



**Institute of Town Planners, India**

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**SUMO 2020**

International Conference on  
**SUSTAINABLE URBAN MOBILITY:**  
Opportunities and Challenges in Developing Countries

Organized By  
**ITPI, West Bengal Regional Chapter**

**01-03 October, 2021**

Supported By



**Ministry of Housing & Urban Affairs,  
Government of India**

**Urban Development & Municipal Affairs Department,  
Government of West Bengal**

**Transport Department, Government of West Bengal**



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## **FOREWORD**

The Sustainable Development Goal 11, envisages to 'make cities and human settlements inclusive, safe, resilient and sustainable, and is one of the 17 Sustainable Development Goals adopted by the United Nations General Assembly in 2015. The seven outcome targets of SDG 11, include safe and affordable housing; affordable and sustainable transport system; inclusive and sustainable urbanization; protection of the worlds cultural and natural heritage; reduction of the adverse effects of natural disasters; reduction of the environmental impacts of cities; and to provide access to safe and inclusive green and public spaces. The three means of implementation of 7 outcome targets include strong national and regional development planning, implementing policies for inclusion, resource efficiency, disaster risk reduction, and supporting the least developed countries in sustainable, and resilient building. India being the signatory is committed to achieve these Goals by 2030. Thus, affordable and sustainable transport system is one of the 7 outcome targets of SDGs.

In India Development Plans or Master Plans are prepared by Local Bodies or Development Authorities under various statutes through Town and Country Planning Departments or in house, however, now a days the trends are emerging to get it prepared through the consultants. All the aspects like housing, traffic and transportation, environment and heritage protection, public spaces like parks, play grounds, etc., in addition to provision of physical and social infrastructure are assimilated in Development Plans or Master Plan. Thus, it needs no emphasis to mention that the seven outcome targets of SDG 11 which includes affordable and sustainable transport system are also Master Plan or Development Plan are take into consideration.

Recently the discussions on sustainable mobility are gaining momentum, which also aims at providing mobility not only to the people but also to goods in cities and their surroundings for better quality of life, which is affordable, safe, and sustainable and helps to improve air quality and reduces greenhouse gas emission.

In line with above facts, the West Bengal Regional Chapter, one of the most active Regional Chapter of ITPI, has chosen the theme focusing on 'Sustainable Urban Mobility (SUMO 2020)', to be organized on physical mode during 2020, but due to COVID 19 pandemic, it was required to be postponed, and after waiting for almost one year with the hope that the situation will be favorable to conduct this international conference on physical mode, ultimately decided to conduct the same online. The conference aims to bring the experts, academicians and researchers both domestic and overseas, together on the same platform to provide opportunities to share the innovations taking place in the laboratory with the industry and masses.

In this direction, the initiatives taken by the West Bengal Regional Chapter of ITPI under the Chairmanship of Dr. Biman Bandyopadhyay are noteworthy and also the efforts of Organizing Committee, SUMO 2020 under the stewardship of Shri Dipankar Sinha, the Chairman of Organizing Committee deserves to be acknowledged.

**Prof. Dr. D. S. Meshram**  
President, ITPI



# Knowledge Partners

Department of Architecture  
and Regional Planning  
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## International Conference, SUMo 2020 Sub Themes

**Monorail - LRT - MRT - BRT - and Integration of Multimodal Transport  
Safety and Accessibility**

**Innovation in Data Analytic, ITES, Shared and Personalized Transport**

**E Mobility and Non Motorized Transport and Alternate mode of Transport**

**Mobility and Accessibility and Transit Oriented Development**

**Land Use, Urban Morphology and Transportation**

**Energy, Environment and Economic Issues of Mobility**

**Comprehensive City Mobility Plan**



## **PREAMBLE**

The Institute of Town Planners, India established in 1951, is the apex body of professional town and country planners in the country with 24 Regional Chapters located mostly in the state capitals including West Bengal Regional Chapter, one of the most active and dynamic Regional Chapter. The Institute of Town Planners India has been persistently endeavouring to promote dynamic, inclusive and integrated town planning practice, education, research and institutional mechanism for vibrant, sustainable and resilient spatio - economic development of towns, cities and regions for the last seven decades. While, the West Bengal Regional Chapter (WBRC) of the ITPI is continuously engaged in series of research and planning activities on Sustainable Urban and Regional Development, through various state level and national level symposiums for last three decades.

While the entire world is emerged in fighting against the COVID 19 pandemic, during 2020-2022 every component of human civilization got affected, the health system and economy were challenged head-on; education system; transportation and governance; had gone through serious dilemmas, WBRC held the torch of intellectual exercises towards better and sustainable future in the post - COVID world by several online interactions. Some of the significant brainstorming sessions were on 'Role of Physical Planning in Achieving Sustainable Development Goals'; 'Integration of Special Zones, Heritage Areas and Precincts in Development Plan: Challenges and Opportunities'; 'Changing Land Use of Kolkata Port: Impact on the City'; 'COVID 19: Perspectives and Urban Policy Prescriptions'; 'Draft Delhi Master Plan 2041'; 'Is Rural-Urban Continuum approach needed for holistic development of the cities and villages of West Bengal in post COVID situation?'; and 'Urbanization Policy of West Bengal in post COVID situation'.

Responding to the Sustainable Development Goals (SDGs) set by the United Nations for ensuring balanced urbanization of the regions through sustainable urban mobility options, the West Bengal Regional Chapter of the Institute of Town Planners, India was prepared to organize an International Conference on 10-12 April 2020, but was deferred indefinitely due to the outbreak of COVID 19 pandemic. After awaiting 18 months, the chapter could manage to organize the International Conference on hybrid mode on 1st, 2nd, and 3rd October, 2021.

It is however encouraging to mention that the West Bengal Regional Chapter could manage to create an absorbing uninterrupted sessions of online interactions (14 hours; 3 days) amongst the experts and young professionals from different corners of the globe and came up with recommendations for sustainable urban mobility. The scholars had submitted their papers intending to present at the conference. After a peer-review, 29 papers were selected and the authors were invited to present the same in different sessions in the program. Nineteen papers, were presented in 8 technical sessions according to the schedule for three days. The juries headed by the chairman of each technical session selected the best papers. Apart from the presenters, there were 22 invited speakers in these sessions who were achievers in their fields especially in transportation planning, town and regional planning. There had been over 100 online attendees throughout the online conference each day.

**Dr. Biman Bandopadhyay,  
Chairman, ITPI WBRC**



## International Conference, SUMo 2020 Technical Committee

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## **THEME NOTE**

A sustainable transport system provides mobility and accessibility to the commuters with an inclusive approach, where sustainability includes the three essential dimensions - economic, social and environmental in a balanced and integrated manner. The potential of Mass Transit Systems (MRTS) along with the Light Rail Transit (LRT) and Monorail integrated with the other modes is widely acknowledged as the essential components for the sustainable multi-modal transportation system. In India, Monorail is already operational in Mumbai, and several other cities are actively exploring the possibilities of LRT and Monorail for their city mobility.

Kolkata city, the metro-core of the Kolkata Metropolitan Area, has grown along a linear north-south corridor, sandwiched between the river on the west and wetland on the east. The Kolkata Port, established in 1865, was one of the major impetuses to such growth. The introduction of suburban rail networks in north-south direction during 1860s further accentuated this longitudinal growth. International and regional connectivity has caused huge influx of population into the area since 1930s, and the trend continued post-independence period. At present, the metropolitan area houses 15.79 million population within an area of about 1,878 sq km. The Kolkata city is visited by more than a million commuters daily, over and above its resident population of about 4.5 million. The tramways, commenced in 1873, continued to support inner-city mobility till date though with a very limited capacity. Despite the metro-rail operations, this is one of the busiest cities with the densest habitation affecting the inner-city transport.

For the last few decades, the city witnessed several transportation infrastructure projects, such as the North-South Metro Rail, Eastern Metropolitan Bypass, a few flyovers and bridges, including the two major bridges over River Ganga, namely Vidyasagar Setu (Second Hooghly Bridge) and Sister Nivedita Setu. Monorails and LRT systems were present in the Traffic and Transportation Master Plan for the metropolis prepared in 2006. At present, about four MRTS projects are in the execution stage, and a few more in the pipeline. The World Bank is supporting three transportation system projects in this region. The Jal Marg Vikas Project (Waterway Development Project) from Kolkata to Varanasi through the River Ganga has commenced. A Comprehensive Mobility Plan for the Kolkata Metropolitan Area has been initiated. The Implementation Plan for Electrification of Public Transportation in Kolkata is also under preparation and a few Electric Public Vehicles are already plying in the city and more are to be procured. A network of Battery Charging Stations is being implemented to make the initiative successful.

With this background, the West Bengal Regional Chapter (WBRC) of the ITPI contemplated a conference on all relevant issues of sustainable mobility, with a key session on the opportunities and challenges with monorails and LRT systems. It is to be organized under the aegis of the Urban Development Department and the Transport Department of the Government of West Bengal, who are keen to see the outcome of the SUMo 2020 for their future initiatives. Different government departments, academic institutions, researchers and experts expressed their desire to participate in the conference. Manufactures and designers of Monorail and LRT systems are also invited to present their observations, state of the art technological systems and to support the program.

However, with all these preparations, the COVID 19 pandemic shattered the lives of the people, including the world of academicians, and researchers. Physical meetings were still uncertain. Considering the ground reality, the ITPI-WBRC had to postpone SUMo 2020 and to reschedule it now during 1 - 3 October, 2023 on virtual platform.

Since, the experts say that the present worldwide pandemic will also impact the future transportation systems, a necessity was felt to evolve the so-called new normalcy in transportation system in the post pandemic world.

