CHAPTER 88

Integrating Transit-Oriented Development and Land Pooling Mechanism: A Review of Urban Planning Strategies for Indian Cities

Priyanka Bendigiri[1] and Avi Gandhi[2]

ABSTRACT

Urbanization in India has triggered rapid and unplanned growth causing conflicts in land usages and transportation networks, leading to lack of integrated planning. This paper explores concepts of Transit-Oreinted-Development (TOD) and land pooling and readjustment tools such as Town Planning Schemes (TPS) to address these issues. Through a review of literature and case studies, the study explores how they can help to improve existing urban planning practices in Indian Cities. While TOD is a concept how urban areas can grow around transit hubs, land pooling and readjustments gives a pragmatic approach of how can TOD be implemented and contextualized in different areas. However, fiscal constraints remain a concern, where Land Value Capture Mechanisms (LVC) help to capture incremental values in land to fund public infrastructure projects. This Paper highlights the need for integrated planning, the role of fiscal tools, and the challenges in current urban practices. It also points out gaps in implementation of TOD and TPS and suggests how integration of both can enhance revenue through LVC mechanism. Ultimately the study calls for more innovative planning approaches to address the challenges of rapid urbaniztaion.

Keywords: Urbanization; Transit-oriented development; T. P. scheme; Land value capture; Fiscal tools; Integrated planning.

1.0 Introduction

Rapid Urbanization is a global trend, particularly in developing countries like India, where cities are sprawling at unprecedent rate (Padam & Singh, 2004; Kehinde,2019). According to Census 2011, about 31.16% of India is urbanized and the number of million cities has increased from 35 in 2001 to 53 in 2011, underscoring how urban centers emerge as engines of economic growth (Hoselitz, 1953; Smith & Lobo, 2019; Parnreiter, 2022). However, this rapid expansion has strained infrastructure, resources and services, leading to unsustainable development (Cohen, 2006; Wang, 2020).

[1]*Corresponding author; School of Real Estate and Facilities Management, NICMAR University, Pune, Maharashtra, India (E-mail: pbendigiri@nicmar.ac.in)*
[2]*School of Architecture and Planning, NICMAR University, Pune, Maharashtra, India*

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Cities face challenges such as environmental degradation, rising greenhouse gas emissions, and social inequalities leading to unplanned and haphazard growth (Chancel, 2020; Sverdrup, 2019). Transportation sector is particularly one of the vulnerable sectors to growing urban pressure (Indian Institute of Human Settlements, 2015). Urban Sprawl, characterized by low density, unplanned development (Bhatia, 2024), has increased travel demand and trip lengths, with the national average trip length in India is currently 7.7 km (MoveInSync, 2023). Moreover, there are 246 vehicles per 1000 people in urban areas as of 2020, indicate growing dependency on private vehicles (Shangliao, 2020).

This trend is expected to increase, with daily trips projected to increase to 4816 lakhs by 2031 (Ministry of Urban Development, 2007). Public transport infrastructure, however, has limited contribution to modal split due to poor planning, limited capacity, utility degradation, overcrowding and funding constraints, resulting in overwhelming traffic volume on roads, potentially exceeding the road capacity leading to congestion and increased travel times (Pucher *et al.*, 2004; Wilkinson *et al.*, 2023). As a result of the above, overall livability of cities has been impacted. In response to these challenges, Transit-Oriented Development (TOD) has emerged as a key urban tool for integrated land use and transportation planning, aligning sustainable development goals sustainable cities and communities (SDG 11); industry, innovation and infrastructure (SDG 9); and climate action (SDG 13) (Ibraeva *et al.*, 2020). However, successful implementation of TOD requires suitable developmental and fiscal measures to address funding issues and equitable distribution of benefits, such as land value capture (Chan *et al.*, 2015; Wang & Xia, 2024). With improved infrastructure in any area, the influx of people increases, subsequently increases the demand and values of land. These increased values can be realized through land value capture mechanisms (Dittmar & Ohland, 2012; Tang,2017; Alterman,2017).

