood.

A significant portion of the land is allocated to residential use, distributed across different income groups to promote an integrated community structure. The largest share, 30% (30,000 sqm), is dedicated to EWS housing, reflecting the primary objective of the proposal—to address the housing needs of economically weaker sections. This higher allocation ensures that a substantial number of affordable housing units can be accommodated within the project, making the development socially responsive and inclusive.

The LIG housing component occupies 25% (25,000 sqm) of the total land area. This category acts as a transitional segment between EWS and middle-income housing, both socially and financially. It also plays an important role in the cross-subsidization model by contributing to revenue generation while still catering to relatively affordable housing demand.

The MIG housing is allocated 20% (20,000 sqm) of the site, providing housing options for middle-income households. This category helps maintain economic diversity within the development and contributes significantly to the financial viability of the project. Similarly, HIG housing accounts for 10% (10,000 sqm) of the land, targeting higher-income groups. Although it occupies a smaller portion of land, this segment generates maximum revenue due to higher market rates, thereby supporting the subsidy mechanism for EWS housing.

In addition to residential use, 10% (10,000 sqm) of the land is allocated for roads and circulation networks. This includes internal roads, pedestrian pathways, and access routes that ensure smooth connectivity within the site and link the development to the surrounding urban areas. A well-planned circulation system is essential for efficient movement, emergency access, and overall functionality of the neighborhood.

The remaining 5% (5,000 sqm) is reserved for amenities and community facilities, such as parks, open spaces, schools, and neighborhood-level commercial areas. These spaces are crucial for enhancing the quality of life, providing recreational opportunities, and supporting social interaction among residents. The inclusion of local shops and services also reduces the need for long-distance travel, making the development more self-sufficient.

Overall, the land use distribution reflects a balanced and integrated planning approach, where residential, infrastructural, and social components are harmoniously combined. It ensures that while a major share is dedicated to affordable housing, adequate provision is made for infrastructure and amenities, thereby creating a livable, inclusive, and sustainable urban environment.

6.4 Planning Standards and Assumptions

The proposed housing development is formulated based on a set of standard planning guidelines, technical norms, and prevailing market conditions to ensure that the project is both realistic and implementable. These standards provide a structured framework for determining unit sizes, construction costs, and financial feasibility, thereby enhancing the reliability and applicability of the proposal.

A key reference for the proposal is the PMAY-U (Pradhan Mantri Awas Yojana – Urban) guidelines, particularly for Economically Weaker Sections (EWS). As per these guidelines, the typical dwelling unit size for EWS housing is around 30 sqm of carpet area, which is considered adequate to accommodate the basic living requirements of a small family. The design of these units is based on minimum space standards while ensuring functionality, ventilation, and access to essential services. By aligning with PMAY-U norms, the proposal remains consistent with national housing policies and ensures eligibility for potential government support and approvals.

In terms of construction costing, the proposal relies on the CPWD (Central Public Works

Department) Plinth Area Rates for 2023–24, which provide standardized benchmarks for estimating building costs across different categories of construction. These rates are widely accepted in planning and engineering practices and include considerations for material costs, labor charges, and basic construction specifications. Using CPWD rates ensures that the cost estimation is grounded in officially recognized standards and reflects current market realities.

Additionally, the proposal incorporates market benchmarks from Tier-2 cities such as Indore, Bhopal, and Jabalpur, which have similar economic and urban characteristics. These benchmarks help in understanding local real estate trends, construction practices, and sale prices for different income categories. By considering these cities, the proposal ensures that both cost and revenue assumptions are aligned with regional conditions rather than relying on generalized national averages.

Based on these references, the average construction cost is assumed to be ₹18,000 per sqm, which falls within the typical range of ₹15,000–₹20,000 per sqm for standard residential development. This range accounts for variations in material quality, construction technology, and site conditions. The selected value represents a balanced estimate that ensures reasonable construction quality while maintaining financial feasibility.

The assumptions also consider that:

Construction will follow standard building materials and techniques suitable for mass housing

Infrastructure such as roads, drainage, and utilities will be developed as per urban planning norms

The development will achieve optimal density through appropriate FSI utilization

Costs are calculated at a macro level, excluding minor fluctuations due to inflation or site-specific variations

Overall, these planning standards and assumptions provide a robust foundation for the proposal, ensuring that it is technically sound, economically viable, and aligned with both policy frameworks and market conditions. This approach strengthens the credibility of the proposed model and enhances its potential for real-world implementation.

6.5 Built-Up Area and Development Parameters

The built-up area and development parameters for the proposed housing project are derived based on efficient land utilization and optimal density planning. The total site area of 10 hectares (100,000 sqm) forms the base for calculating the permissible built-up area using the Floor Space Index (FSI).

An FSI of 2.0 has been assumed for the project, which allows for a total built-up area that is twice the plot area. This results in a total permissible built-up area of 200,000 sqm. The chosen FSI reflects a balance between achieving higher density—necessary for accommodating a larger population—and maintaining adequate open spaces, circulation areas, and livability standards.

The distribution of built-up area among different income groups is strategically planned to support both social inclusion and financial sustainability. A larger share of built-up space is allocated to EWS housing to address affordability concerns, while sufficient area is reserved for LIG, MIG, and HIG housing to generate revenue and ensure project feasibility.