**Dipankar Sinha,**  
**Organizing Chairman, SUMo 2020**



## SUMo 2020 ORGANIZING COMMITTEE

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Urban and Regional Planner,  
Kolkata Municipal Corporation (KMC)





## SUMo 2020 PROGRAM

<b>1st October 2021, Friday</b>	
<b>INAUGURAL SESSION (4:00 pm to 5:15 pm)</b>	
<b>Presided By</b>	<b>Prof. Dr. D. S. Meshram, President, ITPI</b>
Welcome address	<b>Shri Pradeep Kapoor, Secretary General, ITPI</b>
Introduction to the Conference	<b>Shri Aurobindo Debnath, Secretary, Organizing Committee, SUMo 2020</b>
Chairman, Organizing Committee	<b>Shri Dipankar Sinha, Chairman, Organizing Committee, SUMo 2020</b>
Chapter Chairman WBRC	<b>Dr. Biman Bandyopadhyay, Chairman, ITPI WBRC</b>
Chief Guest	<b>Prof. G. Raghuram, Former Director, IIMB</b>
Presidential Address	<b>Prof. Dr. D. S. Meshram, President, ITPI</b>
Vote of Thanks	<b>Dr. Soumyendu Biswas, Secretary, ITPI WBRC</b>
Anchored By	<b>Prof. Joy Sen, IIT, Kharagpur</b>
<b>TECHNICAL SESSION I (5:30 pm to 7:00 pm)</b>	
<b>Conducted by SPA, Delhi</b>	
<b>Sub-theme: Monorail - LRT - MRT - BRT - and Integration of Multimodal Transport</b>	
<b>Chairman</b>	<b>Prof. Sewa Ram, SPA Delhi</b>
Key Speaker	<b>Prof. Manoranjan Parida, IIT, Roorkee</b>
Key Speaker	<b>Prof. Shivanand Swamy, CEPT, Ahmedabad</b>
Key Speaker	<b>Shri Alok Tripathi, NHRCL</b>
Paper Presentation	<b>Payel Roy, and Sudeep K. Roy</b>
Paper Presentation	<b>Ar. Suman Mandal, Ar. Abhiroop Das, and Dr. Sanjib Nag</b>
Paper Presentation	<b>Dr. PK Sarkar, and Arko Kanungo</b>
Rapporteur	<b>Dr. Sourav Sen, and KMDA, Kolkata</b>
<b>TECHNICAL SESSION II (7:00 pm to 8:15 pm)</b>	
<b>Conducted with the Help of Partner Organizations</b>	
<b>Sub-theme: Safety and Accessibility</b>	
<b>Chairman</b>	<b>Dr. Shubhamoy Gangopadhyay, CSIR CTRI, New Delhi</b>
Moderator	<b>Dr. Subrata Paul, IEST, Shibpur</b>
Key Speaker	<b>Prof. Sewa Ram, SPA Delhi</b>
Key Speaker	<b>Prof. Sudip Kumar Roy, IEST, Shibpur</b>
Paper Presentation	<b>Shuktika Sabharwal, and Dr. Rutul Joshi</b>
Paper Presentation	<b>Rituparna Das, and Dr. Ankhi Banerjee</b>
Rapporteur	<b>Dr. Soumen Mitra, IEST Shibpur</b>
<b>2nd October 2021, Saturday</b>	
<b>TECHNICAL SESSION III (4:00 pm to 5:15 pm)</b>	
<b>Conducted by RCGSIDM, IIT, Kharagpur</b>	
<b>Sub-theme: Innovation in Data Analytics, ITES, Shared and Personalized Transport</b>	
<b>Chairman</b>	<b>Prof Ashoke Sarkar, BITS, Pilani</b>
Moderator	<b>Dr. Arkopal Goswami; and Dr. Ankhi Banerjee, IIT Kharagpur</b>
Key Speaker	<b>Prof. Durga Toshniwal, CTRANS, IIT Roorkee</b>
Key Speaker	<b>Dr. Charisma F. Choudhury, University of LEEDS</b>
Paper Presentation	<b>Rashmi Choudhary, J. K. Nayak, and Prof. Manoranjan Parida</b>
Paper Presentation	<b>Manaswinee Kar, Shubhajit Sadhukhan, and Prof. Manoranjan Parida</b>
Paper Presentation	<b>Preety Saini, and Somnath Bhui</b>
<b>TECHNICAL SESSION IV (5:15 pm to 6:45 pm)</b>	
<b>Conducted by CEPT University, Ahmadabad</b>	
<b>Sub-theme: E Mobility and Non Motorized Transport and Alternate Mode of Transport</b>	
<b>Chairman</b>	<b>Prof. Shivanand Swamy, CEPT University</b>
Moderator	<b>Dr. Rajesh J. Pandya, Surat Municipal Corporation</b>
Key Speaker	<b>Ms. Aditi Mitra Ghosh, Radicl Action</b>
Paper Presentation	<b>Dr. Dakshayini R. Patil, and Dr. Mamatha P Raj</b>
Paper Presentation	<b>Anjali Saraswat, and Dr. Satish Pipralia</b>
Paper Presentation	<b>Pranoy Mondal, and Dr. Soumen Mitra</b>
<b>TECHNICAL SESSION V (7:00 pm to 8:15pm)</b>	
<b>Conducted by National Institute of Urban Affairs, New Delhi</b>	
<b>Sub-theme: Mobility and Accessibility and Transit Oriented Development</b>	



<b>Chairman</b>	<b>Shri Hitesh Vaidya</b> , Director, NIUA, New Delhi (Absent)
Moderator	<b>Ms. Sarika Chakravarty</b> , NIUA, New Delhi
Panelist	<b>Shri Laghu Parashar</b> , NIUA, New Delhi
Panelist	<b>Miss Kanika Kalra</b> , NIUA, New Delhi
Panelist	<b>Dr. Ravi Gadepalli</b> , NIUA, New Delhi
Paper Presentation	<b>Tazyeen Alam, and Dr. Ankhi Banerjee</b>
Paper Presentation	<b>Gaurav Verma, and Jignesh Mehta</b>
Paper Presentation	<b>Abhinanda Chatterjee, and Dr. Subrata Paul</b>
Paper Presentation	<b>Ankita Bakshi, Dr. Jayita Guha Niyogi, and Dr. Arup Guha Niyogi</b>
<b>3rd October 2021, Sunday</b>	
<b>TECHNICAL SESSION VI (4:00 pm to 5:15 pm)</b>	
<b>Conducted by the Partner organizations</b>	
<b>Sub-theme: Land use, Urban Morphology and Transportation</b>	
<b>Chairperson</b>	<b>Prof. Sanjukta Bhaduri</b> , SPA, Delhi
Moderator	<b>Dr. Debashis Das</b> , Jadavpur University
Key Speaker	<b>Prof. Mahalaya Chatterjee</b> , Calcutta University
Key Speaker	<b>Dr. Debapratim Pandit</b> , IIT, Kharagpur
Key Speaker	<b>Ms. Uma Adusumili</b> , Former Chief, Planning Division, MMRDA
Paper Presentation	<b>M. Manasa, and Arulmalar Ramaraj</b>
Paper Presentation	<b>Nimish Laddha, and Prof. Prasanth Vardhan</b>
Paper Presentation	<b>Nunna Tagore Sai Priya, and Ankhi Banerjee</b>
Paper Presentation	<b>Purba Biswas, and Shambhavi Vishwakarma</b>
<b>TECHNICAL SESSION VII (5:30 pm to 6:45 pm)</b>	
<b>Conducted by MANIT, Bhopal</b>	
<b>Sub-theme: Energy, Environment and Economic Issues of Mobility</b>	
<b>Chairman</b>	<b>Prof. Manmohan Kapshe</b> , MANIT, Bhopal
Moderator	<b>Prof. Rahul Tiwari</b> , MANIT, Bhopal
Key Speaker	<b>Dr. Amit Garg</b> , IIM Ahmedabad
Key Speaker	<b>Dr. Ajay Singh Nagpure</b> , WRI India
Jury Member	<b>Amit Bhatt</b> , Exe. Director, Integrated Urban Transport, WRI
Jury Member	<b>Dr. Kshama Puntambekar</b> , Associate Professor, SPA, Bhopal
Jury Member	<b>Dr. Anuj Jaiswal</b> , Assistant Professor, MNIT, Bhopal
Paper Presentation	<b>Dr. Neeru Bansal, Dr. R. Parthasarathy, and Akila.S</b>
Paper Presentation	<b>Ranjana kumari, Arkopal K. Goswami, and Ankhi Banerjee</b>
Paper Presentation	<b>Mithila Rele, Dr. Arindam Biswas, and Prof. Dipl-ing Irene Lohaus</b>
Paper Presentation	<b>Aparna Das, Prabodh Bajpai, and Prof. Saswat Bandyopadhyay</b>
Rapporteur	<b>Dr. Mayank Dubey</b> , SPA, Bhopal
<b>TECHNICAL SESSION VIII (7:00 pm to 8:15pm)</b>	
<b>Conducted by CTRANS, IIT, Roorkee</b>	
<b>Sub-theme: Comprehensive City Mobility Plan</b>	
<b>Chairman</b>	<b>Prof. Manoranjan Parida</b> , IIT Roorkee
Moderator	<b>Dr. Uttam Kumar Roy</b> , IIT Roorkee
Rapporteur	<b>Prof. Subhajit Sadhukhan</b> , IIT, Roorkee
Jury Member	<b>Prof. E Rajwashekhar</b> , IIT, Roorkee
Key Speaker	<b>Prof. Durga Toshniwal</b> , IIT Roorkee
Key Speaker	<b>Shri B. M Setty</b> , LEA Associates South Asia Pvt. Ltd
Key Speaker	<b>Shri R. Srinivas</b> , TCPO, India
Paper Presentation	<b>Rahul Ganguly, and Eshanpreet Kaur Khalsa</b>
Paper Presentation	<b>Sayantani Saha, and Shivashish Bose</b>
Paper Presentation	<b>Aditya Manish Pitale, Subhajit Sadhukhan, and Manoranjan Parida</b>
Paper Presentation	<b>J Ravi Kiran, Ekta, and Sandeep Budde</b>
<b>VALEDICTORY SESSION (8:15 pm to 9:00 pm)</b>	
Welcome Address	<b>Dr. Soumyendu Biswas</b> , Secretary, ITPI WBRC
Address by Chairman, WBRC	<b>Dr. Biman Bandyopadhyay</b> , Chairman, ITPI-WBRC
Chairman Organizing Committee	<b>Shri Dipankar Sinha</b> , Chairman, Organizing Committee
Presidential Address	<b>Dr. D. S. Meshram</b> , President ITPI
Vote of Thanks	<b>Shri Pradeep Kapoor</b> , Secretary General, ITPI



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## Improving Land Value Capture Mechanism for Developing TOD Areas - A Case of Delhi

Gaurav Verma, and Jignesh Mehta



### Abstract

The Urban Development Authorities and ULB's in Delhi are highly dependent upon own tax or fee-based revenues as the main source of their revenue generation. Limited capacity and revenues generated, force the ULB's to continuously look for new sources of funds.