2.0 Objectives of the Review

The main aim of this review paper is to analyse Town Planning Schemes (TPS) as land based fiscal tool and demonstrate their growing adoption in India through Case Studies.

3.0 Thematic Analysis

3.1 Transit Oriented Development (TOD)

TOD is a methodology to combine land use planning and transportation planning to deliver urban spaces that are sustainable, compact and accessible (Suzuki *et al.*, 2013). Based on matrices of density, diversity and desing (Curtis *et al.*, 2009). TOD emphasizes hugher density using FSI near transit hubs for efficient land use, thereby reducing urban sprawl and increasing mode share of public transit networks. The general framework includes 1.) Identifying the main urban growth centers. 2.) Connection of the growth centers with a transit network. 3.) Identifying Action Plans to implement TOD and 4.) Encouraging Public-Private- Parntership for

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easy implementation and financial assistance (Bertolini & Spit, 2005). Subsequently, following results in enhanced mobility, liveability, and sustainability in urban areas (Li *et al.*, 2009; Yen *et al.*, 2024).

3.2 Land, land use and spatial planning

The Land is a finite source, strategic land use planning ensures sustanabiltiy (Hailu *et al.*, 2019). Efficient planning focuses on dimensions of economic growth, employement, and equitable resource allocation, but also works to combat social dislocation (Harvey & Jowsey, 2019). Furthermore, spatial planning is essential to ensure disaste resilience through regulating growth patterns (Lourenco *et al.*,2020). However urban expansion has caused land degradation, sprawl and gentrification (Assennato *et al.*, 2022)

3.3 Floor Space Index (FSI)

FSI controls the allowable building density on a land parcel and therefore whether a city develops horizontally or vertically depends on development and control regulations (Deshpande *et al.*, 2015). Higher Density enables vertical development and optimized land use (Suzuki *et al.*, 2015). Conversely, it will also increase real estate prices, leading to affordability challenges (Suzuki *et al.*, 2015).

3.4 Activities

Land Use guides urban activities, impacting accessibility and functionality and influencing travel patterns (Yildrim & Akin, 2023). Zoning rules prevent conflicts while promoting economic synergies (Applleya & Akin, 2023). Mapping activites where people spend their time can be usefull in assessing if land use is productive while taking into account community demographics and public space designs to optimise social interactions, safety, and comfort (Francis *et al.*, 2012; Browing & Jackson, 2019).

3.5 Demography, social inequality and housing & property

Urbaniztion increases the competition for land, raising prices, and resulting in displacement and gentrification (Wang *et al.*, 2024). Increasing property values disproportionately impact low-income populations, resulting in social isolation (Chen *et al.*, 2023). Provisions for affordable housing and equitable zoning are needed (Turbay *et al.*, 2024).

3.6 Accessibility, transit ridership, mobility and transit

The Value of land is directly impacted by its proximity to transit hubs, as defined by the concept of accessibility (Ministry of Housing and Urban Affairs, GOI, 2017). A working mobility system in any city improves connectivity to the transit network and therefore, accessibility (Josephine *et al.*, 2021). However, the volume of transit ridership will be dependent on the diversity of uses within the vicinity of transit hubs, which guarantees the activity is

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feasible (Sharma *et al.*, 2022). Hence, this gives rise to increased coordinated planning to meet future needs (UNEP, n.d.).

3.7 Environmental and sustainability issues

Urban Proliferation strains the existing infrastructure systems, exerting pressure on resources leading to pollution, climate change and deforestation (Uttara *et al.*, 2012). Sustainable practices, such as Transferable Devlopement Rights (TDR), secure ecologically sensitive areas while allowing growth in different locations. Vertical development with energy efficient design systems is needed of the hour.

4.0 Land Value Capture

Land Value capture mechanisms are strategic developmental and fiscal tools used by the public sector to leverage the incremental value generated in land due to public investments in infrastructure projects or policy interventions (Lozano *et al.*, 2013; Suzuki *et al.*, 2015). In the context of urbanization, as cities sprawl and get densified, the demand of efficient and sustainable infrastructure increases, necessitating mechanisms to finance these infrastructure projects while reducing reliance on traditional taxation or borrowing systems (Peterson, 2009).

