NCAER

NATIONAL COUNCIL OF APPLIED ECONOMIC RESEARCH

Final Report

Evaluation and Review of Land Pooling and Development Models for Delhi

Study Sponsored by

Delhi Development Authority

Submitted by

National Council of Applied Economic Research

11, I.P. Estate, New Delhi 110002

September	**2012**

Study Team

Shashanka Bhide
(Project Leader)

D.B. Gupta

Tushar Nandi

D.V. Sethi

Nikita Jain

Shivani Gupta

Rajinder Singh

Acknowledgments

The study team wishes to acknowledge the support received from a number of agencies and persons in the conduct of this study.

The officials of DDA, particularly, Mr. Ashok Kumar, Dr. S.P. Bansal, Mr. S.P. Pathak and Mr. S.B. Khodankar provided their inputs in different stages of this study. Mr. Deepak Trivedi, helped us get the information on infrastructure development relating to various projects undertaken by DDA. Mr. Rajesh Jain and Ms. Meena Vidhani were always helpful in getting the required information from the official agencies. Mr. Vijay Risbud provided information and clarifications, on different aspects of land pooling for urban development.

We have also benefitted from interactions with the industry and land owners.

Magicbricks provided information on prices of land and housing properties in Delhi and adjacent cities listed on their website for sale.

A number of other colleagues and consultants at NCAER also provided valuable inputs to the study team during the course of this work.

CONTENTS

List of Tables

List of Charts

List of Acronyms

Acronym	Full Words
AR	Accommodation Reservation
AMDA	Association of Municipalities and Development Authorities
BSUP	Basic Services for Urban Poor
BUA	Built Up Area
CMDA	Chennai Metropolitan Development Authority
CMA	Chennai Metropolitan Area
CPSPA	City Level Public and Semi- Public Area
CIA	City Level Industrial Area
CSP	Community Service Personnel
CCA	City Level Commercial Area
CSC	Convenience Shopping Centre
DDA	Delhi Development Authority
DUs	Dwelling Units
EDC	External Development Charges
EWS	Economically Weaker Section
FAR	Floor Area Ratio
GDA	Ghaziabad Development Authority
GRA	Gross Residential Area
HIG	High Income Group
HPEC	High Powered Expert Committee
IDC	Internal Development Charges
IRR	Internal Rate of Return
JVP	Joint Venture Project
JNNURM	Jawahar Lal Nehru National Urban Rural Mission
LIG	Low Income Group
LARR	Land Acquisition and Rehabilitation and Resettlement
LRS	Land Readjustment Scheme
LPE	Land Pooling Entity
LP	Land Pooled
LA	Land Acquisition

Acronym	Full Words
MCD	Municipal Corporation of Delhi
MOUD	Ministry of Urban Development
MPD	Master Plan for Delhi
MIG	Middle Income Group
NCR	National Capital Region
NCTD	National Capital Territory of Delhi
NCAER	National Council of Applied Economic Research
NPIIC	New Policy Initiatives and International Co-operation Cell
NOIDA	New Okhla Industrial Development Area
NDMC	New Delhi Municipal Corporation
NH	National Highway
NOC	No Objection Certificate
NDL	Net Developed Land
P & SP	Public and Semi- Public
PSP	Private Sector Participation
PR	Plot Reconstitution
PP	Private Sector Participation (Private Participant)
PDS	Public Development Scheme
PPP	Public Private Partnership
R & R	Rehabilitation and Resettlement
RHB	Rajasthan Housing Board
SPV	Special Purpose Vehicle
STP	Sewerage Treatment Plant
TUDA	Trichur Urban Development Authority
TDR	Tradable Development Rights
TDL	Transferable Development License
TPS	Town Plan Scheme
ULB	Urban Local Body
VMC	Vijaywada Municipal Corporation
WTP	Water Treatment Plant
ZDP	Zonal Development Plan

Foreword

Urbanisation is rapidly becoming an engine of growth for India's economy and the consequence of such growth, sometimes with good outcomes, but often with bad and haphazard ones. India's urban potential is great, but so are its pitfalls. Unless we take urgent action, India faces the grim prospects of a large number of Indians living in poor conditions in slums or in areas with substandard infrastructure, including basics such as water, sanitation, and roads. Urban development has suffered relative neglect in both public policymaking and analytical thinking in India, and those of living in urban spaces face the consequences on a daily basis. It is high time urban issues rise to the fore.

The challenge that India faces now is building inclusive cities that sustain and accelerate economic growth, offering all the scale and scope economies that the great cities of the world—from New York to London to Tokyo—provide to their regional, national, and indeed, global, economies. The urbanisation challenge for India is staggering. Studies have estimated that by 2030, India's urban population will be twice the entire population of the United States. India already has more than 40 cities with populations of a million plus, and by 2030 will have nearly 70 such cities: Europe today has only some 35 such cities. By 2030, 70 per cent of all jobs in India will be in its cities, which will also account for more than 70 per cent of India's GDP. Five states in India—Tamil Nadu, Gujarat, Maharashtra, Karnataka, and Punjab—will be more than half urbanised by 2030.

To avoid the congestion costs, housing shortages, infrastructure snafus, poor governance and corruption, and unplanned commercial and residential development of India's cities that are so much in evidence today will require concerted effort at all levels of policymaking, implementation, and regulation, from the Union Ministry of Urban Development (MoUD) in New Delhi to local municipalities in India's smallest cities and towns. A critical factor in this will be policies that guide the land development needed for sound urban expansion.

It is against this background that MoUD urged NCAER to start a research study in 2011 with the help of the Delhi Development Authority (DDA) looking at sustainable urban land use through public-private partnerships in land pooling in Delhi with its massive population of 16.8 million. The Master Plan of Delhi 2021 indeed envisages that public-private partnership will be critical for increasing Delhi's housing supply.

Land pooling (LP), if done well, offers many advantages. It can reduce the resistance of private land owners to parting with land for redevelopment by allowing them to share in the dramatic valuation gains from urban land-use change and infrastructure provision. LP can unlock land values and greatly increase the supply of land for urban use, allowing planned urbanisation rather than urban sprawl. It can help overcome land acquisition difficulties and the financial misfortunes of urban local bodies (ULB), a major reason for the scarcity of well-serviced land. For

cash-poor ULBs, LP schemes can offer a way of financing infrastructure development without having to dip into scarce general tax revenues.

The NCAER study examines three models of land pooling for the urban extension of Delhi and provides a robust and detailed technical assessment of their economic merit and suitability for implementation. The study provides a perspective both on the private profitability of different models and the creation of affordable housing stock—an important objective for the Delhi Government—and other public objectives. While land pooling has been around in a number of other Indian cities, particularly in Maharashtra and Gujarat, the scale has been small. Learning from these experiences, it is clear that the success of LP will greatly depend on a healthy convergence of the interests of four key stake-holders—the local government that will regulate the process, collect revenues from it and build infrastructure where necessary, land owners who can realize the value locked up in their land, private land developers who will bring capital, resources and technology for creating sound living and commercial spaces, and the urban citizen who will benefit from a more habitable urban environment.

The study was carried out by a team of NCAER researchers led by NCAER Senior Counselor Dr. Shashanka Bhide and including NCAER Research Fellow Dr Tushar Nandi and Adviser Professor D. B. Gupta. I am grateful to them for the immense work and attention to detail that has gone into doing this pioneering study.

The study has benefitted from the intellectual guidance provided by the Honourable Lieutenant Governor of Delhi and the Chairman of DDA, Mr Tejinder Khanna. It was reviewed by the Lt Governor and DDA officials in February 2012 and again by a meeting of the Review Committee for the Master Plan of Delhi-2021 chaired by the Lt Governor in March 2012. I am grateful to Mr G.S. Patnaik and Mr. S. K. Srivastava, former and current Vice Chairmen of DDA, and a number of other senior DDA officials for their tremendous cooperation and partnership with NCAER in addressing this important public policy issue. We are also grateful to the Honourable MoUD Minister, Mr Kamal Nath, for suggesting this study. I hope that NCAER's work will contribute to more evidence-based policymaking by DDA (and by MoUD at the national level) in shaping the future of India's beautiful capital city and the urban future of its citizens.

Shekhar Shah
Director-General
NCAER

September 12, 2012

Executive Summary

Delhi presently has a population of 167.5 lakh. As population continues to rise almost the whole of National Capital Territory of Delhi covering an area of 1483 sq.km will be urbanised by the year 2021, except agricultural green belt, river zone and Ridge. Not only the extent of required additional urban development is large, the speed with which development needs to take place is also greater than before. The scale of challenge to achieve expansion of urban facilities is immense. There is a need to create additional housing and other infrastructure to meet the requirements of growing population of the city.

Besides the redevelopment of existing urban areas there is also a need to develop new areas. The Master Plan of Delhi 2021 provides a policy framework and basis for private sector participation (PSP) and PPP in land assembly and development. A focal theme of MPD 2021 is the involvement of the private sector in (1) Assembly and Development of land, (2) Provision of Infrastructure Services and (3) Housing and Redevelopment.

Delhi has been a forerunner in planned urban development of which land policy is an integral part. However, large scale land acquisition for urban development was last carried out decades back. There have been a number of initiatives to develop a public-private partnership approach to land assembly and development starting in the early 1990s. However, there was no actual implementation of such an approach.