The predicament situation raises the possible solutions to make ULB's capable of generating sustainable revenues for making the sustainable infrastructure development in areas of Delhi. However, TOD areas in Delhi are facing the biggest challenges in continuous flow of required resources for implementation and operation.

This research paper formulates a sustainable model for developing infrastructure investments followed by DBVC strategy under PPP land pooling. A model that allows the authorities and Municipal Corporations to capture value by provision of robust infrastructure around the TOD zones. The expected Delhi's land pooling policy implications make land pooling an emerged way to address these issues rationally.

**Keywords:** Development Based Value Capture (DBVC), Land Pooling, Land Value Capture, Revenue, Sustainable Infrastructure, Transit-Oriented Development (TOD), Urban Local Bodies

### 1.0 INTRODUCTION

Land is considered as the most basic asset for revenue generation by authorities and urban local bodies and intervention in infrastructure appreciates the property value in and around the area. A city can capture rising land values: owning land or taxing it. In many developing cities, the government does not own much land and large-scale acquisition is a political impossibility (Paul Collier, July 2018). Urban Local bodies can utilize the value addition by providing infrastructure, and in turn, can capture its value partly or wholly. Property development at the station nodes and development of air space are some ways to capture land value to finance the transit-supportive infrastructure.

In 2013, the Ministry of Urban Development carried out a study on 'land-based fiscal tools and practices for generating additional financial resources for urban local bodies. The need for agglomerating the resources for infrastructure investments under the smart city mission was keenly felt by the ministry. Thus, the ministry of Urban Development and Government of India had prepared a "value capture policy framework" in 2017 to finance the infrastructure for urban local bodies. In the prepared policy framework, it was mentioned that as per the Mckinsey report, approximately Rs. 325,000 CR of Urban infrastructure investment is required annually. Simultaneously, the Metro Rail Policy 2017 request the state government to adopt this policy to fund the infrastructure projects (MoHUA, 2017). The concept of Land Value Capture is gaining significance as governments across the world are looking for sustainable modes for financing infrastructure projects. The basic principle behind Land Value Capture is that legitimately created value belongs to its creator. Thus, applying the aforesaid principle, if

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there is a rise in the value of immovable properties due to infrastructure investment by the government, the government has the right to capture this increased value.

With undergoing massive urban expansion, the requirement of government investment in infrastructure development is rising steadily. The projects like construction of new airports, metro rails, and expansion of road networks will result in the escalation of land prices in the vicinity of these projects. At present, private developers make use of the benefits of land value increment. The urban local bodies in India are yet to capture this rise in land value (Das, 2016)

Gujarat is seen to be extremely pro-active to provide urban, land services and trunk infrastructure under a successful model of land pooling mechanism for a self-sustaining financial tool for the provision of infrastructure. Since its inception in AUDA Development Plan 2021, under GTPUDA Act, land pooling is getting wider acceptance as a tool to improve the existing peri-urban areas of Indian cities. After the division of Andhra Pradesh into the states Telangana and Andhra Pradesh, the state has opted for the land pooling mechanism over land acquisition for its new capital Amravati. Also with MoHUA's recent initiative for expanding this tool on Delhi, it has received nationwide recognition.

On September 7, 2018, the Delhi Development Authority (DDA) approved the long-awaited Delhi Land Pooling (DLP) policy and Delhi's land pooling policy has received approval from the housing ministry. The new system will replace the existing policy of government land acquisition which deals with high compensation, and became increasingly unpopular because the compensation pay-outs were deemed uncompetitive (DDA, 2016). The land pooling has a strong potential for unlocking the private investments for infrastructure in land pooling zones in Delhi. Robust development based value capture strategies need to be formulated as a self-financing model for developing infrastructure that can overcome these pitfalls.

## **2.0 STUDY OF CONCEPTUALIZATION**

### **2.1 Overview of financing alternatives for Urban Development in the Region**

For exploring the development based value capture strategies as a self-financing model for developing sustainable infrastructure in TOD areas in land pooling zones for Delhi; there is a need to understand value capture strategies first. To capture value, there is a need to create value first by providing infrastructure in TOD areas. As ULB's need funds for development, they depend upon State and Central grants to a significant extent. The development in the TOD area requires infrastructure for which land acquisition is required which of course adds additional cost to it. There is a need to liberate from the burden of land acquisition cost. Land pooling could be a better alternative because it is not only cheaper but also generates higher revenue as compared to land acquisition. A generous amount of capital is required to develop infrastructure and amenities around the TOD areas and thus arises the need to calculate the expenditure cost for sites. To cover the cost of expenditure and generate revenues, value capture tools must be worked out extensively for developing sustainable infrastructure investments in Delhi's Land Pooling zones. Although Delhi has numerous value capture tools based on taxes and fee charges yet none of them achieves the goal of the development of the TOD area.

It is in light of this current context that land pooling under the PPP model or private investment has emerged in India as a viable and popular alternative to direct land acquisition, with States amending laws to allow for this mechanism to be implemented. This working paper will conclude that land monetization would be the purest form for unlocking the private investment for sustainable infrastructure in TOD areas in land pooling zones of Delhi. The next section will provide an understanding of development based value capture strategies for Delhi. Also, assessing the need for an alternative to the current land development approach in Delhi which identifies appropriate DBVC tools for sustainable infrastructure development in TOD areas of Delhi's Land Pooling zones.



### 2.2 Framework of Assessment

The research focuses on formulating a self-financing sustainable model for developing infrastructure around TOD areas in Delhi’s land pooling zones under PPP and articulates the contexts through which development based value capture mechanism can contribute to developing infrastructure around TOD areas and complementary land use of the surroundings. Identifying a model that allows the authorities and Municipal Corporations to capture value from the increase in land and property prices by the provision of infrastructure around the TOD influence area which makes it a sustainable development investment. The research synthesizes transit’s impact on property values, financial instruments, and supportive legislation related to land value capture.

The methodology follows an understanding of the need for development based value capture strategies for Delhi, with the need for an alternative to the current land development approach in Delhi. Also, it focuses on Land pooling as a value capture tool to finance sustainable infrastructure investment for Delhi. With the concluding new framework of simplified DBVC Strategies and recommendations for sustainable development investments in land pooling zones of Delhi. The expected policy implications make land pooling an emerged way as a PPP model to finance and developed the sustainable infrastructure in TOD influence areas of Delhi.

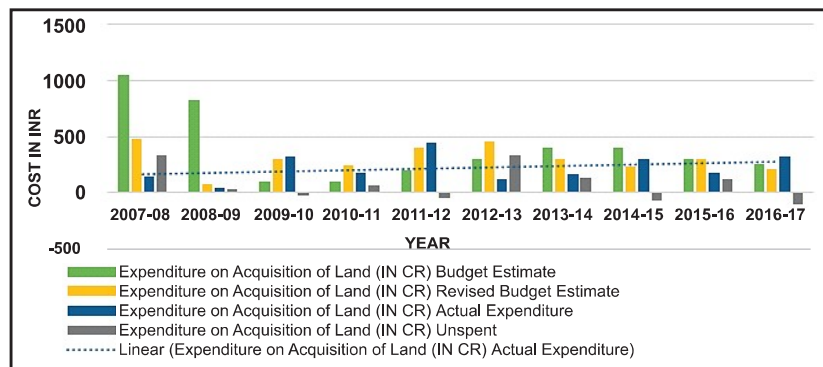
### 3.0 IDENTIFY AND DESIGNING THE INSTRUMENTS - ASSIMILATION OF ANALYSIS

#### 3.1 Assessing the Need for an Alternative to the Current Land Development Approach in Delhi

The need for an alternative of current land development (Land acquisition to land pooling) in Delhi requires the forecast population which is expected to add another 6 million people by 2021. This increase in population would push the demand for infrastructure and housing. Between 1961-1981, the total proposed acquired land in Delhi was 27,487 hectares out of which only 15,540 hectares were actually acquired. During 1982-1992, 6,763 hectares of land were acquired and during 1992-2000 another 2,744 hectares land was acquired. The pace of acquisition was far short of the requirement. The annual acquisition during 1981- 2001 was 475 hectares as compared to the planned requirement which is 1200 hectares. Land acquired during 2002-2011 was even smaller then what it was during 1981-2001. Thus there is a need to assemble more land to build housing for the forecast and expanding the population of Delhi.