These mechanisms also ensure that benefits arising from development are equitably distributed among all the stakeholders (Suzuki *et al.*, 2015). Overall, land markets are also stabilized by reduced speculations due to externalities (Suzuki *et al.*, 2015). Land Value Capture mechanisms can be broadly classified into developmental tools and fiscal tools. Developmental Tools are predominately urban planning instruments that help to shape physical and spatial aspects through planned integration. It is a public participatory approach engaging multiple stakeholders such as land owners, developers, and planning authorities.

Key development tools include -1) Land Pooling and Readjustment: This mechanism involves pooling small and fragmented land parcels for well-planned development, enabling efficient delivery of public utilities. Landowners receive developed , higher-valued land, ensuring fair compensation, while a portion of land is retained for public use (Phatak, 2013 ; Suzuki *et al.*, 2015).2) Transfer of Development Rights (TDR): TDR helps balance land use and support redevelopment by allowing development rights to be transferred from one parcel to another within designated area, ensuring controlled growth and better land management (Walters, 2013; Suzuki *et al.*, 2015). 3) Land Acquisition and Development: Government acquires land at the existing rates, develops it, and then sells or leases at an appreciated value, financing urban expansion (Lozano *et al.*, 2013; Peterson, 2009). 4) Land Use Changes: Modifying land use, such as converting agricultural land to residential or commercial use, increases the development potential and taxe revenue (Phatak, 2013; Munshi, 2020). 5) Premium FSI: Developers can purchase additional Floor Space Index (FSI) beyond the base limit by paying a premium fee.

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This increases revenue, densifies areas, reduces urban sprawl, and promotes sustainable development (Phatak, 2013; Suzuki *et al.*, 2015). Fiscal Tools are mechanisms that increase revenue streams of urban local bodies. Fiscal tools primarily involve betterment levies, development charges, increased stamp duty and property taxes or incentives to promote development.1) Betterment Levies: Land Value appreciation from public investments, without private contribution, is monetised to ensure equitable distribution and align returns with public sector intiatoves (Walters, 2013; Suzuki *et al.*, 2015). 2) Development Charges: Levied on developers to cover infrastructure upgrade costs based on market values (Medda, 2012; Phatak, 2013). 3) Land Value Tax/Incremental Contribution: A recurring tax on unimproved value of land, ensuring the public sector captures a share of land value appreciation over time (Peterson, 2009; Walters, 2013).4) Vacant Land Tax: Encourages development on underutilized land, discouraging speculation and promoting public use (Phatak, 2013; Suzuki *et al.*, 2015). 5) Tax Incremental Financing: Increases property taxes, generating revenue that can be reinvested in infrastructure (Huston & Lahbash, 2018).

5.0 T.P. Schemes

TPS is an urban planning mechanism where land is pooled from landowners at market rates, and readjusted to provide public amenities, and then the reconstituted plots are returned back with appreciated land value (Larsson, 1997; Ballaney, 2008; CRDF & CUPP, 2012). During this procees the government takes away approximately 40% of the land and gives back the remaining (Home, 2007; Banglawala & Pandyhya,2012; CRDF & CUPP, 2012). Typically, the government retains about 40% of land for public use, while landowners receive the remaining 60% (Home, 2007; Mathur, 2013; CRDF & CUPP, 2012).

Figure 1: TPS Preparation Process in Gujarat

Source: Compiled by authors

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Table 1: Historical Timeline of Town Planning Legislation and Practices