Delhi Development Authority sponsored a study by the Association of Municipalities and Development Authorities (AMDA) in 2003 and which was again updated in 2009. Findings of the study provided a framework for land pooling and development. Since then there have been two other suggested models of land pooling.

DDA commissioned the present study to provide an assessment of the three models of land pooling from the perspective of their economic feasibility in a PPP context. The three models are,

i. Alternative modes of assembly and development of land and housing in the NCT of Delhi by Association of Municipal and Development Authorities (AMDA).
ii. PPP Model of Land Pooling and Development within the present framework of MPD-2021 by Planning Department, DDA
iii. PPP Model of Land Pooling and Development by New Policy Initiatives and International Cooperation Cell (NPIIC), DDA

The three alternative models propose voluntary assembly of land by the land owners and transfer of this land to DDA in return for a share of the land that is assembled with rights of its development. The models differ essentially in the manner in which the pooled land is allocated between the public and private sector participants in development and the FAR. The issue is which of the models are likely to be attractive enough for the private sector including the land owners to participate in the proposed land assembly arrangement and would lead to creation of additional housing stock so essential to meet the housing needs to the City's growing population including that of economically weaker segments.

The study has adopted the methodology of Internal Rate of Return to assess the economic feasibility or relative attractiveness of the three models of land pooling. The costs and returns associated with each model are specified and IRR is calculated under a baseline scenario and

also under some alternative scenarios to assess the sensitivity of the results. The parameters for the model were obtained through consultations with the various stake holders and also review of other available data.

The study has reviewed some of the other experiences in land pooling for urban development both within the country and elsewhere to draw some lessons for land pooling in Delhi. The various experiences and innovative measures adopted by different cities and regions point to the potential for improved performance on urban development front. The need for holistic approach to urban development is necessary not only in the plans for urban areas but also in the management processes of development. Achieving cooperation from all stake-holders is necessary for efficient implementation of urban development projects.

The IRR obtained for the three models under the baseline scenarios were:

- Model I: 3.22% for for the 10 year project horizon and for 5-year horizon, it is 3.67% when 15 per cent of the land pooled is returned to the land owners.
- Model II: 14.69 per cent in the 10-year project horizon model and 17.68 per cent in the 5-year horizon model.
- Model III: 28.03 per cent in the 10-year project horizon model and 31.49 per cent in the case of 5-year horizon model.

These baseline results point to some important patterns in the rate of return on investment in land pooling and development.

- First, a general point: as revenues are realised in the 5-Year Model much earlier than in the 10-Year model, the IRR in the former case is higher than in the latter.
- The implication clearly is that processes and procedures that allow completion of the projects quickly will attract more competition and funds into land pooling and development.
- The IRR is just about 3.7% in the case of Model I in the 5-Year or 10-Year alternatives even when 15% of land is returned to the owner as developed land. This clearly is not an attractive return to private investors under the given parameters of the model, including the assumed price of final properties.
- The Model-II provides an IRR of 18.62% under the 5-Year time horizon. This rate of return drops sharply for the lower land size categories. We also note that the return is slightly higher in the case of land pooling of 10-19 ha as compared to the land pooling of 20-39 ha, mainly on account of allocation of higher proportion of land to residential construction in the smaller land pool and the associated higher FAR.
- Model III provides the highest returns to investment among the three models in both the time horizons. The rate of return is generally higher for the land pooling of larger sizes. The estimated return remains high in all size categories of land pooling relative to the other two models.

We examined the results of the model under a number of alternative assumptions relating to the price of land, the level of EDC and IDC and the FAR in specific simulations. The key findings of the simulation analysis are,

- The Model-I provides the lowest IRR among three models. When land price is reduced to Rs 3 crore per hectare from Rs 5 crore of the baseline scenario, in the 10-Year time horizon case, the IRR rises to 13.17% when 15% of pooled land is returned to the LPE. When this percentage of returned land is only 12.5% the IRR drops to 9.49%. Similar pattern emerges when the time horizon is 5-Years.
- In Model-II, when land price is dropped to Rs 3 crore from the baseline scenario of Rs 5 crore per hectare, the IRR increases to 24.72% from 17.68% in the baseline scenario when the time horizon is 5years in both the cases.
- As the percentage of land returned to LPE increases to 60 from 55%, the IRR increases from 14.69% in the baseline case to 16.09% in Model-II, 10-year horizon. When we specify that 50% of EWS housing can be marketed, the IRR rises further. In the case when the percentage of land returned to LPE is 65%, with half of EWS housing to be priced at construction cost and FAR for residential housing at 250%, there is an increase in IRR to 21.99% as compared to the baseline case of 14.69%.
- The 10-year horizon model under the baseline scenario provides an IRR of 28.03% for Model-III and the 5-Year horizon model provides an IRR of 31.49%. Under the scenario of land price of Rs 7 crore per hectare, the IRR in 10-year project horizon is 22.31%. When land price increases to Rs 10 crore per hectare, the IRR drops to 16.34% under the 10-Year horizon and 19.66% under the 5-Year horizon model.

The results of analysis have provided us with the rate of return on investment that the private sector participants may get from the three alternative models of land pooling analysed here under specified conditions.

The analysis points to the superiority of Model III among the three models considered based on the IRR for private sector and the quantum of housing stock to be created per hectare of gross residential area.

But there are also other concerns that need to be kept in view. The higher FAR would mean that density of population accommodated per hectare of neighbourhood area would also increase. This would imply greater demand for infrastructure services from a relatively smaller geographical area. Although in our analysis we have normalised the EDC and IDC in proportion to the FAR implicit in the model specification, the same principle would have to be carried to planning for infrastructure services. When the housing stock is fully occupied, the population accommodated would be greater and the supply of water, sanitation, transport and power would have to be accordingly planned.

As density of population and dwelling units would be determined by demand, it may be necessary to indicate minimum density of dwelling units per hectare of land returned when development licenses are issued.

When EDC is increased from Rs 2 crore per hectare of land pooled to Rs 4 crore per hectare, the IRR drops from 28.03% for the 5-year schedule to 26.11% under Model III. The IRR drops to 24.79% when EDC is Rs 5.74 crore per hectare. In the other two models, it was assumed that EDC would not be charged to the private sector participants in land pooling. If EDC rises to Rs 10 crore per hectare then IRR for Model III drops to 20% and economic viability would then be uncertain.

In general, Model I does not provide attractive returns to the private sector participants. Therefore, we have focused the analysis on the other two models of land pooling.

In an attempt to examine the intermediate positions on key parameters such as land-return ratio and FAR between Models II and III, further simulations were carried out. The Model II provides IRR of 25% or better in the 10-year project horizon when land return ratio is 65%. This is under the assumption that EDC is not charged to the private sector participants. When EDC is charged as in Model III, the required land return ratio is 70% for an IRR of 25%. The Model III still provides better returns because of additional FAR on surrendered land and higher FAR for commercial and P & SP and allowance of Industrial property development.

If land return ratio is decreased under a variant of Model III where FAR is applied on 50% of land returned, the IRR drops below 25% in the 10 year project horizon.

Taking into account the different perspectives of (1) attractive economic returns to private sector participants (2) increasing availability of housing stock at affordable prices (3) achieving planned development and (4) with the government playing a facilitator's role in the process, we find that Model III meets most of these objectives. It does imply that the FAR implied is much higher than specified presently in MPD-2021 and infrastructure cost per hectare of land pooled would be greater than implied under the specifications of MPD-2021 housing density. However, Model II would also have to incorporate higher FAR and land return ratio implying higher infrastructure costs and FAR.

The analysis shows that there is no unique model that can meet all objectives. Models II and III under a set of assumptions meet the criteria set for PPP approach to land pooling and development. While Model III does not require any changes in terms of its key parameters to meet these criteria, Model II will require changes in FAR and land return ratio bringing it closer to the features of Model III to make it attractive to private sector participation and also deliver on the objective of reasonably priced housing. We also find that Model III retains its attractiveness in terms of IRR even when EDC charges are increased upto Rs 6-7 crore per hectare of pooled land. If housing density of Model III implies that EDC would be even greater, either DDA would have to share the EDC costs or reduce FAR to a point where EDC is sustainable. The analysis highlights that review is needed with regard to FAR specification for development in the urban extensions to meet the housing needs of rapidly increasing population of Delhi.

The study also provides an outline of the steps for implementation of the land pooling approach to development of the new urban extensions.

Chapter 1
Introduction

1. The Backdrop

With the rapid growth of urban population, development of housing and other civic amenities for the population also has to accelerate. Land being the most critical resource for housing and other amenities, planned development of land is necessary for its optimal utilization.

The Master Plan of Delhi-2021 projected the population of Delhi in the year 2021 at 230 lakh, up from 138 lakh in 2001 and an estimated 182 lakh in 2011. To meet the projected increase in population almost the whole of National Capital Territory of Delhi covering an area of 1483 sq.km will be urbanised by the year 2021 except agricultural green belt, river zone and Ridge. It is important to recognise not only the extent of additional urban development that is required but also the speed with which development needs to take place to understand the scale of challenge that is to be met.