Landowners are generally reluctant to sell off their lands because of conflict of interests. Thus, for such development projects, the consent of landowners is skipped and the intention

Fig. 1: Expenditure on Acquisition of Land



Source: Author

of acquiring the land is not disclosed or defined. Whereas if the audit report of the Ministry of Housing and Urban affair is reviewed it could be seen that in the acquisition of land, the expenditure of Rs. 84.98 CR was incurred for the construction of just 100 meter road and the lackadaisical approach of DDA resulted in Rs. 8.86 CR INR as damage charges from landowners; Rs.



25.69 CR on account of excess payment of compensation to the landowners. Thus, there is a need for an alternative of land acquisition in Delhi.

### 3.2 Land Pooling as a Cheaper Alternative

As per the table 1, the expenditure for developing raw infrastructure in the Town Planning Schemes of Ahmedabad it usually lies between Rs. 1,000-1,200 per square meter. Taking the example of TPS of Prahalad Nagar, Ahmedabad, the whole development of TPS has been done within INR 161 CR investment for 162 hectares of land which means nearly INR Rs. 1,000 per hectare including the construction of Bituminous road, providing electricity street lighting, providing and laying of appropriate size drainage line, water pipeline, storm water, garden development including maintenance and administrative overheads. For this, land was assembled on the basis of a town planning scheme through voluntary pooling by its owners which could be consolidated, thereby permitting the local agency to develop infrastructure according to a layout plan. This wouldn't be possible if land acquisition was there, which may result in a contradictory situation for landowners. Thus, land pooling is not only a cheaper alternative but also the revenue generation is quite very high.

**Table 1: Cost of Work of TPS of Prahaladnagar, Ahmedabad**

Draft Town Planning Scheme No. 23 - 26 TPS Prahaladnagar	
Abstract of Estimate for Cost of Works	
Submitted Under Section 48(1) of the G.T.P and UD Act-1976	
TPS Area- 162 Ha	
Name of Work	Total Cost Rs. in Cr
Construction of bituminous road including excavating, carting, filling, watering, hammering, soiling, metalling, carpentering and prime coat, tack coat, etc., complete including footpath, central verge and tree plantation	36
Providing electricity street light with underground wiring, painting, cow lamp fitting, etc., completely provided at every 30 m distance	12
Providing and laying of appropriate size drainage line including treatment plant, etc.	40.5
Providing and laying of appropriate size water pipeline including tube well, sump well, pump room with pump in connection to adjoining schemes, etc.	21
Green Development	18.8
Storm Water	25
Administrative Overheads	8
<b>Grand Total</b>	<b>161.3</b>
<b>Say</b>	<b>Rs. 1025 / sq m</b>

Source: Ahmedabad Municipal Corporation (AMC)

**Table 2: Revenue generation of TPS Prahaladnagar, Ahmedabad**

REVENUE CATEGORY	Rs. in Cr
Sale of commercial purpose @60,000 sq m plot @rate 1,25,000 Rs. per sq m	750.0
Sale of residential purpose @50,000 sq m plot @rate 95,000 Rs. per sq m	4-7 5.0
Sale of neighborhood purpose @8,000 sq m plot @rate 75,000 Rs. per sq m	60.0
Betterment charges @203 Rs. per sq m of reconstitute ie. @67.6% at 10,95,120 Rs. per sq m	21.9
Collection by the AUDA	1306.9

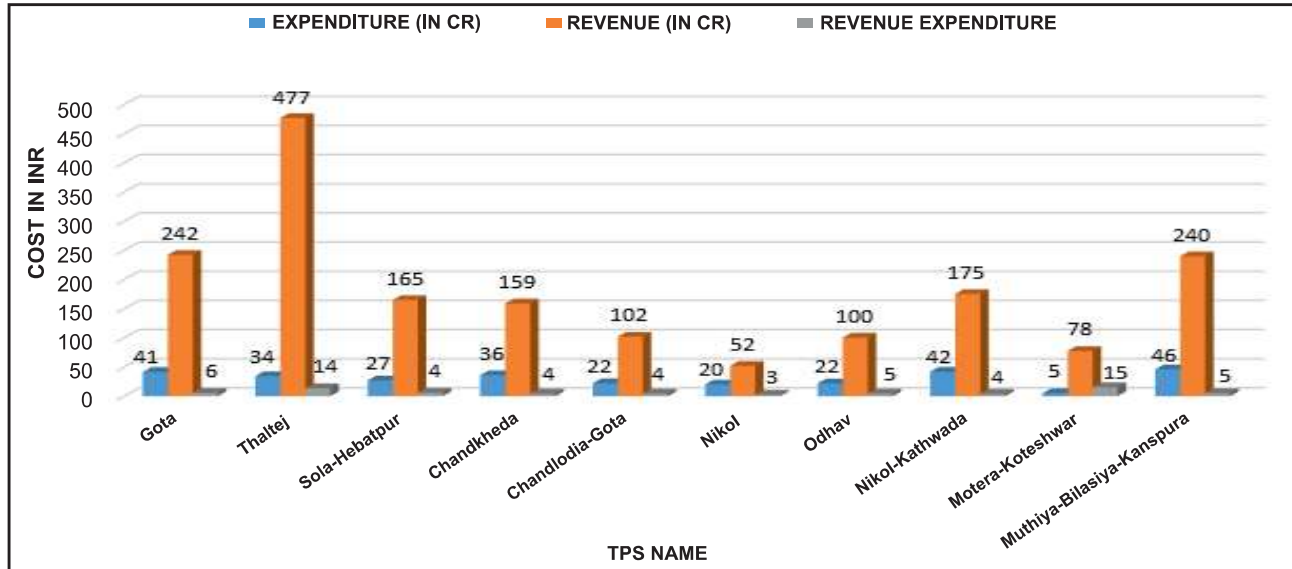
Source: Ahmedabad Municipal Corporation (AMC)





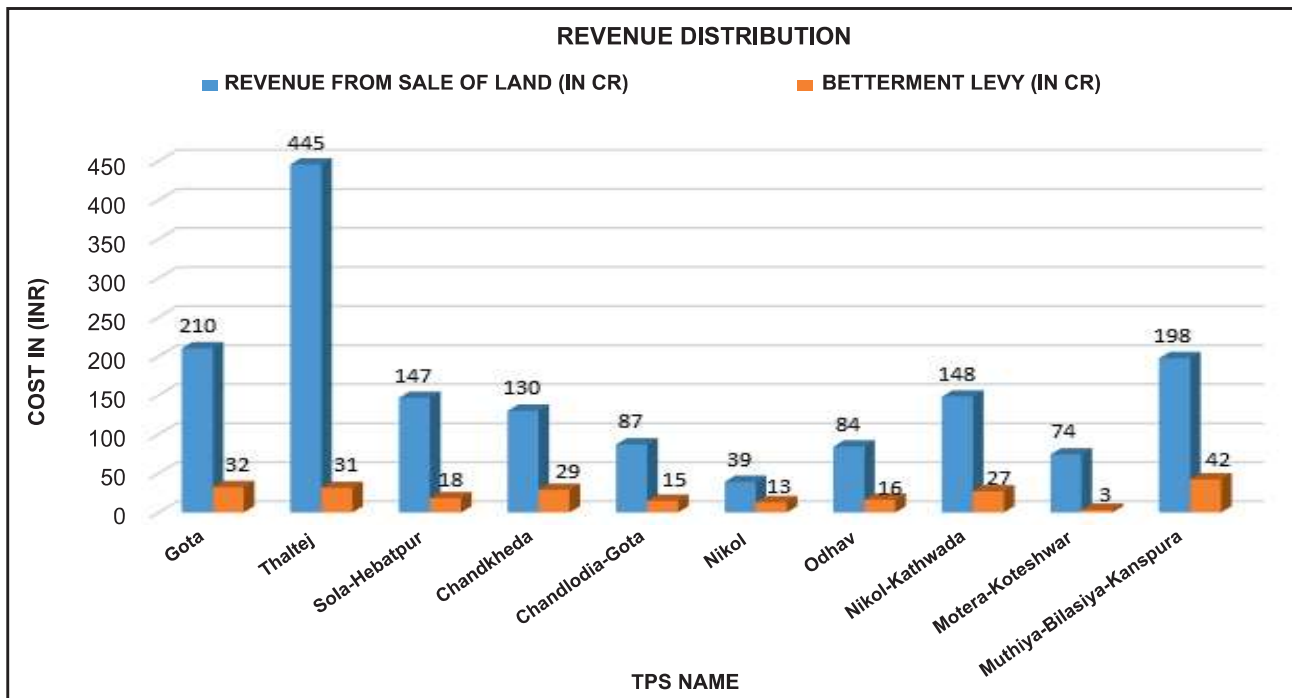
Analyzing the different TPS in Ahmedabad, the revenue generation here is remarkable as compared to the cost of expenditure in making TPS. Revenue collection from the sale of land which means the land monetization is the highest whereas the betterment levy is also an additional tool for collection revenue.

**Fig. 2: Expenditure V / S Revenue Generated In Ahmedabad TPS - Prahaladnagar**



Source: Ahmedabad Municipal Corporation (AMC)

**Fig. 3: Revenue Collection in TPS - Prahaladnagar**



#### 4.0 EMPIRICAL ANALYSIS

##### 4.1 Comparative analysis of Delhi land pooling policy with different States

A comparative analysis has been done with different States having a land pooling policy to analyze in-depth general aspects of land policy, DCRs, finance, revenue and finally concluded



with the result. This analysis will give a perception of Delhi land pooling policy, how it is different from other states and how well it can be implemented on-ground while we have many other existing states examples of such policies. Three cities have been selected for analyzing the policy with Delhi; first Magarpatta, Pune which is India's first land pooling done by a private individual; second Ahmedabad where land pooling is done by authorities and Municipal corporation; third Amravati which is being built from scratch taking lessons from Ahmedabad, making by the authority of Andhra Pradesh where it's a model of the government seeking partnership from people for development.