Year	Event
1896	Establishment of the Bombay Improvement Trust for land acquisition, slum clearance, and road widening in the Dadar-Matunga-Wadala-Sion area.
1915	Bombay Town Planning Act established by Arthur Edward Miram, introducing a public participatory approach, land pooling, and fair benefit distribution.
1949	Formation of the Bombay Provincial Municipal Corporation, leading to the establishment of the Bombay Municipal Corporation for urban development.
1954	Revision of the Bombay Town Planning Act, introducing a two-stage planning process (Development Plan and T.P. Scheme).
1960	Bombay split into Maharashtra and Gujarat, and both states passed their respective Town Planning Acts (Maharashtra Regional and Town Planning Act in 1966 and Gujarat Town Planning and Urban Development Act in 1976).
1980	T.P. Schemes fell out of use in Maharashtra due to time constraints, complex governance issues, and lack of public support.
1976	Gujarat Town Planning and Urban Development Act introduced, dividing the town planning process into three stages (Draft, Preliminary, Final).
1990	Urban Development Authority of Ahmedabad (AUDA) revived T.P. Schemes after failure to acquire land for the ring road project. Key changes included faster land possession and readjustment of land for market sale, making T.P. schemes more financially viable.

Source: Compiled By authors

5.1 Town planning valuation

As stated by Deuskar (2011), CRDF and CUPP (2012), and Mittal (2014), land valuation in TPS is made using three matrices: Original Plot Value (OPV), Semi-Final Plot Value (SPV), and Final Plot Value (FPV). OPV is evaluated using ready reckoner rates or the most recdent sale deed amount, adjusted by inflation. SPV indicates the developing time frame represented and is usually equal to OPV unless the land is relocated. The FPV indicates the value of land that is fully developed using Ready Reckoner rates, or close to the same cost of the most recent sale deed with inflation applied. The difference between OPV and SPV is the compensation paid to landowners. Difference between FPV and SPV is the incremental contribution, and the government collects 50% of it as betterment charges.

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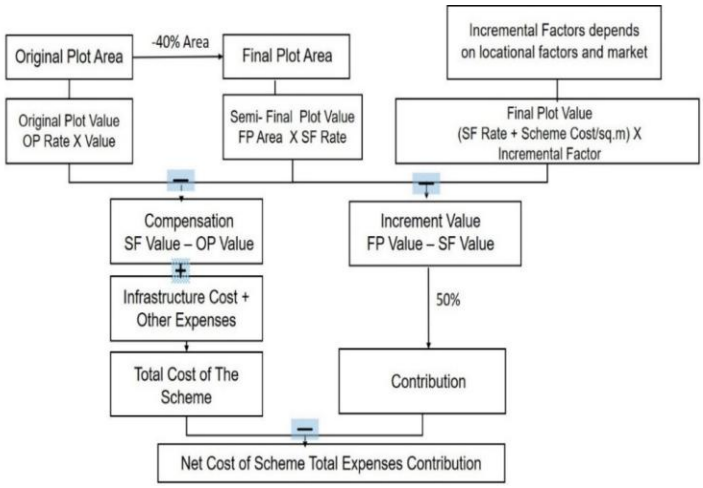
Figure 2: Valuation, Cost and Finance for TPS Implementation



Source: Compiled by authors

5.2 CASES

5.2.1 Amravati

The land pooling scheme, in Nelapadu village, was a significant urban planning intitative. A total of 1300.92 acres belonging to 981 landowners were pooled, and a TOD based planning is being implemented. Higher density plots were allocated near the transit corridors, while 267.75 acres of the area were residential, and 65.03 acres commercial. The Layout, therefore, consisted of plan layout and zoning in a clustered community style with institutional zones along the edges of the settlement. Landowners' preferences, vastu compliance, and access and connectivity were all taken into considertation. The final plots were allocated by an online lottery that was publicaly available to ensure transparency. It is one of the best urban planning practices for the development of greenfield cities in India.

5.2.2 Pune – Holkarwadi

Pune, a culturally vibrant and educational city in the state of Maharshtra, is developing prominently as an IT hub resulting in unplanned development, traffic congestion, and over utilization and stress on existing infrastructure system. In response, six TPS are proposed of around 1000 hectares of land by Pune Metropolitan Region Development Authority. Out of the 6 Holkarwadi has been chosen for the case study, which was reclassified from agricultural zone to urban area under MRTP act along with all urban utility services. The base FSI is set to 2.5, with a maximum of 4.0 for Authority Plots to incentivise development. This case study highlights how effective implementation of T.P. Scheme can address urban sprawl (PMRDA, n.d.).