2. Planning Framework for Delhi

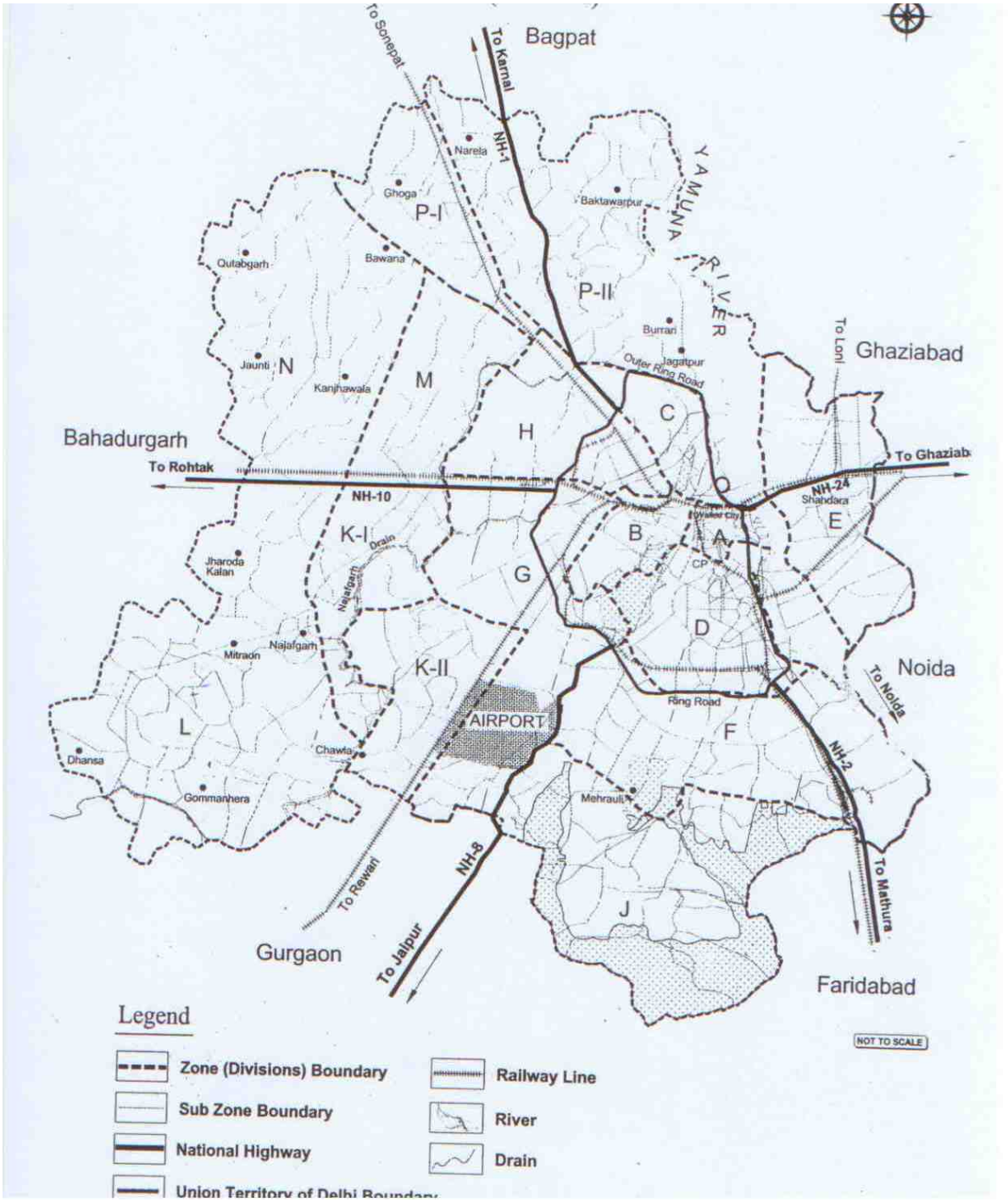
Delhi presently has a population of 167.5 lakh (Census 2011), well below 182 lakh projected by the Master Plan. Delhi comprises 9 revenue districts, 12 municipal zones and 15 planning zones. Chart 1.1 provides the boundaries of the planning zones of Delhi. For balanced development of the capital in its regional context Regional Plan for National Capital Region-2021, envisages development of surrounding cities, so as to diffuse pressures of population on Delhi. The Regional Plan also identifies Central NCR comprising about 2,331 sq, km of area around Delhi as an inter-state metropolitan region around NCT of Delhi. The Central NCR comprises six urban complexes in Haryana and UP: Sonipat-Kundali, Ghaziabad-Loni, Noida-Greater NOIDA, Faridabad-Ballabhgarh, Gurgaon-Manesar and Bahdurgarh. Trends in the population of NCR districts are shown in Table 1.1. Master Plan for Delhi 2021, approved and notified under the Delhi Development Act, 1957, provides a roadmap for its development for a projected population of 220-230 lakh in 2021.

Table 1.1: District-Wise Population of NCR

Sr. No.	Population District	1991	2001	2011
1	Gurgaon	11,46,090	16,60,298	26,03,491
2	Sonipat	7,54,866	12,79,175	14,80,080
3	Panipat	8,33,501	9,67,449	12,02,811
4	Faridabad	14,77,240	21,94,586	28,39,447
5	Rohtak	7,76,977	9,40,128	10,58,683
6	Meerut	24,17,676	29,97,361	34,47,405
7	Baghpat	10,30,236	11,63,991	13,02,156
8	Bulandshahr	28,49,859	29,13,122	34,98,507
9	Ghaziabad	22,35,612	32,90,586	46,61,452
10	GautamBuddha Nagar(Noida & Gr. Noida)	4,68,321	12,02,030	16,74,714
11	Alwar	22,96,580	29,92,592	36,71,999
12	NCT of Delhi	94,20,644	1,38,50,507	1,67,53,235

Source: Census of India. Because of creation of new districts over time, adjustments were necessary in the population numbers. These adjustments were based on Kumar and Somanathan (2009)

Chart 1.1: Planning Zones in Delhi



The size of each of the new urbanisable zones in the MPD-2021 is as given below:

Zone J	15,178 ha
Zone K-1	5,782 ha
Zone L	22,840 ha
Zone N	13,975 ha
Zone P-II	8,534 ha
Total	**66,309 ha**

The areas given above include mandatory agricultural green belt (54 border villages) measuring about 11,000 ha, existing built-up areas/villages/unauthorised colonies, etc. (about 7,681 ha) and land reservations for power plants, services, utilities, solid waste, sewerage, etc. (20,000 ha), Thus, after accounting for these uses which are either essential for urban life or that are already in use, an area of about 27,628 ha is to be developed as new urban area. As per MPD 2021 about 45-55% (say 14,000 ha) of this total area will be available for new residential development, 15-20% (about 5,000 ha) for greens, 10-12% (about 2,800 ha) for transportation and 7 to 9% (about 2,000 ha) for commercial and industrial uses each. If developed uniformly over the years, an average area of 3,000 ha would have to be developed every year during the period of 2013 to 2021.

The MPD stipulates some key initiatives, such as:

- Synergy between public transport and land use
- The concept of facility corridors
- Local Area Planning
- Incentivised redevelopment and influence zones along major corridors with additional FAR
- In-situ slum rehabilitation, redevelopment and up-gradation of resettlement colonies
- Optimum densification by infill housing redevelopment
- Accommodation Reservation (AR) and Transferable Development Rights (TDR)
- Infill development in regularised unauthorised colonies
- A shift from plotted to group housing regime

Redevelopment of existing urban areas, where possible or required is an important strategy for providing habitation to increasing population of Delhi as reflected in several of the key initiatives listed above.

The MPD 2021 also provides a policy framework and basis for private sector participation (PSP) and PPP in land assembly and development. A focal theme of MPD 2021 is the involvement of the private sector in (1) Assembly and development of land, (2) Provision of Infrastructure Services and (3) Housing and redevelopment.

In the present study, the focus is on PPP in land assembly and its development for urban use. Before describing the scope of the study we outline some relevant features of urban development of Delhi to provide a context for the study.

Residential development

MPD-2021 envisages development of about 24 lakh new housing units. About 14 lakh dwelling units (DUs) are to be provided in new urban zones. Such development will require about 5500 ha land to build on. Remaining about 10 lakh units are to be provided by densification of existing residential areas.

The MPD-2021 emphasises the need to make optimum use of scarce urban land, which means redevelopment and densification of the existing urban areas and suitable infrastructure improvement to support this redevelopment. It calls for a comprehensive redevelopment strategy for accommodating a larger population, strengthening of infrastructure facilities accompanied by creation of more open spaces at the local level. The focus of redevelopment is also involvement of private sector for optimising the use of existing urban areas and by shifting from plotted development to group housing and an incentivised regime of additional FAR of 50% (maximum of 400).

A phased program for synchronized planning and development of infrastructure is necessary to achieve these goals. Detailed studies for infrastructure (particularly roads, water and power) for both new development areas and redevelopment areas are needed. Transportation planning is an equally critical need to synchronise with the development of housing and other land use development.