<u>Category</u>	<u>Built-up (sqm)</u>
<u>EWS</u>	<u>60,000</u>
<u>LIG</u>	<u>50,000</u>
<u>MIG</u>	<u>50,000</u>
<u>HIG</u>	<u>40,000</u>

Table no.6 Buildup distribution, Source- Secondary source

Interpretation of Distribution

The allocation ensures that EWS housing receives the highest share (30%), reflecting the primary objective of providing affordable housing to economically weaker sections. This higher allocation directly responds to the housing shortage identified in earlier chapters.

The LIG and MIG categories, each occupying 25% of the built-up area, serve a dual purpose. They not only cater to a broader segment of the population but also play a critical role in revenue generation, thereby supporting the cross-subsidy mechanism.

The HIG component, though occupying a smaller share (20%), is strategically significant as it generates the highest revenue per unit area due to higher market rates. This revenue is essential for subsidizing EWS housing and ensuring the financial sustainability of the project.

6.6 Cost of Construction

The total construction cost of the proposed housing development is estimated based on an average construction cost of ₹18,000 per sqm, as derived from CPWD standards and prevailing market conditions in Tier-2 cities. This rate includes the cost of structural construction, basic finishes, labor, and essential services, making it suitable for standard residential development across all income categories.

The cost calculation is carried out by multiplying the built-up area of each housing category with the unit construction cost (₹18,000/sqm). The resulting values are then converted into crores for ease of interpretation.

Category	Built-Up Area (sqm)	Cost per sqm (₹)	Total Cost (₹)	Cost (in Crore ₹)
EWS	60,000	18,000	1,080,000,000	108 Cr
LIG	50,000	18,000	900,000,000	90 Cr
MIG	50,000	18,000	900,000,000	90 Cr
HIG	40,000	18,000	720,000,000	72 Cr
Total	200,000	—	3,600,000,000	360 Cr

Table no.7 Cost of construction, Source- Secondary data

6.7 Revenue Generation and Cross-Subsidy Mechanism

The financial viability of the proposed housing model is ensured through a cross-subsidy mechanism, wherein revenue generated from the sale of LIG, MIG, and HIG housing units is utilized to subsidize the cost of EWS housing. This approach minimizes dependency on external funding and enables the project to function as a self-sustaining development model.

Revenue Generation from Sale of Units

The revenue is calculated based on the market sale rate per sqm and the built-up area allocated to each income category.

1. LIG Housing

Built-up Area = 50,000 sqm

Sale Rate = ₹30,000 per sqm

$$50,000 \times 30,000 = 1,500,000,000 \text{ ₹}$$

= ₹150 Crore

2. MIG Housing

Built-up Area = 50,000 sqm

Sale Rate = ₹45,000 per sqm

$$50,000 \times 45,000 = 2,250,000,000 \text{ ₹}$$

= ₹225 Crore

3. HIG Housing

Built-up Area = 40,000 sqm

Sale Rate = ₹60,000 per sqm

$$40,000 \times 60,000 = 2,400,000,000 \text{ ₹}$$

= ₹240 Crore

Total Revenue

$$150 + 225 + 240 = 615 \text{ Crore}$$

Thus, the total revenue generated = ₹615 Crore

Cost of Sellable Units

From Chapter 6.6, the construction cost of revenue-generating units is:

LIG = ₹90 Cr

MIG = ₹90 Cr

HIG = ₹72 Cr

$$Total = 90 + 90 + 72 = ₹252 \text{ Crore}$$

Profit Calculation

$$\begin{aligned} Profit &= TotalRevenue - CostofSellableUnits \\ &= 615 - 252 = ₹363 \text{ Crore} \end{aligned}$$

This surplus represents the net revenue available for cross-subsidy and profit.

Cross-Subsidy Allocation

EWS Construction Cost = ₹108 Crore

This entire cost is covered using the surplus generated from LIG, MIG, and HIG units.

$$RemainingProfit = 363 - 108 = ₹255 \text{ Crore}$$

Interpretation and Significance

The financial analysis clearly demonstrates that the proposed model is economically viable and sustainable:

The entire cost of EWS housing is fully subsidized without requiring direct financial contribution from beneficiaries

Even after subsidizing EWS housing, the project generates a significant surplus profit of ₹255 Crore

The model reduces dependence on government funding and promotes private sector participation

Higher-income groups effectively support affordable housing through market-driven pricing mechanisms

6.8 Spatial Planning and Layout Design

The spatial planning of the proposed housing development is based on the concept of a compact, integrated, and walkable neighborhood, aimed at creating a self-sufficient and inclusive urban environment. The layout is carefully designed to ensure optimal land utilization, efficient circulation, and equitable access to amenities for all income groups. The planning approach emphasizes not just the physical arrangement of buildings, but also the creation of a functional, socially cohesive, and economically active community.

1. Central Green Space and Recreational Park

At the core of the layout is a central green space, which acts as the primary open and recreational area for the entire development. This central park serves multiple functions:

Provides space for recreation, relaxation, and social interaction

Acts as a visual and environmental buffer, improving microclimate and air quality

Enhances the aesthetic quality and livability of the neighborhood

The central location ensures that the green space is equidistant and accessible to all residential clusters, encouraging community interaction and promoting a healthy lifestyle.