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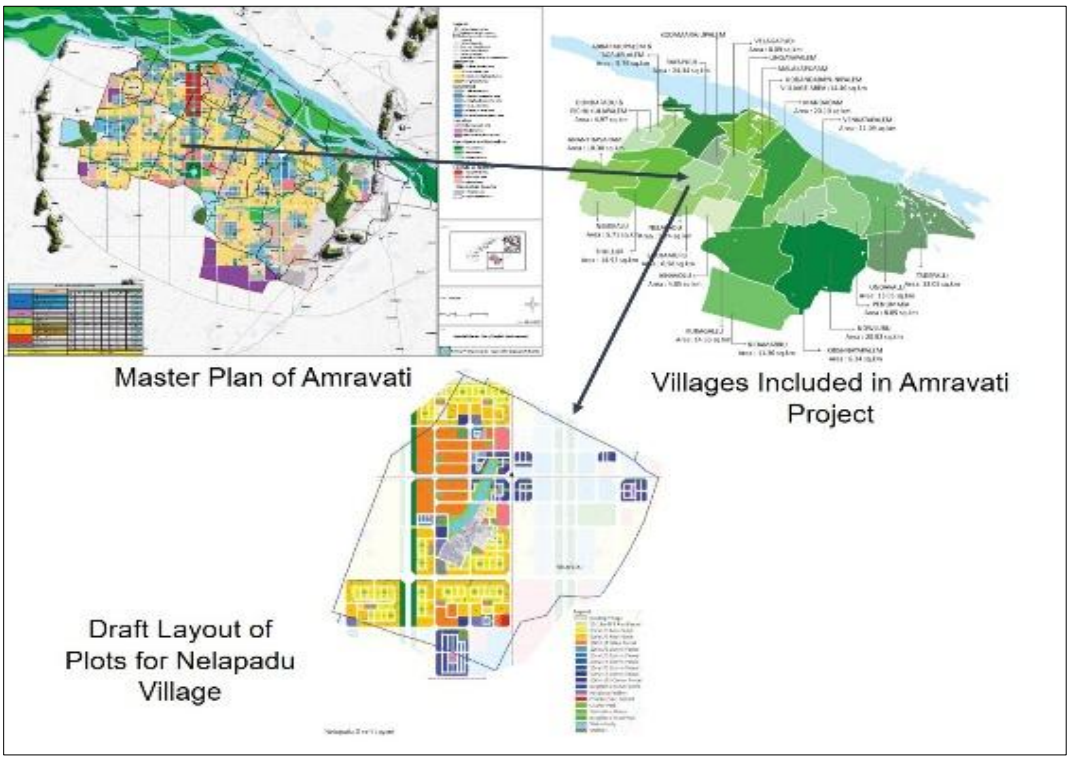
Table 2: Redistribution and Valuation Statement also Called F-Form in Gujarat

		A	B	C	D	E	F	G	H	I	J
	Different Scenario for Land Deductions	Original Plot Value (Rs./sq.m.)	Original Plot Size (sq.m.)	Total Original Plot Value (Rs.)	Final Land Value (Rs./sq.m.)	Final Plot Size (sq.m.)	Total Original Plot Value (Rs.)	Increase in The Value of Property (Rs.)	Betterment Charges to be paid (Rs.)	Benefit To the owner (Rs.)	Betterment Charges (Rs./sq.m)
		Original Plot			**Final Plot**			**Betterment Charges Calculation**			
	i	**A**	**B**	**A X B**	**D**	**B – (i X B)**	**E X D**	**F - C**	**(F - C)/2**	**G - H**	**I/E**
Scenario 1	50%	4500	10000	45000000	10000	5000	50000000	5000000	2500000	2500000	500
Scenario 2	40%	4500	10000	45000000	10000	6000	60000000	15000000	7500000	7500000	1250
Scenario 3	20%	4500	10000	45000000	10000	8000	80000000	35000000	17500000	17500000	2187.5