Table 1.2: Proposed Housing and Land Development for Delhi- 2021

Sl. No	Housing Type	Distr-ibution across all catego-riies (%)	EWS/ LIG Compon-ent (% under each category)	No. of DUs Lakh	Redev. DUs (lakhs	New DUs (lakhs)	Net Land for New Housing (ha)
1.	Slum & JJ in-situ Rehabilitation Relocation/ Reconstruction, Up-gradation	25	25	6.0	2.4	3.60	900
2.	Houses on Independent Plots & Redevelopment	8	4	1.92	1.22	0.70	200
3.	Group Housing (Min. 35% of total DUs mandatory 2 room and less)	42	14	10.08	2.0	8.08	4000
4.	Employer Housing	4	2	0.96	0.34	0.62	400
5.	Unauthorised Regularised colonies infill	15	6	3.60	2.60	1.0	
6.	Other Housing areas, Upgradation of Old areas/ Traditional areas/ Villages	6	3	1.44	1.44	-	
	Total	100	54%	24.0	10.0	14.0	5500

Source: Computed from MPD-2021

While the pace of acquiring land for urban development has to accelerate, land for infrastructure development would be required even more urgently. The approach to assembling land for urban development will have to consider alternative methods: traditional method of land assembly under the applicable Land Acquisition Legislation and also use of Transferable Development Rights (TDR) and Accommodation Reservation (AR), the instruments that allow assembly of land and transfer of development rights as per the planned urban development.

Land Utilisation Norms

The norms provided in MPD 2021 require about 10-12% of neighbourhood area to be under roads/circulation, social infrastructure @about 7 sqm per person and green/open space at about 4.5 sqm per person at neighbourhood level (10,000 population). The provision of community service personnel/EWS and lower category housing (between 25-40 sqm carpet area) is a mandatory stipulation of MPD-2021 for which additional FAR of 15% and higher density are permitted (MOUD notification dated 19.5.2009). Thus, land utilisation norms have been specified in the MPD-2021 so that urban development takes place in a holistic manner.

The other key parameter determining the development of built up area is the Floor Area Ratio (FAR). The FAR has been increased under MPD 2021 by about 50% from the basic FAR provided in MPD 2001. We have summarized the basic allowed average FAR along with its range in Table 1.2 below.

Table 1.3: Allowed Basic FAR under MPD 2021

Land use	FAR (% of net land)
Residential	**2.0 ***
Commercial	**1.25 (1.0 to 2.5)**
Industrial	**1.2 (1.5 to 2.0)**
Public and semi-public	**1.2 (2.0 to 4.0)**

***:** There is enhancement of FAR in redevelopment areas etc subject to a ceiling of 4.0. There is also provision of additional 15% FAR for EWS and social housing.

MPD 2021 accordingly envisages a land policy based on optimal utilisation of available resources, both public and private in land assembly development and housing.

3. Approach to land assembly for urban development

Delhi has been a forerunner in planned urban development of which land policy is an integral part. The policy for large scale acquisition of land was framed in 1961 and it has been reviewed periodically to taking into account the past experience and new conditions. However, large scale land acquisition for urban development was last carried out in 1982. Since then there has not been large scale acquisition of land by the development authority. There have been a number of initiatives to develop a public-private partnership approach to land assembly and development starting in the early 1990s. However, there was no actual implementation of such an approach.

In its efforts to initiate a fresh look at policy towards land assembly for planned development of Delhi, Delhi Development Authority sponsored a study by the Association of

Municipalities and Development Authorities (AMDA) in 2003 and which was again updated in 2009. Findings of the study are summarised in the report "Alternative Modes of Assembly and Development of Land and Housing in the NCT of Delhi" (AMDA, September 2009).

The AMDA report provides valuable summary of the development of land policy in Delhi. It notes that between 1961 and 1981, the total land proposed to be acquired was 27,487 hectares but only 15,540 hectares was actually acquired by 1981. Between 1982 and 1992, 6.763 hectares of land was acquired and between 1992 and 2000, another 2,744 hectares of land was acquired. The pace of acquisition was far short of the requirements. The annual acquisition during 1981-2001 was 475 hectares as compared to the planned requirement of 1200 hectares (AMDA, 2009).

Land acquired between 2002 and 2011 is even smaller than what was done during 1981-2001. There is, thus, need to assemble more land to build housing for the expanding population in Delhi and to make optimal use of the scarce land resource that is available.

It is in this context that alternatives to traditional approach to land assembly need to be examined and MPD 2021 also takes cognizance of this point.

The guiding principles for a policy of land pooling involving sharing of land for development of various housing properties and infrastructure have been spelt out by the MOUD as follows:

- Government to act as a facilitator with minimum intervention to facilitate and speed up integrated planned development.
- A land owner or a group of land owners (who have grouped together on their own volition /will for this purpose) or a developer hereinafter referred to as the 'private participant' shall be permitted to pool the land in identified area or other for unified planning, servicing and sub-division/share of the land for development as per prescribed norms and guidelines.
- Each of the land owners (offering 4 hectare land or more for development) to get an equitable return irrespective of land uses assigned to their land in the Zonal Development Plan (ZDP) with minimum displacement.
- To ensure speedy development of Master Plan Roads and other essential physical and social infrastructure and recreational areas.
- To ensure inclusive development by adequate provisions of EWS/LIG Housing.

In order to implement this policy we require specific operational framework. Three alternative models of land pooling have been put forward by different agencies:

- Alternative modes of assembly and development of land and housing in the NCT of Delhi by Association of Municipal and Development Authorities (AMDA).
- PPP Model of Land Pooling and Development within the present framework of MPD-2021 by Planning Department, DDA
- PPP Model of Land Pooling and Development by New Policy Initiatives and International Cooperation Cell (NPIIC), DDA

4. The Present Study

DDA commissioned a study to NCAER to evaluate the three alternative models of land assembly with respect to their economic viability. The main purpose of this study is to undertake an evaluation of proposed models from financial viability point of view to

encourage the participation of private developers in provision of land and affordable housing for various sections of society while ensuring planned development of city as per Master Plan for Delhi-2021.

The three alternative models propose voluntary assembly of land by the land owners and transfer of this land to DDA in return for a share of the land that is assembled with rights of its development. In other words, while land would become available for planned development, the land owners would be active participants in this development. The private sector participation in planned development of the city would become possible by sharing the development program with the public agency. The models differ essentially in the manner in which the pooled land is allocated between the public and private sector participants in development and the FAR. The issue is which of the models are likely to be attractive enough for the private sector including the land owners to participate in the proposed land assembly arrangement and would lead to creation of additional housing stock so essential to meet the needs to the City's growing population including that of economically weaker segments.

Specific Objectives of the Study

1. For the Government/DDA to act as a facilitator with minimum intervention for facilitating and speeding up integrated development, what should be the approach to create a land pool in the area identified for development, that is

    a) Whether DDA would create a land pool through acquisition which will cover roads, Master Plan greens and the land required to be given in exchange under the non-remunerative uses, or alternatively, permit the entire land to be pooled by the private developers and obtain the land in exchange for Master Plan roads/greens and the utilities and services. The cost of acquisition may be factored suitably in the external development charges.
    b) Whether government should act as first mover for acquiring land for the MPD roads to give impetus to speedy development of the area without waiting for the private developers to pool the land.

2. For enabling the land owners/ group of land owners to pool the land in an identified area, it is necessary that unified planning, services and subdivision of land for development as per prescribed norms and guidelines of the Master Plan be prepared by DDA in a time bound manner. For this mandatory job to be performed by DDA Planning Department, we should be looking at a period of 24 to 30 months for completion of layout plans in the Urban Extension Areas.

3. The land owners (offering 4 ha of land or more for development) are to get an equitable return on land for housing "irrespective of the land use of their land in the ZDP (lay out plan) with minimum displacement. In this context, it is relevant to ask whether DDA should exchange land at a minimum rate irrespective of the size of the pooled land or opt for a graduated scale on return of developed land to the developer who is pooling land of 40 ha and lesser percentage of land to smaller modules.

4. The aspect of the modification of Development Control Norms of MPD-2021 required for making the models financially viable particularly with respect to the issue of grant of higher FAR besides suggesting the option of granting of FAR either on gross residential area or net area needs to be explored. To ensure inclusive

development, every neighbourhood should have 15% of FAR or 35% of Dwelling Units whichever is higher for the economically weaker sections within this parameter an option has to be suggested for constructing the Dwelling Units for EWS.

5. To suggest a financial model with revenue projections, estimation of costs and benefits and specifications of assumptions used and the reasoning for assumptions.

6. To suggest an implementation module with sensitivity analysis for FAR values for various uses, its applicability on gross or net, varying costs of land and land to be returned maximum and minimum based on the land area assembled. A matrix may be developed showing on the different indices how the parameters such as costs, land return, IRR, FAR values change and at a reasonable IRR what should be the optimum model for land pooling.

The study would attempt to carry out the economic evaluation of the alternative models of land pooling and development on the basis of realistic land values, market trends, land holding costs during the project period, admin charges, promotional charges, taxes, approval expenses and realistic sale price of built up area.

Approach to the Study

The core objective of the present study is the economic analysis of alternative land pooling models indicated earlier. The other objectives of the present study require us to examine the process of implementation of the models so that the role of government and private sector can be clearly defined to achieve faster development. There are divergent interests and different constraints faced by each stake holder. For instance, the land owner will expect to maximize return from the land owned, the private developer and builder will seek to obtain a rate of return which may be earned in any other alternative investment opportunity, the government will have to ensure that housing development takes place to meet the emerging demand for housing in a planned manner while respecting its own fiscal constraints.