2. Cluster-Based Housing for Different Income Groups

The residential layout is organized into cluster-based housing blocks, where different income groups (EWS, LIG, MIG, HIG) are accommodated in a planned yet integrated manner. Instead of complete segregation, the design ensures:

Proximity between different income groups, promoting social inclusion

Efficient management of services and infrastructure within clusters

Creation of semi-private spaces such as courtyards and shared open areas

EWS and LIG housing are located closer to key amenities and transport access, while MIG

and HIG units are distributed to maintain overall balance and integration within the site.

3. Internal Road Network and Accessibility

A well-defined hierarchical road network is proposed to ensure smooth movement and connectivity throughout the site. This includes:

- Primary access roads connecting the site to the city

- Secondary roads linking different residential clusters

- Pedestrian pathways and walkways for safe and convenient movement

The layout prioritizes pedestrian-friendly design, reducing dependency on vehicles within the site. Adequate road widths, turning radii, and access points are planned to ensure efficient circulation, emergency access, and service delivery.

4. Provision of Social and Commercial Amenities

To create a self-sustaining neighborhood, the layout incorporates essential social and commercial infrastructure, including:

- Schools and educational facilities

- Healthcare centers

- Local retail shops and daily convenience stores

- Community centers and gathering spaces

These amenities are strategically located within walking distance of residential areas, ensuring that residents can access daily needs without long commutes. This reduces travel time, enhances convenience, and improves overall quality of life.

5. Mixed-Use Edges and Economic Activity

The edges of the site are designed as mixed-use zones, incorporating small-scale commercial activities such as shops, services, and workspaces. This serves multiple purposes:

- Supports local economic activity and livelihood generation

- Provides opportunities for home-based businesses and informal sector employment

- Activates street edges, improving safety and vibrancy

This integration of residential and commercial uses ensures that the development is not only a living space but also an economically active environment.

6. Walkability and Livability

A key principle of the layout design is walkability, ensuring that all essential services and facilities are accessible within a comfortable walking distance (typically 5–10 minutes).

This is achieved through:

Compact planning and optimal spacing of land uses

Continuous pedestrian pathways and shaded walkways

Strategic placement of amenities and open spaces

By reducing dependence on motorized transport, the design minimizes travel costs, reduces environmental impact, and promotes a healthier lifestyle.



Map no.13 Proposed model map, Source- Primary data

Conclusion

Overall, the spatial planning and layout design create a well-integrated, accessible, and inclusive neighborhood, where residential, social, and economic functions are seamlessly connected. The emphasis on central open spaces, mixed-income clusters, efficient circulation, and proximity to amenities ensures that the development is not only physically efficient but also socially vibrant and economically sustainable. This approach directly supports the objective of providing livable and affordable housing while enhancing the

overall urban experience for residents.

6.9 Advantages of the Proposed Model

The proposed Mixed-Income Cross-Subsidized Housing Model offers multiple advantages that address the shortcomings of conventional affordable housing approaches. By integrating financial, social, spatial, and economic dimensions, the model provides a holistic solution for sustainable urban housing development.

1. Financial Sustainability

One of the most significant advantages of the model is its ability to ensure financial self-sufficiency. Unlike traditional housing schemes that rely heavily on government subsidies and budgetary support, this model generates internal funding through the sale of LIG, MIG, and HIG housing units at market rates. The surplus revenue is effectively utilized to subsidize EWS housing, thereby reducing or eliminating the financial burden on economically weaker sections.

This approach:

Minimizes dependence on limited public funds

Encourages private sector participation by ensuring profitability

Enables scalable and replicable housing solutions without continuous government intervention

Improves project feasibility and faster implementation

Overall, the model creates a sustainable financial ecosystem where affordable housing is delivered without compromising economic viability.

2. Social Inclusion

The model promotes social equity and inclusiveness by integrating different income groups within a single development. Unlike conventional housing projects that often segregate EWS housing into isolated or peripheral locations, this approach ensures that all residents share the same neighborhood, infrastructure, and amenities.

This leads to:

Reduction in socio-economic segregation and spatial inequality

Equal access to facilities such as parks, schools, healthcare, and public spaces

Enhanced social interaction and community cohesion

Improved dignity and quality of life for lower-income groups

By creating mixed-income communities, the model fosters a more balanced and inclusive urban environment, aligning with the principles of equitable urban development.

3. Location Efficiency

The model emphasizes location-sensitive planning, prioritizing sites that are well-connected to employment centers, markets, and public transport networks. This ensures that housing is developed in areas where demand is highest, rather than in distant peripheral locations.

The benefits include:

Reduced travel time and commuting costs, especially for low-income households

Better access to jobs, education, and essential services

Increased attractiveness and acceptance of housing projects

Higher occupancy rates compared to peripheral developments

This approach directly addresses one of the major issues identified in existing housing schemes—the mismatch between housing location and livelihood opportunities.

4. Livelihood Integration

A key strength of the proposed model is its focus on integrating housing with livelihood opportunities. Recognizing that housing is closely linked to economic stability, the model ensures that residents remain connected to their sources of income.

This is achieved through:

Locating housing near existing employment hubs

Providing spaces for home-based work and small-scale businesses

Incorporating mixed-use areas and neighborhood-level commercial activities

Supporting informal sector employment, which is crucial for low-income groups

By maintaining livelihood linkages, the model prevents income loss and enhances the economic resilience of households. This not only improves affordability but also ensures long-term sustainability of the housing development.