**Table 3: Comparative Analysis of Land pooling Policy of Different Cities of India**

Parameters	Magarpatta	Ahmedabad	Amravati	Delhi
<b>General</b>				
<b>Legal Backup</b>	Developed under MTDCCL, 1993	Developed under GTPUDA, 1976	Developed under APCRDA ACT, 2014 (Under section 43 sub section-4)	Developed Under MPD 2021, supported by DDA act 1957
<b>Section / Act</b>	Special township notification, 2006 under Maharashtra Regional and Town Planning act, 1972	Chapter 5 under section 40	CRDA ACT	Chapter 19- MPD 2021
<b>Area</b>	430 ACRE	It extend to whole of the state of Gujarat	38,581 Acre	6 land pooling zones of Delhi
<b>Owner's Involved</b>	123 Farmer's family (800 individual)	Vary to different-different TP schmes	24 village farmers	Land parcels of any size brought under pooling provided they fall in land pooling area
<b>Rehabilitation</b>	Every native peasant got parcel of land for house or flat within the Magarpatta City SEZ based on their land and every native peasant got parcel of land for house or flat within the Magarpatta City SEZ based on their land.	Within the close vicinity of original plot (minimum displacement) and with at least minimum previous benefits	Plots within the same village with maximum displacement of 5 km	Within the close vicinity of original plot (minimum displacement) and with at least minimum previous benefits
<b>Eligibility</b>	Land owners of Magar area	Greenfield site under public domain with scope / propose development project	No eligibility criteria on plot size but all 24 villages near krishna river bank are included	Land owner having land 2-20 ha and 20 ha above in Delhi land pooling zones, 70% contiguous pooled land, Min 30 m wide road on one side expect forest land, unauthorized colonies, <i>lal dora</i> villages, heritage and natural features



Parameters	Magarpatta	Ahmedabad	Amravati	Delhi
<b>Develop By</b>	Develop by MTDCCL	Urban local body i.e. Government body	Developer entity	Developer entity
<b>Land Policy</b>				
<b>Model</b>	Co-operative movement	Public Participation model	People Public Partnership	Joint Development model
<b>Project Scheme</b>	Township project	Neighborhood planning scheme	City development scheme	Zonal development scheme
<b>Minimum Area</b>	Land pooled for 162 HA	100 HA	---	2 ha
<b>Maximum Area</b>	---	100 HA ABOVE	38,581 Acre	20 ha above
<b>Land Distribution Under Public Domain</b>	---	Roads-15%, Parks and open spaces- 5%, Social infrastructure- 5%, sale of residential and commercial- 15% (it may be altered to the nature of development)	Roads and utility services-30%, Parks and open spaces- 10%, EWS- 5%, social amenities - 5%	Roads-12%, Recreational - 16%, PSP- 10%
<b>Land Distribution Under Private Domain</b>	---	---	---	Gross Residential- 53% , Commercial- 4%
<b>Deduction Policy</b>	---	40:60 ratio (commonly- but may vary to the site) where 60% is retained by appropriate authority and 40% by land owners but the ratio can't be reduced by min 30:70 and maximum by 50:50	50: 50 ratio	40: 60 ratio
<b>Compensation</b>	Company stock holder	Shared amenities, Better transportation connectivity, Infrastructure development, Increased land and property value	Residential and commercial plots, Annuity, Training and employment and debt waiver of 1.5 lakh to farmers one time	Shared amenities, Better transportation connectivity, Infrastructure development, Increased land and property value and TDR



Parameters	Magarpatta	Ahmedabad	Amravati	Delhi
<b>Supporting Agencies</b>	Pune Municipal Corporation	Gujarat town planning and valuation department	Singapore government appointed Surbana International consultants	NIUA
<b>Beneficiary</b>	Farmers (FDI - Farmers Direct Investment)	State government, Authority, ULB's and Land owner	Farmers (FDI - Farmers Direct Investment) and APCRDA	Center and State government, Authority, ULB's and Land owner
<b>Additional Benefits</b>	Authorised Registration, Employment, Annuity, Entrepreneur, SEZ		Free higher education, Singapore trip, Pension, Free health camps	Tradable FAR - is allowed and can be transferred to another DE in the same planning zone having licence of project more than 20 Ha
<b>Ownership After FP</b>	7 / 12 registration, part land remain with farmers including companies stock	2 or more original plots which are owned by several persons or owned by persons jointly be held in ownership in common as a final plot	Ownership of residential and commercial	7 / 12 registration, part land remain with original land owners
<b>Transfer of Land Rights / Shares</b>	Allowed within native peasants	Possible	---	Not possible
<b>Reservation of Land</b>	---	Up to 10%	---	---
<b>Change of Land Use</b>	---	Land allotted for the purposes referred shall not be changed by variation of schemes for the purposes other than public purpose	No under section 99 CRDA ACT	Not possible
<b>Amalgamation</b>	---	---	Joint / Individual allotment plot size	Amalgamation and sub division of plots shall be allowed as per norms of master plan
<b>Development Control Norms</b>				
<b>Scheme Preparation by</b>	Developer Entity	Appropriate Authority (In case of Ahmedabad-AMC andAUDA)	APCRDA	DDA



Parameters	Magarpatta	Ahmedabad	Amravati	Delhi
<b>Green Building Regulations</b>	---	---	---	10% Energy consumption by solar fittings and green building norms
<b>Delineation</b>	---	Based on roads, No. of land parcels, and development zone	Based on urban population	Based on sector
<b>Density</b>	---	---	---	800-1000 persons / hectare
<b>EWS Household Size</b>	---	As per DP	---	32-40 sq m
<b>Ground Coverage</b>	---	---	---	40%
<b>Far</b>	---	As per DP	---	FAR 400 for group housing and additional 15% EWS in that, Commercial, Industrial and PSP- as per MPD 2021
<b>Finance</b>				
<b>Finance by</b>	HDFC LOAN	Appropriate Authority (Grants, loans, impact fees and state government)	APCRDA	Appropriate Authority (Grants, loans, impact fees and central government)
<b>Expenditure</b>	By MTDCCL	Net cost of scheme borne by the appropriate authority	Net cost of scheme borne by the appropriate authority	Net cost of scheme borne by the appropriate authority
<b>Margin</b>	---	20% of the amount of cost of infrastructure provided in the adjacent area of the scheme	20% of the amount of cost of infrastructure provided in the adjacent area of the scheme	---
<b>Revenue</b>				
<b>Monetization of Land</b>	Sale and auction of land (30% cost of construction get by the cost of the land)	Sale and auction of land	Sale and auction of land	Not mentioned in policy
<b>Development Charges</b>	Paid by MTDCCL ( No discloser of rates)	Paid by individual land owner @Rs. 50,000 / hectare for land and Rs. 15 / sq m for building	Rs. 3,38,825 / - and city level impact fee Rs. 6,12,490 / -	Paid by DE ( No discloser of rates)
<b>Betterment Charges</b>	Paid by MTDCCL ( No discloser of rates)	Paid by individual land owner (No discloser of rates)	---	---



Parameters	Magarpatta	Ahmedabad	Amravati	Delhi
Stamp Duty	---	---	---	Yes
<b>Result</b>				
<b>Success</b>	Win-win-situation	Win-win-situation	Win-win-situation - 85% rate	Win-Nowin-situation as DE is not getting any beneficial profit
<b>Inspiration</b>	Inspired many other projects in pune like Nanded city SEZ, Videocon SEZ	Foundation of land pooling which Inspires many other states like Madhya pradesh, Delhi, Andhra pradesh and Maharashtra	Amravati is one of the largest greenfield venture in India	---

Source: Author

### Inferences

Delhi land pooling policy lacks to create long term wealth for its landholders whereas Magarpatta creates long term wealth for peasants for landholding. The opportunity for them to turn into an entrepreneur or shareholders or permanent job in the company somehow lost in the policy, unlike Magarpatta. No flexibility of plot sizes and allotment of house sizes has been given to the landowners to attract them whereas in the case of the Amravati model that flexibility has been given to the landowners. In Amravati, the farmers hold equal partnership rights with the state / city government whereas in Delhi the capital expenditure will be incurred by EDC where because of the higher EDC charges and unwillingness to pay a fee of EDC makes the people un-willing to pay any taxes.

### 4.2 Empirical Findings - Delhi Land Pooling Policy Challenges

However, the current policy faces challenges and for implementing the policy on the ground it is imperative to handle these issues successfully. Failing of land pooling policy of Delhi will result in failure of another master plan of Delhi i.e. MPD 2021 which means the urge for getting an ample amount of land for providing housing and infrastructure to the forecast population of Delhi. Higher land and property prices will eventually result in migration of population to satellite cities like Noida, Gurugram, Faridabad, Meerut, and Ghaziabad. The major challenges in Delhi land pooling policy which will defeat the purpose are:

- Statutory Law
- Spotted development - lead by the developers
- On the ground reality of F.A.R - what policy says