In order to achieve these objectives, the study relies on following activities:

1. Review of other major approaches to land assembly adopted in the country.

2. Consultations with stake holders

3. To identify the critical legal issues that may need to be overcome to implement the various approaches to land assembly

4. Development of the economic model to assess economic viability of alternative models of land pooling involving private parties

5. Development of data base to assess economic viability of alternative models of land pooling for urban development

6. Assessment of the alternative models to identify a suitable model for land assembly and development

Similar challenges are being faced in the other urban centres in the country as in the case of Delhi. There have also been a few other initiatives to address the challenges. Experience with alternative approaches to land assembly would be examined to assess the relative advantages or weaknesses of the proposed models in Delhi as compared to the other approaches.

5. Structure of the Study Report

In the next chapter of this report, we present a review of some of the other experiences in land pooling for urban development both within the country and elsewhere to draw some lessons for land pooling in Delhi. In Chapter 3, we provide a description of three models proposed for analysis. Chapter 4 provides a detailed economic analysis of the three alternative models of land pooling and development. In the final chapter, we discuss implementation issues relating to land pooling.

Chapter 2
Review of Practices of Land Assembly and Development

A number of models of land assembly and development for housing and other purposes have been implemented in many areas of the world including Delhi and a number of cities in India. We provide a brief review of these models in selected cities/states in the country and a few international cases. The underlying purpose is to illustrate the wide range of experiences and some lessons for Delhi's current exercise. However before proceeding to describe various practices of land development and assembly, it would be useful to note the key aspects of the *Land Acquisition and Rehabilitation and Resettlement (LARR) Bill 2011*, introduced in the Parliament especially from the viewpoint of private sector participation in land pooling and urban development. Although the bill is not yet legislation, it is likely to influence the decisions of various stakeholders in housing development.

2.1 Land Acquisition and Rehabilitation and Resettlement (LARR) Bill 2011

The Land Acquisition and Rehabilitation and Resettlement Bill of 2011 is a Central Government Legislation and attempts to overcome the distortions and shortcomings of the Land Acquisition Act of 1894. The highlights of the new Bill are

Land can be acquired by government for the following purposes:

i. For its own use
ii. To hand over land to private companies for public purpose
iii. For use by private companies for certain declared activities
iv. Public Purpose (Consent of 80% affected families not needed)
v. Strategic purpose
vi. Infrastructure
vii. Rehabilitation of people affected by natural calamities
viii. Housing for economically weaker section

Consent of 80% of the affected families will be needed for acquisition to be made for private companies coming under the purview of the proposed Bill.

The quantum of compensation to the land owners from whom land is to be acquired contemplated under the Bill is as under:

- For rural areas : Not less than four times of original market value as obtained from registered transactions in the recent three years.
- For Urban Areas: Not less than twice that of market value as obtained from registered transactions in the recent three years.

Some other aspects of the LARR Bill relevant to the present study are:

- Acquisition of multi-cropped land
- Allowed upto 5% in a district with riders.

States are free to frame their own laws and if they so desire, are free to improve upon the provision stipulated under the proposed bill. It allows flexibility to the state government on whether or not to intervene on behalf of private players in land acquisition.

The urgency clause can only be invoked for national defence and for security purposes, and also in the event of emergencies or natural calamities.

The R&R package will be applicable when the private parties acquire 100 acres or more land in the rural areas and 50 acres or more in urban areas.

The R&R for those subsisting on the acquired land will be applicable to those dependent on the said land for livelihood for at least three years on that piece of land.

The purpose of acquisition can't be changed. The Bill, however, allows transfer of land with the approval of state government; if the transfer is made without any development of the land, the farmers will have to be paid 20% of the appreciated value. The bill specifies timelines for the payment of compensation. The price of land has to be paid within three months of the award, and the other monetary compensation within six months and the infrastructure entitlement under the R&R package within 18 months. Penalties will be levied on violation.

Apart from subsistence allowance, 20% of appreciated value within 20 years is to be shared with original owner.

For those who have lost livelihood, apart from subsistence and one time resettlement allowance, mandatory job for one person per affected family or Rs 2,00,000/- as one-time payment.

While the new Bill has many positive features, it is also being criticised on some of its features:

Acquisition of agricultural land: The Bill says maximum of 5% of multi-cropped land can be acquired in the district, provided equivalent wasteland is developed. The cost of land acquisition, therefore, increases further. Non-availability of waste land for development and transfer to the land owners from whom land is acquired would also delay the process of land acquisition.

Displacement: The bill provides for long term obligations and liabilities against land acquisition by the private developer. This will generate large administrative work and delay transfer/sale of properties.

Compensation issue: The Bill increases compensation significantly and therefore also cost of projects for which the land is acquired.

Acquisition for private companies: Present Bill provides for 'partial' state acquisition for companies, but does not indicate which portion of land would be acquired by the government: in which there is difficulty for acquisition by the private sector because of litigation, procedural issues or legal issues; or would the state acquire land initially or do so for the balance of land required.

Rehabilitation: 'Land for Land' principle figures only in case of irrigation projects, this may become necessary for any other use in future.

Although the involvement of the private sector and PPP mode of urban development may bring in larger resources to development projects and achieve faster development, it also brings to the fore the need for mechanisms to resolve concerns of equity and justice for those who are adversely affected by the development. The recent agitations and court cases have also forced the governments to revisit the land acquisition policy, to ensure a fair deal to the land owner and also protect the livelihood of the poor dependent upon land/agricultural activity which may be disrupted or may have to be abandoned as a consequence of land acquisition for development purposes.

In principle, land acquisition by the government for urban housing construction is likely to become difficult as a result of the bill. Land may be acquired by the government for urban infrastructure such as roads, laying water pipes or sanitation projects under the provisions of the new Act which may result from the bill. Even here, cost of land would increase significantly both as a consequence of the minimum price set under the bill and also the R&R requirements when agricultural land is acquired. Active collaboration with the private sector in urban development will become even more important for the government as a result of the provisions of the Bill.

2.2 Urban Land Development and Planning Practices

We first describe the experience of land development models in selected cities/states in India. This is followed by brief descriptions of selected international experiences. We then provide a comparative picture of private sector participation models in Urban Development in Haryana, Uttar Pradesh, Gujarat and Maharashtra. Private sector role is being increasingly accepted in view of lengthy and expensive land acquisition process and to channel private sector resources for urban development through market led approach.

Roles of government/private sector agencies in land development: States have their own legislation and regulatory framework which guide and regulate private sector participation in urban sector. In general, the role of government/ULB/Authority/private sector involves the following:

- Policy and planning for planned urban development
- Defining the scope for private sector participation in urban development
- Rules and Regulations for issue of licenses to developer
- Coordination with various departments, agencies and developers
- Notification of various charges (license fee, betterment levy, FAR charges, EDC, etc.).

- Grant of licenses, permission for land assembly,
- Lay out plan and building approvals
- Zoning regulation and development control norms
- Redevelopment guidelines
- Standards, specifications and quality control in the development of infrastructure and also for housing
- EWS , Social housing guidelines
- Acquisition of land for roads/infrastructure services
- Development of roads/infrastructure services/facilities

Private Sector Role

- Assembly of land through market where such purchases are allowed; this may include vacant land or redevelopment of existing properties
- Compliance with land title registration/transfer regulations
- Preparation of plans/projects/schemes at the lay out level and preparation of building plans and obtaining approval
- Payment of various charges such as EDC, and IDC where relevant
- Other regulatory and legal compliance
- Marketing and sale of built-up area/Assets

Typically following charges are to be paid by the developer and later recovered from the consumer through the price of developed property

- External Development Charges (EDC), Internal Development Charges (IDC) (in some cases as in UP, Rajasthan)
- Betterment levy, Service Charges (that are levied by the development authorities in addition to the EDC and IDC
- FAR Charges/ purchasable additional FAR Charges
- Land use conversion charges especially when agricultural land is used for development of residential or commercial properties
- Local government taxes, fees
- Property transfer/Registration/Stamp Duty

Common Issues Affecting Urban Development

Land related

- Delays in the process of land assembly and acquisition
- Litigations as a result of perceived inadequacies in the process; prevalence of encroachment on acquired/under acquisition land and the need for removing these encroachments and the consequent delays in the availability of land.
- Piecemeal development due to non-availability of some portions of land when large scale development is required.
- Speculative holding and forward buying by the private parties leading to escalation in land prices and inequitable distribution of benefits from urban development

Planned Development

- Scattered implementation of projects due to problems of purchase leading to inefficient development and use of infrastructure affecting quality of life in the new areas
- Speculative projects in remote locations as private parties begin to develop properties in anticipation of other developments in the area but the new inhabitants may suffer because of the delay in the implementation of the larger projects
- Lack of social housing, social and physical infrastructure as a result of delays in the execution of integrated projects

Infrastructure Services

- Lack of services due to scattered development and delay in the execution of projects
- Need for high level of coordination in land acquisition, development, services and construction
- Bottlenecks in the availability of finances for infrastructure development

2.3 Review of select Land development models

DDA's Partnership Models

The DDA has followed since 1961 large scale land acquisition, development and disposal policy. The responsibility of land management, development, planning, housing and construction in NCT vests with the DDA. A large number of cooperative group housing societies have demonstrated the potential for residential housing development where the assembly and development of land including external development is the responsibility of the DDA and the residents' societies take on the responsibility for development of properties.