Overall Significance

The combined advantages of financial sustainability, social inclusion, location efficiency, and livelihood integration make this model a comprehensive and practical solution to urban housing challenges. It moves beyond the traditional approach of merely providing housing units and instead focuses on creating livable, inclusive, and economically vibrant communities.

6.10 Implementation Strategy

For the successful execution of the proposed mixed-income cross-subsidized housing model, a well-defined and coordinated implementation strategy is essential. The effectiveness of the proposal depends not only on planning and design but also on institutional efficiency, policy support, and stakeholder participation. The following measures are recommended to ensure smooth and timely implementation:

1. Promotion of Public–Private Partnerships (PPP)

The involvement of the private sector is crucial for ensuring financial viability, efficiency, and innovation in project execution. The government should actively promote **Public–Private Partnership (PPP) models**, where:

The public sector provides land, policy support, and regulatory facilitation

The private sector undertakes construction, financing, and project management

PPP models help in:

Reducing the financial burden on government agencies

Accelerating project delivery through professional expertise

Enhancing quality and efficiency in construction

Different PPP structures such as **joint ventures, developer-led models, or viability gap funding (VGF)** can be adopted depending on project requirements.

2. Provision of Policy Incentives

To attract private developers and make the project financially attractive, suitable **policy incentives** should be provided. These may include:

FSI (Floor Space Index) incentives: Allowing higher FSI for projects that include a significant share of EWS housing

Tax rebates and exemptions: Reducing GST or providing tax benefits for affordable housing components

Subsidies and grants: Supporting infrastructure development and EWS housing construction

Relaxation in development norms: Simplifying regulations related to setbacks, parking, and density where appropriate

Such incentives improve project feasibility and encourage developers to participate in affordable housing initiatives.

3. Timely Approvals and Fund Disbursement

One of the major challenges in housing projects is delays in approvals and financial processes. To address this:

A **single-window clearance system** should be implemented to streamline approvals from multiple agencies

Approval timelines should be clearly defined and strictly followed

Funds, especially subsidies and institutional financing, should be **disbursed in a timely and phased manner**

Reducing bureaucratic delays ensures faster project execution and prevents cost escalation due to time overruns.

4. Strengthening Institutional Coordination

Effective implementation requires strong coordination among various stakeholders, including:

Urban local bodies (ULBs)

Town planning departments

Housing boards and development authorities

Financial institutions and private developers

A dedicated **nodal agency or project management unit (PMU)** should be established to:

Oversee project planning and execution

Facilitate communication between stakeholders

Resolve conflicts and administrative issues

Improved coordination ensures that all aspects of the project—planning, financing, and execution—are aligned and efficiently managed.

5. Monitoring, Evaluation, and Quality Control

Continuous monitoring is essential to ensure that the project meets its objectives in terms of quality, timelines, and affordability. This can be achieved through:

Regular site inspections and progress reviews

Use of **digital tools and GIS-based monitoring systems**

Third-party audits for quality assurance

Establishment of clear performance indicators and milestones

Strict monitoring helps in:

Maintaining construction quality and safety standards

Preventing delays and cost overruns

Ensuring accountability among stakeholders

6. Community Participation and Awareness

Involving beneficiaries and local communities in the planning and implementation process can significantly improve project outcomes. This includes:

Conducting awareness programs about housing schemes

Incorporating feedback from residents

Ensuring transparency in allotment and pricing

Community participation enhances acceptance, reduces resistance, and ensures that the project meets the actual needs of residents.

6.11 Conclusion

The proposed mixed-income cross-subsidized housing model presents a practical, financially viable, and socially inclusive solution to the housing challenges in Jabalpur. By integrating affordability with location, livelihood, and infrastructure, the model addresses the key shortcomings of existing housing schemes.

It shifts the focus from conventional peripheral housing development to a more integrated and demand-responsive approach, ensuring better utilization of resources and improved quality of life for residents. The model can serve as a replicable framework for other cities facing similar housing affordability challenges.

In addition, the proposal highlights the importance of adopting a holistic planning approach, where housing is not treated as an isolated component but as part of a larger urban system. By linking residential development with transport networks, employment opportunities, and social infrastructure, the model ensures long-term sustainability and functionality. This integrated perspective helps in reducing indirect costs for residents, such as commuting expenses and time, thereby making housing truly affordable in both economic and social terms.

Furthermore, the model demonstrates that inclusive urban development can be achieved without compromising financial feasibility. Through an effective cross-subsidy mechanism and strategic planning interventions, it is possible to balance the needs of different income groups while maintaining economic viability. The approach not only improves occupancy rates and user satisfaction but also contributes to creating vibrant, diverse, and resilient urban communities. As cities continue to grow, such innovative and adaptable models will be essential in addressing the evolving challenges of urban housing and ensuring equitable development.

CHAPTER7: SITE-SPECIFIC IMPLEMENTATION OF PROPOSED HOUSING MODEL

7.1 Introduction

This chapter presents the practical application and validation of the proposed Mixed-Income Cross-Subsidized Housing Model across selected wards in Jabalpur. While the previous chapters focused on analysis, identification of priority areas, and proposal formulation, this chapter translates those findings into site-specific implementation strategies. The aim is to demonstrate how the proposed model can be adapted to different urban contexts while ensuring both social inclusiveness and financial feasibility.