### Statutory Law

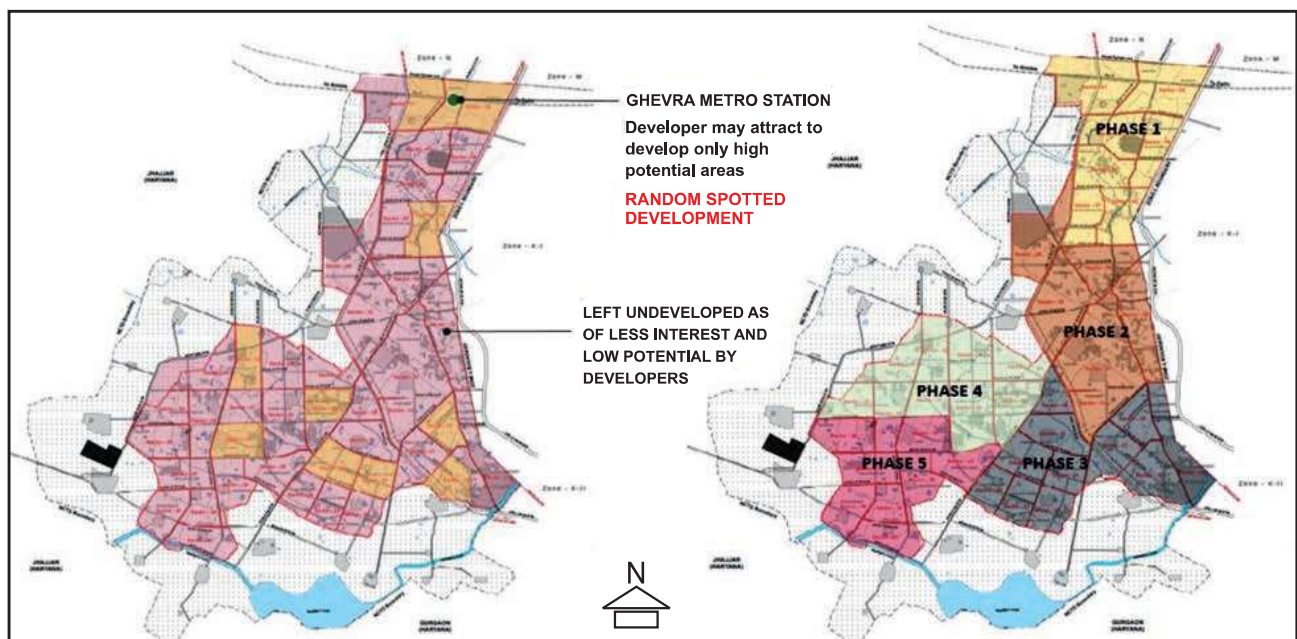
The policy section produced by the Government as well as other planning-related documents and reports becomes statutory law when written by a legislative body. It's a law that a government deliberately creates through elected legislators and an official legislative process. It's up to the judiciary to interpret and enforce statutory law, but the judiciary can't create statutory law. Delhi land pooling policy is not a statutory law that is set down by a body of the legislature. It has been written in Delhi master plan 2021 under chapter 19 which gives the proposal of implementation under the master plan but it doesn't make it as a statutory law; it might get modified or deleted in the future as well. Implementation of any policy needs to have legal back for the implementation

on-ground, whereas the other states using land pooling have a separate legal origin which makes it statutory like Gujarat has GTPUDA Act, 1976 section 65 which provides validity for the scheme, Andhra Pradesh has APCRDA Act, 2014 section 52, Rajasthan land pooling scheme act, 2016, The Punjab and town planning and urban development Act 1995. Delhi also has a DDA Act, 1957; which gives the legal authority to DDA to make planning and making policies to implement but it might delete as well so there is no legal statutory legal backup as other cities have. It is necessary to include the Delhi land pooling policy in DDA Act 1957.

### Spotted Development

In Delhi land pooling policy, the phasing of land pooled areas hasn't been mentioned, thus it does not attract many developers. A developer might be more interested in developing a sector that has high potential and has a major earning scope like around the metro stations which might lead to the spotted development in a zone and the rest of the sectors remain undeveloped because of the less potential. There should be no biases in developing the sector; as done by the state of Gujarat and Amravati which are doing in phase wise development keeping in mind of market growth pattern which determines the phasing of land pooling zones.

**Fig. 4: Spotted Development scenario for land pooling**



Source: DDA and Author

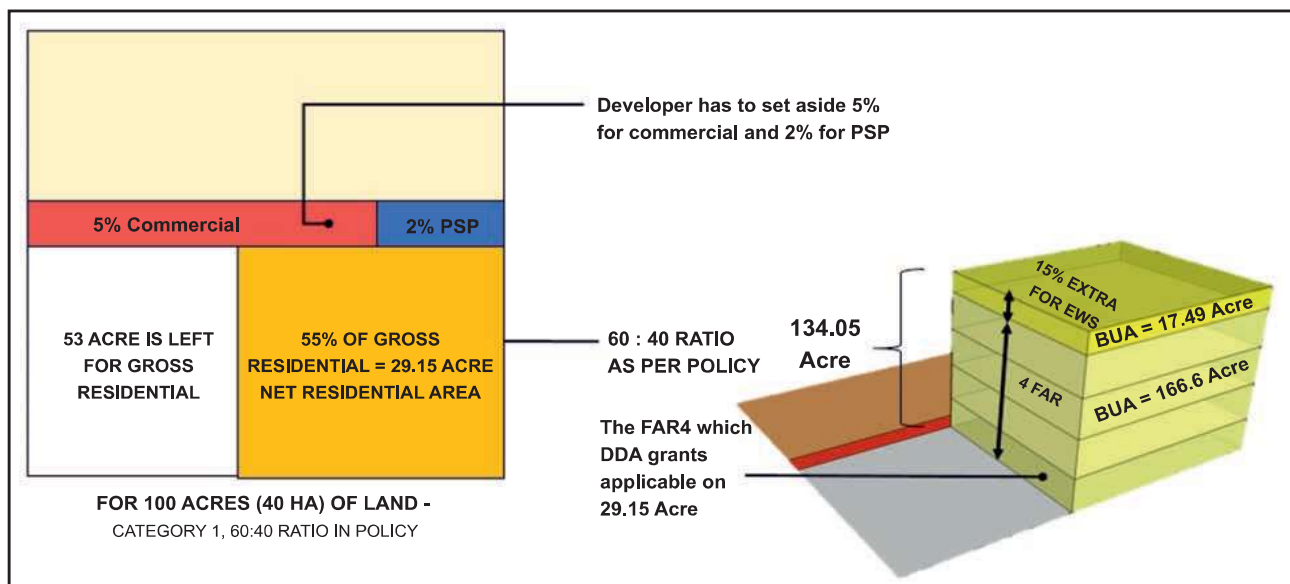
### On-Ground Reality of FAR - Truth of FAR in Policy

According to DDA, developers get incentive FAR of 4 in zones demarcated for land pooling but going by calculations, they only achieve 1 to 1.3 FAR, which is much less than what DDA is claiming to offer. While fixing FAR for the land pooling policy, DDA had made it attractive for the builders by including community and commercial facilities in the area (part of FAR) they would be developing and selling. "If in DDA's scheme, community and commercial facilities are part of FAR (saleable built-up area), then developers will assume that they will be able to utilize more FAR than what will actually be available for them if the Apartment Ownership Act is factored in. There is a need for clarification on this subject from DDA to all stakeholders that the developers can't sell community and commercial facilities. The only saleable built-up area is the apartment in the group housing project. "Citing the scarcity of water, the Delhi Development Authority (DDA) has proposed to reduce the Floor Area Ratio (FAR) for residential areas from 400 — as

approved in 2013 to 200 in its land-pooling policy that has been hanging fire for five years”. With this decline of F.A.R, it will create a negative impact on the model as it defeats the whole purpose of the land pooling which is to create housing for all and better infrastructure for the forecast population of Delhi; because the reduction in F.A.R makes the houses more expensive as it diminishes the profit margins of developers and to make more profit the developer has to raise the cost of unit prices, thus the affordability factor somehow gets lost.

It not only has to face the bitter reality of F.A.R but also the waste of land in the current land pooling policy is quite high. Analysis with illustrations a developer can just build 36.15 out of 60 acres (60%) of land and if we analyze the overall use of the land it's just 48.15 / 100 acres which is only 48% if we compare it to other cities and their land deduction policy it's been around 60-70%.

**Fig. 5: On-Ground FAR Calculation of Delhi Land Pooling Policy**



Source: Author

### 4.3 Existing Value Capture Tools in Delhi

Currently, Delhi has numerous tax and non-tax based value capture tools which are neither collected by Municipality or by Delhi Development Authority. DMRC is also expanding its hands in capturing the land value by property development. Delhi is a city that is basically focused on taxed based value capture tools which makes it quite reliable on forcefulness.

Currently, Delhi has non-taxed based tools also, the value captured by them is quite less as compared to Tax based tools. Majorly the urban local bodies are depending upon the taxed based value capture like property tax which is highest amongst all. About 60-70% of revenue is being collected by property tax only in tax-based tools. Whereas the development authority relies on fee-based which is only one time (most of it). Despite having numerous land value capture tools none of them go for the development of the TOD area, therefore we need to develop a new institutional framework for selected value capture tools for development in the TOD context.