In 2006, DDA floated two innovative schemes for using land as a resource for attracting private investments and resources in slum rehabilitation and housing, which marked a paradigm shift. The Tehkhand scheme covering an area of 14.3 ha of land is for construction of 3,500 houses for resettlement of slum dwellers with 750 high category houses (for market sale) along with development of sites for various facilities. The bids were invited and India Bulls/DLF consortium won the bid. The DDA's main contribution was land, whereas private developers had borne expenses for construction, site development and other related activities besides paying the bid amount to DDA. This mode is being extended to other encroached sites of DDA, Delhi Government, MCD, NDMC, etc. for in-situ rehabilitation. For such projects the Development Control norms of MPD-2021 allow a density of 600 dwelling units per hectare and an FAR of 400. Commercial component up to 10% of floor area provides self-employment opportunities to Slum & JJ dwellers and makes the scheme financially viable. One-third of land is used for slum rehabilitation, one third for community facilities/greens and one third for 'market sale housing'. However, the total plinth area of market sale housing shall not exceed that of the slum component. The sites of facilities such as schools, religious place, community halls, shopping centres, etc. shall revert back to DDA. The development of these facilities would be then accomplished either through leasing of land by DDA to the parties who propose to develop such properties or by selling land to such parties.

Another important partnership project that was floated by DDA in 2006 was for the Commonwealth Games Village on NH 24. The site covering 11 ha is adjacent to Akshardham Temple. Construction of 1168 flats was offered by DDA to the bidder against upfront payment and constructing the entire Commonwealth Games Village flats together with site development, parking and services. The DDA and developer were to share one-third/two-third flats. The bid was won by MG Emaar. This approach minimised the financial investment of the DDA in construction and development and can be extended for redensification and redevelopment of old areas/housing whenever land is available for such development. With additional FAR as incentive, several PPP schemes are being worked out by the urban authorities/ agencies.

This approach may also be extended to infrastructure development including major roads, metro corridors, facility corridors in urban extensions, transport terminals, depots and stations where there is potential for property development in partnership with private sector. However, land bank is a pre-requisite for this kind of development of properties through PPP. The private sector participation is limited to the development of properties rather than land assembly.

The UP Experience

In UP, the Ghaziabad Development Authority (GDA) joint venture model of urban development envisages a consortium/joint venture where builders/developers/cooperative societies based on technical and financial capabilities qualify through open bid for developing properties. GDA acts as a facilitator for the entire process. The land is purchased by the developers through negotiations with the landowners failing which the GDA acquires the land under the Land Acquisition Act. In joint venture project (JVP) the land is notified under Sections 4, 17(4), 6 of Land Acquisition Act, 1894, and 10% of compensation is deposited (by the JV with the GDA).

The private developer earns revenue from the sale of property/flats on 60% of land in the free market. The model is also attractive for the Development Authority, as it involves lower financial outlay for housing development the arrangement also leads to development of infrastructure facilities. In this model, 20% of the plots/flats built by the private developer (or the entity which is the JV partner with the GDA) are reserved for the EWS/LIG at predetermined rates. The model is applicable in selective residential areas with a minimum contiguous land size of 50 acres.

The UP Government during recent years has adopted the policy of land- infrastructure bundling for coordinated development of infrastructure and real estate. In NOIDA/Greater NOIDA land is being used as a resource for infrastructure development. The private sector is invited to develop major roads, public facilities and utilities against allotment of land for residential, commercial and industrial development. The Formula 1 racing track and Yamuna Expressway in the Greater NOIDA have been developed in this manner.

We should also note that there have been complications arising from some of these arrangements. While the land may be acquired from land owners at one rate, its value to the commercial developers may be quite different. The original land owners may not have obtained the rates that the commercial developers may have realised. The arrangements become even more strained if the land use is changed after acquisition of land. The need for

more comprehensive specification of the arrangements has become clearer from this experience.

The Haryana Experience

The Haryana Urban Development Authority acts as a facilitator by issuing licenses after permitting the acquisition of land by the private developers from the farmers directly at negotiated market prices. The minimum applicable size for the scheme is 40 hectares. The private developer/builder is responsible for the development of layout level facilities only. The entire process of negotiating the land purchase and development is to be completed within three years after receiving the license. The developer is required to provide 20% of the plots/flats to EWS/LIG categories at predetermined rates.

Non-acquisition of certain portions of land area designated for planned development often upsets the continuity of services, roads and other development. The experience so far is that the pace of development of properties by the private sector has been comparatively fast, who is keen to recover his investment at the earliest. However, the provision of the basic services in private developments is of variable quality depending on the payment of EDC by the developers to the development authority and then to the utilities. After the properties are disposed of, the maintenance of the colony becomes a challenge and requires good coordination between the private developer and the Municipal body. Similarly the community facilities plots remain vacant for long periods. One of the conditions of licence for the development projects is a ceiling of 15% profit on investment. But its monitoring is a difficult process.

Town Planning Scheme of Gujarat

The Town Planning Scheme of Gujarat has been important examples of partnership between urban development authorities and the private sector. The responsibility of initiating Town Planning Scheme (TPS) rests with the Development/Local Authority and the cost of implementation of a TPS is met through the annual budget of the local authority. Cost recovery from a TP scheme project is in the form of owner's contribution which is upto half of the estimated increase in land value. Moreover, the local authority gets in return certain share of the land surrendered by the owners so that other facilities can be provided in a planned framework. The model is applicable in residential pockets with an average size of the scheme varying between an average of 10 and 400 ha. The model is most attractive to the landowners who get back 50 to 70 per cent of the land surrendered initially by her to the authority, and much better housing environment. However, to the reservation of land for EWS/LIG housing is only to the extent of 10%.

Chennai: Guided Urban Development

The Chennai Metropolitan Development Authority (CMDA) guidelines for Guided Urban Development envisage private sector participation on a minimum project size of four hectares within the Chennai Metropolitan Area (CMA). The guidelines stipulate minimum of 60 plots per gross hectare of land of where 75 per cent will be reserved for EWS and LIG households. These can be purchased by the government at a fixed price or disposed of by the developer at

price fixed by the government/CMDA. The land assembly, provision of site infrastructure (roads, drainage, water supply, power, sewerage, street lights) are the responsibility of developer. The land for community facilities, roads and parks (30%) is handed over to the CMDA free of cost.

Rajasthan Experience

In Rajasthan Integrated Township Schemes stipulate minimum area of 100 acres in Jaipur, 50 acres in other Divisional Head Quarters except Bharatpur and 25 acres in other Municipal Towns including Bharatpur. Land availability for the Township projects is the key issue. The local authority helps in procurement and consolidation of land including transfer of lands available with local authorities/Rajasthan Housing Board. The developer is encouraged to come up with a scheme on his own land in a zone reserved for Township development. The Local Authority facilitates land consolidation in such cases if the developer owns at least 2/3rd of the minimum prescribed area. About 65% of the land is available for disposal by the developer and 35% of facility/circulation area/parks are surrendered to local authority.

Table 2.1: Rajasthan Integrated Township Land Use Break-up

Sl. No.	Land use	Distribution of assembled land	Allocation
1.	Residential	40%–50%	Plotted & Apartments (5% land of the scheme area reserved for E.W.S./informal sector)
2.	Commercial	5%–10%	Available to the developer for disposal
3.	Institutional (Educational/ Medical)	10%–15%	Available to the developer for disposal
4.	Facilities (Roads, parks & open spaces)	Not less than 35% (including sector roads)	To be developed as per approved plan. At least 10% area for parks and open space shall be reserved. This entire area under roads, parks and open spaces to be surrendered to local authority after development.

Conversion charges for land use and charges for external development are deposited by the developer, which include charges for roads, drainage, water supply and power. However, in Township schemes IDC and EDC can be paid by way of transfer of additional 15 per cent and 5 per cent of land acquired, respectively.

Table 2.2 Rajasthan-Plot Distribution in a Residential Development

Use	Percentage of land acquired	Detailed Break Up
Residential/Plotted	60%	• 35% to be made available to Khatedar in his own land or in the vicinity. • 15% to be retained by local authority towards cost of Internal Development. • 5% to be retained by local authority towards External Development/augmentation of infrastructure. • 5% to be developed by local authority for EWS/LIG housing. Out of this, ½% would be reserved for convenient shopping/informal sector under "Jan Sathi" scheme.
Internal Roads	20%	
Sectoral facilities	10%	
Local level facilities/ open spaces/ parks	10%	

West Bengal Housing Board Partnership with Gujarat Ambuja

The West Bengal Housing Board allotted 25 acres of land to Gujarat Ambuja Company for development of Group Housing. The types of houses are LIG, MIG and HIG. The area of LIG and MIG varies from 30 sqm to 65sqm. Area of HIG varies from 70 sq m to 250 sq m per flat. According to the development control norms, the permissible division is 50 per cent LIG/MIG and 50 per cent is HIG. The LIG/MIG houses are 4 storeyed (G + 3). The HIG construction is 8 storeyed to 14 storeyed frame-structures. The ground coverage is 35% with a permissible FAR of 250. The land being outside the city limits, infrastructural development is also the responsibility of JVC (Joint Venture Company).