Based on the Weighted Overlay Analysis (Multi-Criteria Decision Analysis), all wards in Jabalpur were classified into high, moderate, and low priority categories depending on the severity of housing stress, overcrowding, and slum concentration. To test the applicability of the model across these varied conditions, three representative case study areas have been selected:

- High Priority Area – Chhota Fuhara, Ward 14 (Ghamapur): A dense inner-city slum area with extreme overcrowding and strong livelihood linkages
- Moderate Priority Area – Adhartal–Anand Nagar, Ward 12: A developing zone with moderate density and potential for planned densification
- Low Priority Area – Tilhari Fringe Basti, Ward 1: A peripheral area with low density, available land, and high potential for future development

These selected sites represent different urban typologies, ranging from congested core areas to emerging and fringe settlements. This allows for a comprehensive understanding of how planning interventions need to be context-specific rather than uniform.

The chapter focuses on comparing existing conditions with proposed redevelopment strategies, including changes in built-up area, density, infrastructure, and accessibility. It also evaluates the financial feasibility of each case through cost and revenue analysis, highlighting the role of cross-subsidy in supporting EWS housing.

Through these case studies, the chapter demonstrates that:

High-priority areas require in-situ redevelopment to retain livelihoods

Moderate-priority areas benefit from planned densification and infrastructure

improvement

Low-priority areas can function as financial support zones through large-scale development

Overall, this chapter establishes that the proposed housing model is not only theoretical but also practically implementable across different urban conditions, providing a scalable and adaptable solution for addressing housing affordability in Jabalpur.

7.2 High Priority Area: Chhota Fuhara (Ward 14 – Ghamapur)

Existing Conditions

- Chhota Fuhara is a core inner-city settlement characterized by:
- Extremely high density and overcrowding
- Irregular layout with over 80% plot coverage
- Narrow internal lanes with poor accessibility
- Strong proximity to employment, markets, and transport
- Limited open spaces and poor ventilation

The area supports livelihood activities such as vending, retail, and home-based work, making location a critical factor for residents.

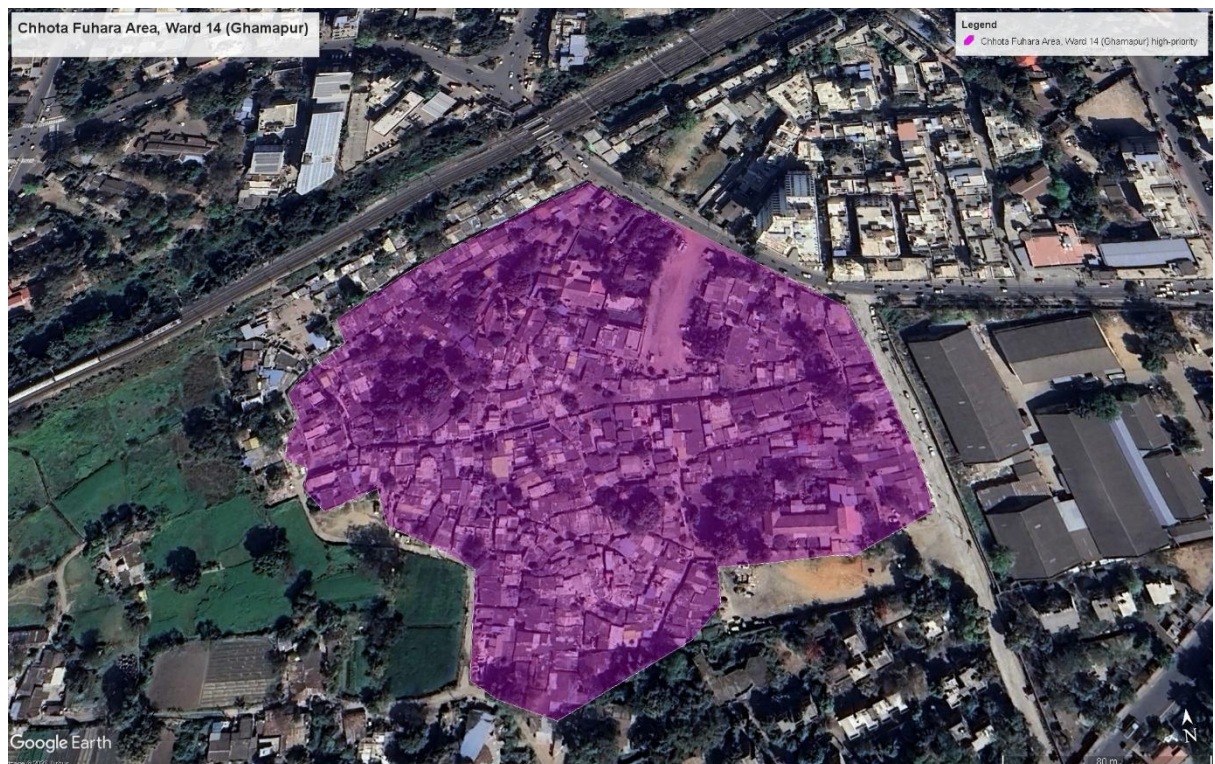
Planning Approach

- Given its central location and high density, the strategy focuses on in-situ redevelopment rather than relocation. The key interventions include:
- High-density redevelopment using FSI optimization
- Mixed-income housing integration
- Improved road network and circulation
- Provision of basic infrastructure and open spaces