### 4.4 Appropriate Land Value Capture Tools for Delhi

Analyzing numerous tools which currently exist in Delhi, there are some which have been identified to be efficient and have highest potential to work in TOD context in Delhi land pooling zones based on market and statistical analysis are as follows:





**Table 4: Various Value Capture Tolls in Delhi**

VARIOUS VALUE CAPTURE TOOLS CURRENTLY EXISTING IN DELHI								
TOOLS	LEGISLATION	LVC IN THEORY	LVC IN PRACTICE	BASE	RATE	FREQUENCY	COLLECTED BY	CAN WORK OR NOT
<b>TAX BASED VALUE CAPTURE TOOLS</b>								
PROPERTY TAX / LAND VALUE TAX	Wealth Tax act, 1957	YES	YES	Area Based	7% Residential, 20% Commercial, 10% Industrial	Yearly	Municipality	✓
VACANT LAND TAX	Wealth Tax act, 1957	YES	YES	Area Based	Included in Property Tax	Yearly	Municipality	✓
TAX-INCREMENT FINANCING	Delhi Township Board	YES	NO	Area Based	-	Recurring for area based	-	✗
STAMP DUTY TAX	Registration Act, 1908	YES	YES	Area Based	6% - Men, 4% - Women	when there is a transaction of property	Authority	✓
<b>NON-TAXED BASED VALUE CAPTURE TOOLS</b>								
DEVELOPMENT/ IMPACT FEES	DA ACT, 19 57	YES	YES	Area / Project Based	Sewer and water = Rs100 square meter	One time charge	Authority	✓
CHANGE OF LAND USE	No law	NO	YES	Area / Project Based	Residential = 14,000-24,777, Commercial and Industrial = 1.5 Times of Residential	One time charge	Authority	✓
LEASE OF LAND AND DEVELOPMENT	Property Act, 1982	YES	YES	Area / Project Based	As per market rate	One time charge	Authority	✓
PROPERTY TRANSACTION FEES	Registration Act, 1908	NO	YES	Area Based	6% - Men, 4% - Women		Authority	✓
SALE OF NAMING RIGHTS TO STATIONS	DMRC ACT	NO	YES	Area Based	10 X Fixed annual licence fees	For a period of 10 Year	DMRC	✓
EXTERNAL DEVELOPMENT CHARGES	No law	NO	YES	Area / Project Based	As per Hectare or Acre	Onetime charge	Authority	✓
LAND POOLING	MPD 2021	YES	YES	Area / Project Based	As per EDC charges	Onetime charge	Authority	✓
AIR RIGHTS / F.A.R	No law	YES	YES	Area Based	As per category	Onetime charge	Authority	✓
FEE FOR REGULARISING UNAUTHORISED DEVELOPMENT	DDA Act 1957, Section 57	NO	YES	Area Based	As per category	Onetime charge	Authority	✓
BETTERMENT CHARGES	DDA ACT,1957	YES	YES	Area Based	RS 150/ SQ.MTR.	Onetime charge	Authority	✓

Source: Author

- **Development based Land Value Capture Tools**

- Sale of Land
- Land lease agreement
- Land Readjustment
- Air rights sale / TDR

Out of four tools for sale, land lease agreement and land readjustment are the purest forms of capturing land value i.e. Land monetization.

- **Tax based Land Value Capture Tools**

- Land value tax
- Vacant land tax
- Property tax

- **Fee-based Land Value Capture Tools**

- Impact / Development fees
- Betterment charges
- External Development Charges ( EDC )

The above tools have been identified based on statistics efficiency, amount of revenue collected, popularity or people's willingness to pay the levy and the extent the levy is being charged for collecting the revenue.

## 5.0 CONCLUSIONS

The findings and policy recommendations towards establishing land value capture (LVC) potential for financing a project are given below:

### 5.1 Implementing Urban Projects Through Land Value Capture

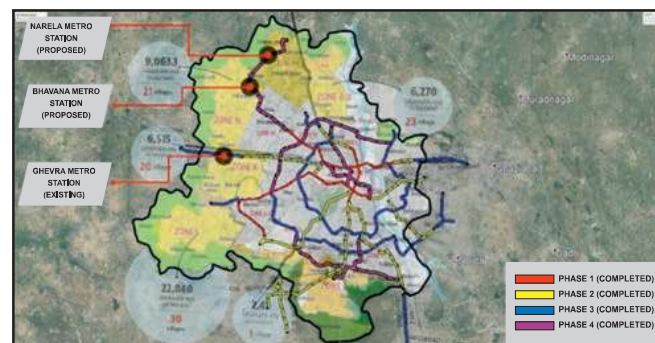
The recommendations are derived from the selected sites of Delhi land pooling zones. The illustrations on the site are done to analyze the expenditure cost required to develop the TOD influence area of 500 meters. The cost of expenditure for developing the whole sector is being compared with the cost of expenditure in developing an influence zone of TOD. The above appropriate land-based value capture tools have been applied to the selected site of land pooling zones of Delhi. Applying these tools on sites gives a perception of the reliability of these tools in applying to capture the land value in the TOD context in Delhi land pooling zones.

The three sites which have been selected in land pooling zones based on three criteria i.e. first, it should fall under Delhi land pooling zones, second, there should be a Greenfield site and third, there should be an existing or proposed metro station in the land pooling zones. The three sites selected are:

- Ghevera Metro Station - Existing (Zone - L)
- Bawana Metro Station - Proposed (Zone - N)
- Narela Metro Station - Proposed (Zone - P1)

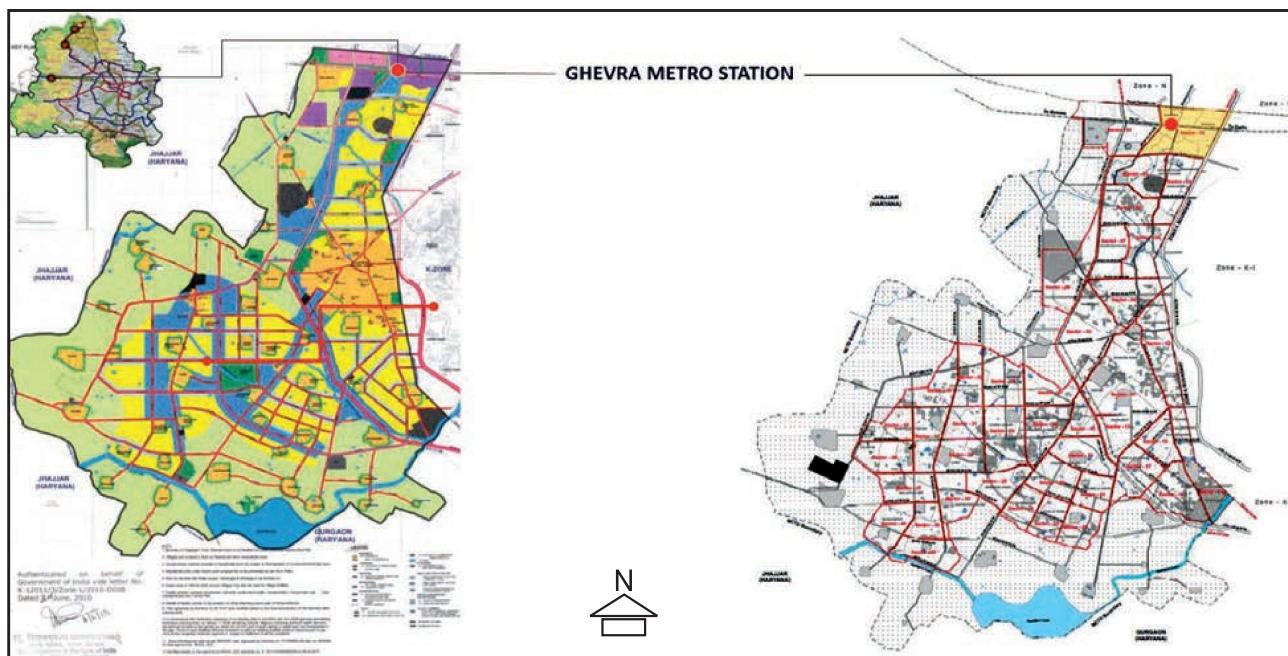
Let us implement the urban project of developing or providing infrastructure around TOD areas through Land Value Capture on Ghevera site.

**Fig. 6: Site Selection for Land Pooling Zones**



Source: Author

**Fig. 7: Zone L - Proposed Zonal Development and Sector Plan, MPD 2021**



Source: Author

Fig. 8: Ghevera Site - Aerial Map



Source: Author

The site Ghevera has an existing character of unplanned industrial area around sector 1 and 2 having obnoxious industries which fall under Nazafgarh zone, Mundaka ward; having circle rate under category H. The cost of expenditure of sector 1 have been analyzed for a total area of which is 440 HA with vacant area as 228 HA, which is being compared with the cost of expenditure incurred for developing sample area of 50.3 HA around the 500 meter TOD influence zone.

The capital expenditure for developing the sector 1 near Ghevera site would be around 1188 CR having the percentage of proving road and recreational infrastructure as per Delhi land pooling policy including truck construction of roads which includes road construction, street lighting, water supply network, sewage, and storm water network and recreational development and maintenance cost.

Whereas, if the analyses for calculating the capital expenditure for developing sample area of 50.3 HA is done, it would be around 442 CR considering the percentage of roads 5% and

Table 5: Capital Expenditure for Sector 1 - Ghevera Site

	Const. of Roads	Street Lighting	Sewerage Network	Storm Water	Water Supply	Recreational	Cost of Publication	Manpower Cost
RATE	50,000 / SQ.M	70,000	2601 / RMT	10.9 CR / KM	2516 / RMT	11604 / SQ.M	10 LAKH	1 CR
AREA	27.36 HA	27.36 HA	27.36 HA	27.36 HA	27.36 HA	36.48 HA	27.36 HA	27.36 HA
COST	227 CR	12 CR	11 CR	497 CR	11 CR	426 CR	10 LAKH	1 CR
CAPITAL EXPENDITURE FOR AREA 228 HA: INR 1188 CR (ROADS: 12%; RECREATIONAL - 16%)								

Source: Author

Table 6: Value Capture from Selected Appropriate LVC tools - Ghevera Site

	Revenue from LVC Tools							
	Development Based Tools		Taxed Based Tools		Fee Based Tools			
	Land for Sale	Air Right Sales	Land Value Tax	Land Vacant Tax	Property Tax	Impact Fees	Betterment Charges	EDC
Rate	50,00 / SQ.M	70,00	2601 / RMT	10.9 CR / KM	2516 / RMT	11604 / SQ.M	10 LAKH	1 CR
Area	27.36 HA	27.36 HA	27.36 HA	27.36 HA	27.36 HA	36.48 HA	27.36 HA	27.36 HA
Revenue	280.75 Cr	23.65 Cr	38.02 Cr	42.25 Lakh	2.86 Cr	84.33 Lakh	15.55 Cr	67.29 Cr

Source: Author



recreational 16% (as analyzing the percentage of roads nearby developing the areas are not as the same percentage of land pooling policy, therefore, can't apply for sample area as it may or may not have an equal percentage of roads and recreational spaces in the considered sector). So, 37.2% would be the total cost for developing the TOD area on a sample area of the cost of the sector area.