The JVC was bound to dispose of LIG flats at a highly subsidised rate. The subsidy is made-up by the revenues from HIG Group and commercial complex properties. The JVC is responsible for the maintenance of physical infrastructure and any structural defects.

For development of Rajarhat New Town the State Government set up the West Bengal Infrastructure Development Corporation Limited in 1999. The new town area was declared as a 'Planning Area' under the West Bengal Town and Country Planning (Planning and Development) Act, 1979 and the WBIDCO Planning Authority. This has now become the New Town Kolkata Development Authority. The conventional land acquisition through procurement of land by the authority is supplemented by direct purchase and negotiation. For this purpose a Land Procurement Committee was set up with officials and land owners' representatives.

Andhra Pradesh-Township and Land Pooling in Vijaywada Housing (BSUP) Scheme

In 2007-08 Government of Andhra Pradesh permitted Vijayawada Municipal Corporation (VMC) to acquire 226 acres of agricultural land and this land was then shared between farmers and VMC in the ratio of 60:40 without cash compensation to the farmers. Several rounds of negotiation resulted in this partnership, wherein the farmers would part with their land of which 40 per cent for development by VMC for the construction of houses under the Scheme and related infrastructure and the rest 60% of land with infrastructure facilities is returned to the farmers.

Kerala: Plot Reconstitution

Trichur Urban Development Authority (TUDA) carried out by Plot Reconstitution (PR) Scheme technique (1982-86) covering an area of 75 ha. Earlier a proposal was framed for development of a central bus stand, market/shopping, hotel, etc. which involved the acquisition of land through Kerala Land Acquisition Act, 1961. There were strong objections against the land acquisition. The TUDA decided to resort to the technique of plot reconstitution inviting the land owners for negotiations. Formulation and implementation of Plot Reconstitution scheme resulted in advantages to all parties concerned. TUDA received more than 2 Ha of land free of cost and without lengthy land acquisition procedure. The nine land owners got developed land (about two-third of original land) with roads, services and enhanced value (about 7.7 times). The whole scheme was completed in six years from the date of final agreement with the land owners.

Maharashtra: Town Planning in Mumbai

A Town Planning or Reconstruction Scheme provides collaborative means of undertaking and financing land development without the need for compulsory land acquisition, but with the involvement of owners. At the same time it helps to provide serviced plots to accommodate urban expansion. The cost of infrastructure provision is met through contributions of land owners. A merit of this scheme is the entitlement of the land owners to the profits and benefits of the scheme. The entire scheme of land development and servicing is self-financing while the local authority can secure lands free of cost for public purposes and EWS/LIG housing. The Bombay Town Planning Act 1954 (replacing the Bombay Town Planning Act, 1915) introduced development planning for an entire area- a departure from the earlier practice. Thus, TPS were to be prepared for the developing areas of the municipality in the context of the development plan, and were to be the main means of implementing the development plan.

The Bombay Town Planning Act, 1954 was transformed into the Maharashtra Regional and Town Planning Act, 1966; one chapter of which is devoted to Town planning schemes. These are conceived as mechanisms for implementing the development plans.

Numerous TPS were prepared in Maharashtra, and over 40 schemes were executed in Mumbai alone. Despite their good features, TPS technique has been criticised on account of procedural duplication, considerable delays, and land distribution leading to litigation. The increasing demand of serviced land at affordable prices and convenient locations and the long time period needed to implement TPS have made urban local bodies increasingly reluctant to adopt TPS.

The Mumbai experience stands out for its plurality of land development strategies which can be summarised as follows:

Table 2.3 Plural Land Policies and Strategies in Mumbai

Sl. No.	Predominant Consideration	Land Policy
1	Planning/regularisation of existing/new development in private land	Town Planning Schemes
2	Obtaining land for public purpose or conservation of heritage buildings in already developed areas	Transferable Development Right and Accommodation Reservation
3	Mobilising financial resources	Development of Government land at vantage locations, use of development rights at railway stations, etc.
4	Planned development in fringe areas including redevelopment/renewal of old areas.	Incentive based guided land development.
5	New Town Development in green field sites	Land acquisition under LA Act 1894, with option for one eighth land return.
6	In-situ slum rehabilitation	Incentive based slum redevelopment cross subsidised by market sale component and bonus FSI

These experiences across the country demonstrate the potential for partnerships between the development authority, land owners and the private developers. While some of these cases refer to development of relatively small areas, they also point to the potential for application of the concepts on a larger scale. There is need for transparent procedures and quick implementation of the schemes so that value of the assets created is realised by all parties**.**

2.4 Other Country Experiences

Selected International Approaches: Land Pooling/Readjustment Models

To ensure planned development, while safeguarding the rights of land owners, Land Pooling and Readjustment Models envisage that an equal portion of land is deducted from every agricultural plot as contribution of land for physical & social infrastructure, and to raise resources. Land remaining with land owner is reconstituted so that each gets regular shaped plots and frontage on public road. Land owners contribute fund in proportion to land holding to finance infrastructure development cost. This method has been adopted in TPS in India and had its roots in “land pooling” in Germany, which is being followed in Australia, Japan, Thailand, Taiwan and South Korea.

Land Readjustment Scheme (LRS) in Korea is used as a major tool to secure land for the construction of large complexes. Under the programme, once a certain area is declared as the development site, some portion (one-fourth) of land is set aside for public use such as roads, recreation area and other national facilities (5%) and another portion of land is retained by the government/developer (9 to 10 %) to cover the cost of development. The increase in land value after the development is usually quite high so that original owner still realises substantial profit on his remaining land (60 to 65%). In order to prevent the speculation on

land and capture of the development gains, government introduced Public Development Scheme (PDS) under the Land Development Promotion Act. Under the Act land can be purchased compulsorily. The PDS involves:

- Pooling through acquisition by the government authority without compensation
- Relaying of pooled land
- Carrying out infrastructure work and subdivision of land
- Reallot part of developed land back to the owners, and
- Selling surplus developed land to meet the cost of development.

The method minimises public expenditure in the conversion of raw land to developed urban land. At the same time, original owners end up with reasonable compensation, with the value added plots. The public agency obtains land for circulation, open spaces, etc. free of cost, besides getting residential, commercial and industrial plots through which the amount incurred towards provision of infrastructural facilities is ploughed back.

However, many original land owners feel deprived due to loss of occupation and agricultural income and the cost of moving/displacement. The process of PDS brings public investments in infrastructure and obviates the need for financial transactions which both parties typically find it difficult to make. The public authority does not have to find the cash for land acquisition and the land owners do not have to pay a infrastructure development charges.

2.5 Comparison of Selected Land Development PPP Experiences in India

The following table gives an overview of the models of private sector participation in urban development in Haryana, Uttar Pradesh, Gujarat and Maharashtra.

The basic legal framework for the PSP approach to urban development in the four states is provided in their respective legislations relating to land acquisition and urban development. The regulatory system is again embodied in the urban authorities and municipal authorities. The experiences have varied in the details of land sharing and sharing of responsibilities for development. In Table 3, we have outlined the key features of different approaches. One key feature that should be noted is that many states also specify a policy that is applicable to a specific township or area so that the specific features are applicable to only those geographical areas without affecting the prevailing policies elsewhere.

Table 2.4: Some Key Features of State Experience in Land Assembly for Urban Development

Feature	Haryana	Uttar Pradesh	Gujarat	Maharashtra
Land Assembly	Negotiated market land Purchase by private parties Government acquisition under Land Acquisition Act, 1894 :	Negotiated market land purchase by private parties Govt. land purchase at market value and a number of other payments Allotment of land under Land Infrastructure Bundling approach	Land Acquisition by Government through allotment of • TDR • Cash • one eighth developed land	Similar to Gujarat under the Town Planning Schemes
Minimum Area	100 Acres (10 acres for group housing projects)	Minimum Area : 50 Acres (20 Ha)	Not specified (10 Ha as per practice for TPS) Land return average 50-70%	Not specified TPS 50 to 70 % land return
Reservation for EWS/LIG	20% EWS/LIG (50-125 sq.m plot/flat) 25% plot/flats (on no profit no loss)	20% EWS/LIG plot/flat) 40% units (on no profit no loss)	Poor and slow in providing low cost housing, mainly serves middle and upper income	Low priority to EWS
Scope and Coverage	Mainly Greenfield	Mainly Greenfield	New TP Schemes, Old area Redevelopment, slums/ unauthorized colonies Incentive based Guided land development	Same as in Gujarat
Time Frame	3 to 7 years	3 to 7 years	5 to 10 years upto plan sanction, 3 to 5 yrs for development	5 to 15 years
Major Innovations	Project cost mobilized from developer equity, users installments and commercial financing	Land Infrastructure Bundling One window approach	Land sharing for public roads, greens and facilities without need for acquisition	Plural PPP Policy covering TPS, infrastructure services, /chawls/old city /slums