Before and After Comparison

Parameter	Before	After (Proposed)
Site Area	2.2 ha	Same
No. of Units	900	1,450
Avg Unit Size	18–22 sqm	30 sqm + mix
Built-up Area	38,000 sqm	44,000 sqm
Density	410 du/ha	660 du/ha
Road Density	12 km/sq.km	20 km/sq.km

Table no.8 Before and after comparison of site, Source- Secondary data



Map no.14 Chhota Fuhara Area, Ward 14 (Ghamapur) high-priority
Source- Google earth pro

Financial Feasibility Calculation

Component	Value / Calculation	Result
Total Built-up Area	—	44,000 sqm
Construction Cost per sqm	—	₹18,000
Total Construction Cost	$44,000 \times 18,000$	₹79.2 Cr
Revenue (LIG)	—	₹33 Cr
Revenue (MIG)	—	₹39.6 Cr
Revenue (HIG)	—	₹39.6 Cr
Total Revenue	$33 + 39.6 + 39.6$	₹112 Cr
Profit	$112 - 79.2$	₹32.8 Cr

Table no.9 Financial Feasibility calculation, Source- Secondary data

- The project generates a total revenue of ₹112 Cr
- After deducting construction cost, a profit of ₹32.8 Cr is achieved
- This surplus can be used to subsidize EWS housing, making the project financially viable

7.3 Moderate Priority Area: Adhartal–Anand Nagar (Ward 12)

Existing Conditions

This area represents an emerging settlement with moderate density, featuring:

- Semi-structured layout with better road connectivity
- Moderate housing congestion
- Mixed livelihood activities
- Availability of some open spaces
- It acts as a transition zone between core and peripheral areas.

Planning Approach

- The strategy focuses on planned densification and infrastructure improvement:

Affordability of housing in tier 2 city (Study area Jabalpur)

- Increasing built-up area using FSI
- Strengthening internal road networks
- Introducing mixed-income housing
- Enhancing infrastructure and service delivery

Before and After Comparison

Parameter	Before	After (Proposed)
Site Area	3.8 ha	Same
No. of Units	650	1,150
Avg Unit Size	25–30 sqm	30–45 sqm
Built-up Area	32,000 sqm	76,000 sqm
Density	170 du/ha	300 du/ha
Road Density	14 km/sq.km	21.3 km/sq.km

Table no.10 Before and after comparison of site, Source- Secondary data



Map no.15 Adhartal – Anand Nagar Ward 12 (Moderate Priority), Source- Google earth pro

Financial Feasibility Calculation

Component	Value / Calculation	Result
Total Built-up Area	—	76,000 sqm
Construction Cost per sqm	—	₹18,000
Total Construction Cost	$76,000 \times 18,000$	₹136.8 Cr
Revenue (LIG)	—	₹57 Cr
Revenue (MIG)	—	₹68.4 Cr
Revenue (HIG)	—	₹68.4 Cr
Total Revenue	$57 + 68.4 + 68.4$	₹193.8 Cr
Profit	$193.8 - 136.8$	₹57 Cr

Table no.11 Financial Feasibility calculation, Source- Secondary data

- The project generates a total revenue of ₹193.8 Cr

- After deducting construction cost, a profit of ₹57 Cr is achieved
- This ensures financial viability while supporting cross-subsidy for EWS housing

7.4 Low Priority Area: Tilhari Fringe Basti (Ward 1)

Existing Conditions

- Tilhari represents a low-density peri-urban fringe area with:
- Dispersed settlement pattern
- Availability of vacant land
- Low housing stress and congestion
- Weak livelihood base and dependence on city

Planning Approach

- The strategy here focuses on future-oriented planned development:
- Large-scale housing development using available land
- Integration of mixed-income housing
- Infrastructure provision to support future growth
- Controlled densification to prevent sprawl

Before and After Comparison

Parameter	Before	After (Proposed)
Site Area	5.5 ha	Same
No. of Units	280	750
Avg Unit Size	35–45 sqm	30–60 sqm
Built-up Area	25,000 sqm	110,000 sqm
Density	50 du/ha	135 du/ha
Road Density	16 km/sq.km	22.5 km/sq.km

Table no.12 Before and after comparison of site, Source- Secondary data



Map no.16 Tilhari Fringe Basti Ward 1 (Low Priority), Source-Google earth pro

Financial Feasibility Calculation

Component	Value / Calculation	Result
Total Built-up Area	—	110,000 sqm
Construction Cost per sqm	—	₹18,000
Total Construction Cost	$110,000 \times 18,000$	₹198 Cr

Revenue (LIG)	—	₹100 Cr
Revenue (MIG)	—	₹119 Cr
Revenue (HIG)	—	₹119 Cr
Total Revenue	100 + 119 + 119	₹338 Cr
Profit	338 – 198	₹140 Cr

Table no.13 Financial Feasibility calculation, Source- Secondary data

- The project generates a total revenue of ₹338 Cr
- After deducting construction cost, a profit of ₹140 Cr is achieved
- This high surplus makes fringe areas key contributors for cross-subsidy in the overall model

7.5 Comparative Analysis of Implementation Strategies

The implementation of the proposed Mixed-Income Cross-Subsidized Housing Model varies significantly across different priority zones, as each category reflects distinct urban conditions, levels of housing stress, and development potential. The comparative analysis highlights how planning strategies must be tailored to suit the specific needs of high, moderate, and low priority areas, rather than adopting a uniform approach across the city.