Illustrating the appropriate LVC tools on selected sites, each tool has been illustrated to capture land value on the selected site keeping the potential of workability according to the past trends. Since each tool cannot be applied on the same plot, the total value capture done by all three categories i.e. development based tools, Taxed based tools and fee-based tools can't be compared with the capital expenditure analyzed for sample area i.e. 50.3 HA. If we go for the purest form, land value capture is a development based tools because taxed and fee-based tools are not surely reliable for capturing the value of any land or developed sector. 68.8% is the total value captured if considering only development based tools which is quite sufficient in providing revenue for development by the urban local bodies.

## 5.2 Findings

The above section presents a researched-based scenario for the implementation of urban projects through LVC for both public and private sectors. The sampled sites in above section show that the revenue generation from value capture tools are economically, financially, and institutionally sustainable. The above section is also intended to generate discussion amongst key stakeholders and serves as a basis for research and experimentation for unlocking the private investments in sustainable infrastructure in Asia. Since the paper limited its scope of work to some of the indicators of economic and institutional framework, certain obsolete types of infrastructure may occur due to innovative technologies and business models. New sources of private investments would increase the legal and regulatory challenges faced by government agencies looking to increase investments in sustainable infrastructure.

More private sector involvement may enhance performance and increase efficiency of infrastructure services in addition to reducing the fiscal burden of public budgets. It is evident from the past that governments will not be able to meet projected demand for investment in a sustainable way. Increasing access to long-term capital at adequate rates to support sustainable investments will require enhanced participation from the private sector. This establishes the distinction between standard and sustainable infrastructure.

## 5.3 Recommendations and Policy Implications

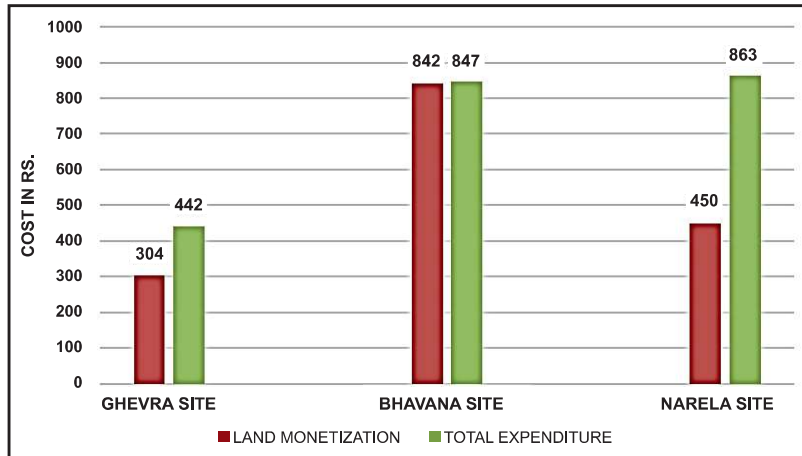
- Appropriate DBVC Tools for Development in ToD areas of Delhi's Land Pooling Zones

Development Based Land Value Capture Tools:

In development based land value capture tools; sale of land, land lease agreement and land readjustment are the purest forms of doing land value capture. In other words, land monetization is the purest form for value capture in the TOD context.

Analyzing all three selected sites with their value capture being generated by Land Monetization only, if we take an average of all three sites, revenue 74.3% of the revenue is being generated by land monetization only. Therefore, it is appropriate to say that land monetization is the purest form of doing land value capture in the TOD context in Delhi land pooling zones.

**Fig. 9: Revenue Generation from Land Monetization - All 3 Sites**



Source: Author

the development of an area. Taking an example in Bihar, where vacant land in urban parts of the state would now come under the aegis of the state, lands located in municipal areas on the main principal road, main road and local roads would be Rs. 5, Rs. 4 and Rs. 3 per square feet respectively. Similarly, lands available in Nagar *Parishad* areas and located either on the main principal road, main road and local roads would be charged Rs. 4, Rs. 3, and Rs. 2 per square foot, respectively. In a similar way lands available in Nagar *Panchayat* areas and located either on the main principal road, main road and local roads would be charged Rs. 3, Rs. 2 and Rs. 1 per square feet respectively.

**Fee-Based Land Value Capture Tools:**

Sale of impact / development fees, betterment charges, and external development charges are the fee-based land value capture tools purest forms of capturing land value. Seeing the past trend in Delhi, the fee or tax-based is really not as reliable as the people are not willing to pay any taxes because of the higher fee charged by Municipal Corporation or by the authority. So, there is a need to minimize the fee if we need to capture the land value as minimizing the fee-based levy people might be willing to pay a levy which is imposed on them. Hence, there is a need for analyzing how much EDC a person gives and how much a betterment charge a person should give as per the range of TOD influence area.

**Table 7: Distribution of Betterment Levy based on Floor Area Ratio**

Band	Range of Far	Betterment Levy
1	5-4	50%
2	4-3	40%
3	3-2	35%
4	2-1	25%

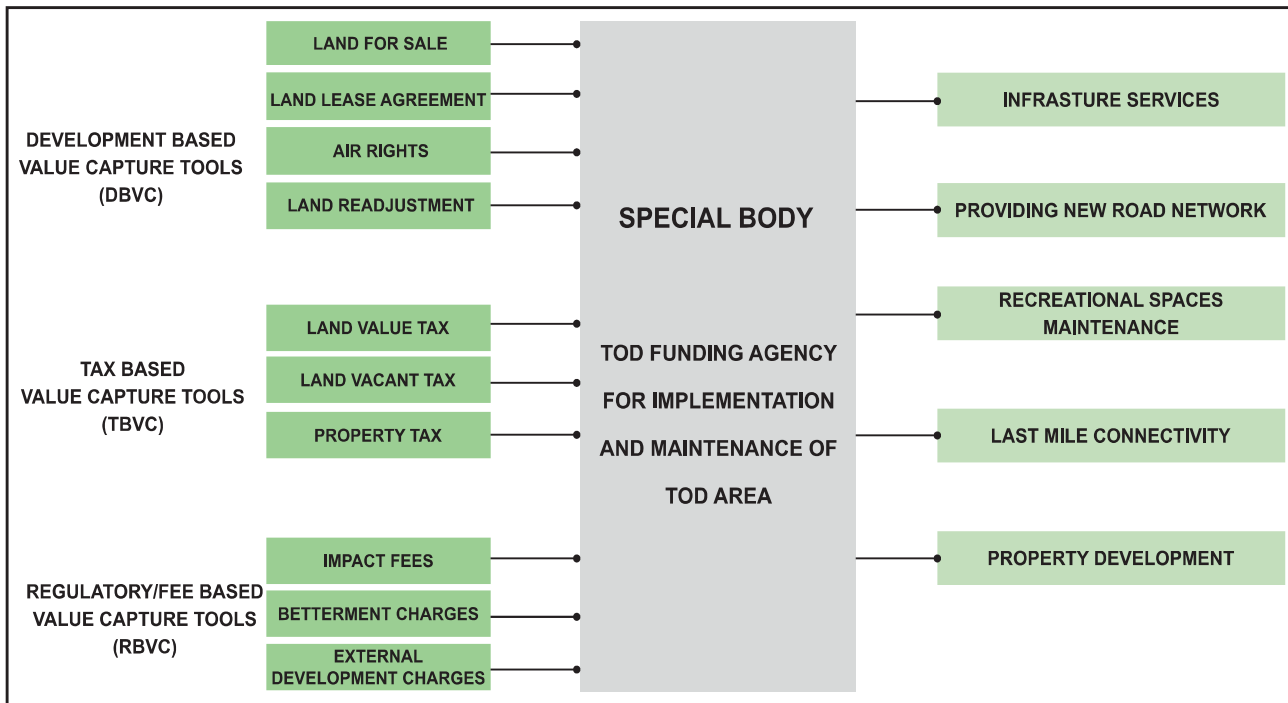
Source: Author

In the current scenario, the betterment levy is executed as same for different F.A.R. at different radius but on practical implementation, it cannot be the same. For example, the betterment levy imposed on commercial or residential land use around the 100 meters of influence zone of TOD area cannot be same as the around the 800 meters as the distance varies the land value also varies so, there cannot be the same levy for the same radius.

There should a FAR range that decides the percentage of levy imposed on particular land use based on the distance of land from the metro station.

- New Administrative Framework: Simplified and direct Institutional framework (who collects and division of LVC tools must be subdivided).

Fig. 10: New Administrative Framework for TOD Areas



Source: Author

Fig. 11: Proposed Share Mechanism for New Administration Framework



The value captured from different land-based value capture tools is of no use unless it is transferred or imposed for the development in the TOD context. It can only be workable if there is a simplified institutional framework that directly collects some amount of value capture amount, which is mandated to be given by various agencies collecting revenue from their judiciary areas and that amount can be used for development in TOD context only.

- **Statutory Law-** Delhi Land Pooling policy should be included in the DDA Act,1957 to legally backup as Land Acquisition Act, 1984
- **Phasing** - Phasing should be mandated and given by DDA to developers to avoid the spotted development in land pooling zones of Delhi
- **Declaration of EDC Charges or Revenue Sources in Policy** - There should be a declaration of fees or charges for each tool where revenue is being generated.
- **Increase the F.A.R in Delhi Land Pooling Policy** - Capacity building of agencies like Delhi Jal Board and other agencies for improving infrastructure and making viable for developers as well.
- **Development Based Value Capture Tools** - The purest form to capture DBVC is by Land monetization with property development and sale for FAR.



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