Figure 3: Master Plan of Amravati and TPS Draft Layout of Nellapadu Village



Source: Compiled by authors

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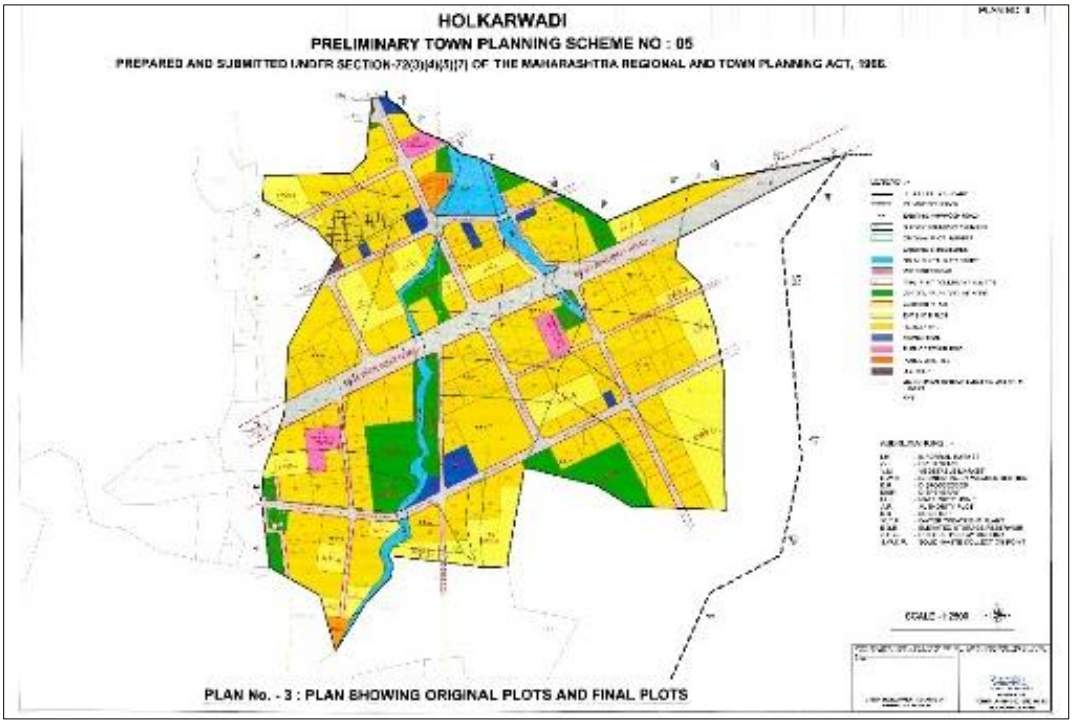
Figure 4: TPS Layout of Hokalarwadi (TPS - 05)



Source: PMRDA Website

5.2.3 BHUJ

The earthquake in 2001 had a devastating impact on Bhuj city of Gujarat, particularly in Walled City. According to Balachandran (2017) and Byahut & Mittal (2017), the major reason for lar scale destruction was because of poor urban planning, and a lack of disaster-resilient infrastructure. A disaster management agency was later set up along with urban authorities which intiated redevelopement and proper governance framework using Development Plan and TPS, which focussed on land pooling and readjustment along with changes in development and control regulations, seismeic safety, infrastructure upgrades across all surveyed land plots. The financial assistance was given by Asian Deveelopemnt Bank and technical assistance was given by Enviornment Planninng Committee.

6.0 Conclusion

Rapid Urbanization of Indian cities have significantly increased the demand of land which is eventually leading to unplanned haphazard urban growth leading to traffic congestion, land use conflicts, inadequate infrastructure, resource depletion and subsequently causing social

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inequality and segregation. This declines the economic productivity and quality of life for residents. In order to achieve sustainable growth, it is essential to ensure land use planning and transportation planning systems are in place and well-integrated with each other. While TOD has emerged as an urban planning tool to contextualize loacal area plans with prime focus on transit stations, TP schemes have emerged as land pooling and redadjustment strategy aimed to regulate development and use of land, particularly to develop new greenfield cities and peri-urban areas of existing cities. Integrating both TOD and TP scheme helps to ensure urban growth is sustainable with optimized land use, improved connectivity and accessibility, increased property valuation, equiltable development and fostering holistic urban planning.

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