1. High Priority Areas – In-Situ Redevelopment

High priority areas, such as Chhota Fuhara, are characterized by extreme overcrowding, high slum concentration, and strong livelihood linkages. These areas are typically located

in the central or inner-city zones, where residents depend heavily on proximity to employment, markets, and services.

The most appropriate strategy for such areas is in-situ redevelopment, which involves upgrading and reconstructing housing within the same location without displacing residents. This approach ensures:

Retention of existing livelihoods and social networks

Reduction in displacement-related socio-economic disruptions

Efficient utilization of scarce central urban land through high-density vertical development (FSI optimization)

The key focus in these areas is on:

Improving housing quality while maintaining density

Upgrading infrastructure such as roads, water supply, and sanitation

Introducing open spaces and better ventilation

Integrating mixed-income housing to ensure financial viability

This strategy is crucial because relocation to peripheral areas would increase travel costs and reduce income opportunities, ultimately leading to low occupancy and project failure.

2. Moderate Priority Areas – Planned Densification

Moderate priority areas, such as Adhartal–Anand Nagar, represent transition zones with medium levels of density and relatively better infrastructure compared to inner-city slums.

These areas have potential for controlled growth and redevelopment.

The preferred strategy here is planned densification, which involves increasing the built-up area and housing capacity in a structured and regulated manner. This approach allows:

Efficient use of available land without excessive congestion

Gradual improvement of infrastructure and services

Accommodation of future population growth

The key focus in moderate priority areas includes:

Strengthening road networks and internal connectivity

Enhancing basic infrastructure such as water supply, drainage, and waste management

Promoting mixed-income housing to maintain financial balance

Ensuring a balance between built-up area and open spaces

These areas act as buffer zones, where proper planning can prevent the emergence of high-density slums while supporting sustainable urban expansion.

3. Low Priority Areas – Greenfield Development

Low priority areas, such as Tilhari Fringe Basti, are located on the urban periphery and are characterized by low density, availability of vacant land, and minimal housing stress. These areas offer significant opportunities for future development.

The most suitable strategy for such zones is greenfield development, which involves planning and developing new residential areas on previously undeveloped land. This approach enables:

- Large-scale, well-planned housing development

- Provision of modern infrastructure from the initial stage

- Flexibility in layout design and land use planning

The key focus in low priority areas includes:

- Generating maximum revenue through higher-income housing segments

- Supporting cross-subsidy for EWS housing in high-priority areas

- Developing strong transport connectivity to integrate with the main city

- Preventing unplanned urban sprawl through controlled development

These areas function as the financial backbone of the model, as they generate surplus revenue that supports affordable housing in central areas.

7.6 Key Insights

The site-specific implementation of the proposed housing model across different priority zones provides several critical insights that are essential for effective urban planning and housing policy formulation. These insights highlight the importance of adopting a context-sensitive, integrated, and flexible approach rather than relying on uniform development strategies.

1. Different Strategies are Required for Different Priority Zones

The analysis clearly demonstrates that urban areas are heterogeneous in nature, with varying levels of density, infrastructure availability, and housing stress. As a result, a single planning approach cannot effectively address the needs of all areas. High-density core areas, transitional zones, and peripheral regions each require distinct planning

interventions based on their specific characteristics.

This insight emphasizes the need for:

Zone-specific planning frameworks

Flexible policies that adapt to local conditions

Prioritization of resources based on urgency and demand

Adopting differentiated strategies ensures more efficient use of land, infrastructure, and financial resources while improving overall planning outcomes.

2. Central Areas Require Redevelopment, Not Relocation

One of the most important findings is that central and inner-city areas, despite being highly congested, remain the most desirable locations for low-income groups due to their proximity to employment and services. Relocating residents from these areas to peripheral locations often leads to:

Increased commuting costs

Loss of livelihood opportunities

Social disintegration

Low occupancy of relocated housing units

Therefore, in-situ redevelopment emerges as the most suitable strategy for such areas. By improving housing conditions within the same location, it is possible to:

Retain economic linkages

Enhance living standards

Optimize land use through vertical development

This approach ensures that housing solutions are both socially acceptable and economically sustainable.

3. Moderate Areas Offer Optimal Balance of Density and Feasibility

Moderate priority areas serve as transition zones between highly congested cores and low-density peripheries, making them ideal for planned urban growth. These areas typically have:

Moderate density levels

Some existing infrastructure

Availability of land for expansion

Such conditions provide an opportunity for planned densification, where housing can be

developed in a structured manner without creating excessive congestion.

These areas offer:

Better feasibility for infrastructure improvement

Lower redevelopment complexity compared to core areas

Balanced conditions for implementing mixed-income housing

Thus, moderate zones act as strategic intervention areas where early planning can prevent future housing stress and support sustainable urban expansion.

4. Peripheral Areas Act as Financial Engines for Cross-Subsidy

Low priority or peripheral areas, although less critical in terms of housing stress, play a crucial role in the financial sustainability of the overall model. These areas typically have:

Lower land costs

Availability of large parcels of land

Potential for large-scale development

Such conditions make them suitable for greenfield development, where higher-income housing (LIG, MIG, HIG) can be developed and sold at market rates.

The key role of these areas includes:

Generating maximum revenue and surplus profit

Supporting the cross-subsidy mechanism for EWS housing in central areas

Facilitating planned urban expansion

Thus, peripheral zones function as the economic backbone of the model, enabling affordable housing delivery without excessive reliance on government funding.

5. Mixed-Income Model Works Effectively Across All Contexts

A major insight from the implementation is that the mixed-income cross-subsidized housing model is adaptable across different urban contexts. Whether applied in dense inner-city areas, moderate zones, or peripheral locations, the model demonstrates consistent effectiveness in balancing affordability and financial viability.

The benefits of this approach include:

Social integration by avoiding segregation of income groups

Financial sustainability through internal revenue generation

Improved occupancy rates due to better location planning

Flexibility in adapting to different spatial and economic conditions

This confirms that the model is not limited to a specific type of area but can be scaled and replicated across the city.

CHAPTER 8: CONCLUSION

8.1 Urban Context and Housing Scenario in Jabalpur

Jabalpur, as a rapidly growing Tier-2 city, represents the emerging urban challenges faced by medium-sized Indian cities undergoing demographic and spatial transformation. The city has experienced steady population growth, increasing from approximately 0.94 million in 2001 to 1.26 million in 2011, and is projected to grow further, intensifying the demand for affordable housing. A significant proportion of the workforce—nearly 45% engaged in informal employment—faces income instability and limited access to formal housing finance. Additionally, the presence of 80–85 slum settlements highlight the extent of housing inadequacy and intra-urban inequality within the city.

The spatial structure of Jabalpur is further constrained by large tracts of defense and institutional land, limiting the availability of centrally located land for housing development. As a result, most formal housing projects, particularly under government schemes, are pushed towards the urban periphery. These peripheral developments often lack adequate infrastructure, connectivity, and proximity to employment centers, leading to low occupancy and reduced effectiveness. This urban context establishes Jabalpur as a critical case for understanding the challenges of housing affordability in Tier-2 cities, where land availability, accessibility, and livelihood integration are deeply interconnected.

8.2 Nature of the Housing Affordability Challenge

The study reveals that the housing affordability crisis in Jabalpur is not driven solely by a shortage of housing units, but by a structural mismatch between housing supply and actual user needs. While policy initiatives such as PMAY-U have significantly increased housing production, they have not adequately addressed issues of location efficiency, accessibility, and socio-economic compatibility. This has resulted in a paradoxical situation where housing units exist, yet remain underutilized, while a large population continues to reside in informal settlements.

The analysis also highlights that affordability must be understood as a combination of direct and indirect costs, where transportation expenses, access to infrastructure, and livelihood opportunities play a critical role. In this context, housing located far from economic centers becomes functionally unaffordable, even if it is financially subsidized.

Therefore, the challenge lies not only in providing housing but in ensuring that housing is accessible, usable, and integrated within the urban system.

8.3 Integrated Approach and Key Findings

This study comprehensively examined the issue of housing affordability in Tier-2 cities, with a specific focus on Jabalpur, by integrating spatial analysis, field-based observations, policy evaluation, and financial modelling. The findings clearly establish that housing affordability is not merely a function of housing cost but a complex interaction of location, accessibility, income levels, infrastructure availability, and livelihood linkages. The research demonstrates that despite significant efforts under government initiatives such as PMAY-U, a substantial gap persists between housing provision and actual accessibility for economically weaker and lower-income groups.

A critical insight emerging from the study is the “location inefficiency” of existing affordable housing models, particularly the Affordable Housing in Partnership (AHP) approach. While these projects have contributed to increasing housing supply, their peripheral locations have resulted in unintended consequences such as increased commuting costs, livelihood disruption, and low occupancy rates. In contrast, the Beneficiary-Led Construction (BLC) model has shown higher effectiveness due to its demand-driven nature, incremental flexibility, and retention of social and economic networks.

The spatial analysis using Weighted Overlay (MCDA) further reinforces that housing stress is concentrated in central and inner-city wards, where overcrowding, slum concentration, and density pressures are significantly high. However, most formal housing developments are located on the urban periphery, highlighting a fundamental mismatch between housing demand and supply locations. This disconnect underscores the importance of integrating spatial planning with housing policy to ensure that affordability is evaluated in terms of both cost and location efficiency.

The proposed Mixed-Income Cross-Subsidized Housing Model addresses these limitations by combining financial viability with social inclusiveness. The model demonstrates that it is possible to fully subsidize EWS housing through internal revenue generation from LIG, MIG, and HIG segments, thereby reducing dependence on external subsidies. More importantly, the model emphasizes in-situ redevelopment, mixed-income integration, and proximity to livelihoods, ensuring that housing solutions are both

economically viable and socially sustainable.

The site-level implementation across high, moderate, and low priority wards further validates the adaptability of the model. It highlights that different urban contexts require differentiated planning strategies—ranging from in-situ redevelopment in dense core areas to planned densification and greenfield development in peripheral zones. At the same time, the financial analysis confirms that cross-subsidy mechanisms can generate sufficient surplus to support affordable housing while maintaining profitability.

8.4 Final Conclusion

In conclusion, the research establishes that housing affordability is not just about building houses—it is about building accessible, inclusive, and sustainable urban environments. The proposed mixed-income cross-subsidized model offers a practical pathway to achieve this goal by aligning economic feasibility with social equity. If implemented effectively, this approach has the potential to transform not only Jabalpur but also other Tier-2 cities facing similar challenges, contributing towards the broader vision of equitable and inclusive urban development in India.

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