Feature	Haryana	Uttar Pradesh	Gujarat	Maharashtra
	Equitable FAR for lands required for public roads/ corridors, etc. Lesser restrictions and interference in private sector development.	Purchasable FAR	50-50 cost sharing for ED/ Internal Dev.	TDR Slum re-development, mixed use development, etc Land Monetisation and efficiency Incentivised guided development
Major issues	Resistance from farmers for acquisition, due to compensation issues, litigation, encroachment on govt. lands/roads Piecemeal development due to withholding of land by the owners/farmers/speculators, Disputed land ownership Speculative holding of plots/projects depending largely on outside investors delay in obtaining approvals Difficulty in monitoring profits despite ceiling Scattered location of projects/urban sprawl Lack of external services Lack of inter-departmental coordination EDC/cost recovery not inducing development of services Thrust on MIG/HIG housing		Compromise with planned development Fragmented land holdings and sprawl Long time in finalization and approval of TP Schemes Poor land bank of government/ULB Perceived bias in favour of land owners as ULB subsidies required for TPS Slow implementation Access to social infrastructures/utilities and land difficult and inadequate Lack of social housing Lack of adequate external & internal development and poor maintenance of public facilities	

2.6 Lessons Emerging from Various Practices and Approaches to Land Assembly for Urban Development

Developing an Urban Land Policy

The main considerations of land policy cover following aspects:

i. There is scope for PPP/ and Private Sector Participation (PSP) in the entire gamut of urban development activities. Renewal of existing habitations, green field development, infrastructure services, slum rehabilitation, redevelopment, development of residential, commercial, industrial and recreational areas require optimal utilisation of resources and capacities available in the public and private sectors.

ii. Promoting planned development by carefully specifying development control norms for optimal use of land, conservation of scarce natural resources.

iii. Advance availability of External Infrastructure Services, Social Amenities and Public Greens.

iv. Creation of housing for the EWS

v. Equitable treatment in the assembly of land for the various land owners

vi. Generating revenues from land while keeping housing affordable to the consumers. The various sources of revenues are

- Financial resources by recovery of FAR Charges, Development charges, Conversion Charges, Betterment Levy, that lead to benefits to the population as a whole.
- Devolution of finances generated for Infrastructure Development, Greens and Social Housing to the appropriate agencies responsible for their development
- Property Development on public land for financing of public transport and other infrastructure
- Land and Infrastructure Bundling to achieve infrastructure development under PPP
- Densification of Influence Zone along transport corridor, in-situ Slum Rehabilitation
- Using TDR and Accommodation Reservation Tools for land acquisition and development of public amenities and greens.

ix. Creation of enabling legal and regulatory framework

x. Efficient implementation of policies

We have indicated below some options for realizing additional financial resources for development of urban infrastructure based on experiences in urban development. These are not necessarily applicable to the greenfield development of urban extensions but yet important from an overall perspective.

The Concept of Land pooling and Readjustment: As we noted earlier, in many cities it is becoming extremely difficult to acquire lands on large scale for planned development. In this situation, the process of land pooling and readjustment is being adopted by the governments.

In its basic form, land readjustment involves the preparation of a plan for the development of land which should be acceptable to both the local government and the owners. The areas required for public uses such as streets, parks and schools and so on are set aside, leaving land areas for private development. The EDC, Conversion charges, Betterment levy, and such revenues are obtained against grant of development rights with the surrender of land by the developers for common greens, transport infrastructure and social facilities. The scheme does not envisage in-situ development of land but a portion of land is returned to the owner in the nearest vicinity as per approved layout plan so as to ensure planned development. It provides an early return on the public investment through the sale of certain portion of the land ceded to the local government.

The concept of Excess Condemnation is another method which has been employed to serve the twin objectives of providing a public road, highway or such facility and generate revenue by the acquisition of additional lands which are directly affected by such provision. The adjacent area is developed by the local body, the land value of which increases as a result of facility/road, and it accrues to the local body, rather than to individuals. The concept of property development along major public transport corridors/MRTS has been adopted in Delhi, and also in the planning of urban extensions under MPD 2021 in the form of Facility Corridors. However, the concept is more effective in obtaining land for infrastructure development in which a portion of land adjacent to the new infrastructure is returned to the owners so that they gain from the appreciation of property prices in return for the land forgone.

The Concept of White Zoning: As adopted in Singapore, white zoning allows flexibility in land use for the land owners. Depending upon the feasibility of land use and floor area permissibility, the identified areas can be redeveloped subject to the payment of relevant land use and FAR charges. This approach can strengthen the financial base for infrastructure development by the urban local body and provide necessary services.

The Concept of Incentive/Additional Floor Area: Relatively low and uniform floor area Ratio (FAR) have distorted urban land market by promoting sprawl, increasing transportation and reinvestment activity. It is necessary that the FARs are rationalised to permit higher density development in the areas with adequate infrastructure and public transportation capacities. The likely gains in property values can be recouped by the authorities through charges for infrastructure development. For regularisation of additional floor area coverage on residential buildings and farmhouses in Delhi, the concept of payment of additional Floor Area Charges had been notified by the Government of India (1998).

Betterment Levy: Betterment levies are imposed on land owners to finance urban development/public services by the ULB /service agencies. But use of this instrument requires strong partnership between the service agencies and the residents.

Infrastructure Bundling: Urban projects, such as slum redevelopment, roads, and airports are being financed through award of land for development to partly compensate the cost of development. Slum Rehabilitation at Tekhand, IGI Airport, New Delhi, redevelopment of the New Delhi Railway Station, Sports City/F-1 Racing Track, Yamuna Expressway (UP) and 1,000 km Ganga Expressway in Uttar Pradesh are some of the examples of such projects where the cost of infrastructure development is part-funded by the award of land rights. However, the authorities will need to build land banks to make such schemes possible.

Special Purpose Vehicle (SPV) mechanism is being adopted for integrated city level major infrastructure projects that can be financially viable, but face difficulties in raising resources.

Such projects can be funded through financial SPV for core projects like integrated transit corridors, roads, highways, water supply, sanitation, public transport, land development, power generation, etc. The DDA/government provides support in the form of land, equity contribution, package of concessions, dedicated levies to repay loans and a transparent regulatory framework.

Transferable Development Right: As per RBI's Notification number FEMA 1/2000-RB dated 3rd May, 2000, 'Transferable Development Right' means certificates issued in respect of category of land acquired for public purpose either by Central or State Government in consideration of surrender of land by the owner without monetary compensation, which are transferable in part or whole. Transferable Development Right (TDR) is compensation in kind to a land owner who is surrendering his land to a local government/Authority. TDR means making available certain amount of built up area (or raw or developed land) in lieu of the area relinquished or surrendered by the owner of the land so that he can use this land area either himself or transfer it to some other person for an agreed sum of money. The owner of any land which is required for road widening for the formation of new roads or development of parks, playgrounds, civic amenities, etc. shall be eligible for the award of Transferable Development Rights. Such award will entitle the owner of the land in the form of a Development Rights Certificate which he may use himself or transfer to any other person or agency. As such, TDR is a certificate from local government that the owner of a property gets for developing public utilities such as parks, schools and hospitals. The TDR may specify the location where the built up area would be provided under the certificate.

Accommodation Reservation: The concept of Accommodation Reservation allows the land owners to develop the sites reserved for an amenity in the development plan using full permissible FSI/FAR on the plot subject to agreeing to entrust and hand over the built-up area of such amenity to the local authority free of all encumbrances and accept the full FAR as compensation in exchange. The area utilised for the amenity shall not form part of FAR calculation. Reservations such as social housing, parks, utilities, retail markets, dispensaries, etc. can be implemented by this way wherein local authority is not required to incur expenditure on land acquisition.

In case of road widening and construction of new roads the local authority can grant additional Floor Space/ FAR on 100 per cent of the area required for road widening or for the construction of new roads proposed under the development plan, provided the owner surrenders the land for widening of construction of new roads to the local authority free of all encumbrances and accept the additional FAR as the compensation in exchange.

The various experiences and innovative measures adopted by different cities and regions point to the potential for improved performance on urban development front. The need for holistic approach to urban development is necessary not only in the plans for urban areas but also in the management processes of development. Achieving cooperation from all stake-holders is necessary for efficient implementation of urban development projects.

Chapter 3

The Three Proposed Alternative Models of Land Pooling

3.1 Introduction

Consolidation of land is necessary for planned development of urban areas to optimise the use of this scarce resource. Provision of infrastructure services such as water, sanitation, transport, communications and electricity, construction activities and organisation of economic activities become more efficient when land utilisation is planned at a larger level than individual land holdings. Private sector partnership in land consolidation is likely to be an effective mechanism for the government to achieve urban development more quickly if the mechanism for land consolidation is attractive to the private sector under the specified planning norms. One approach to land consolidation is to transfer land in a specified area to a common pool and then assign back land for development as per development plans. Land pooling, therefore, becomes a tool for land consolidation and planned development. In the present study, we have examined the economic viability of three alternative models of land pooling, a process which is accomplished by voluntary participation of the land owners in urban development, and examined the implementation issues associated with the process.

In this chapter we outline the salient features of these three models. Detailed assessment of economic viability of the models is presented in the following chapter.

A common feature of all the three models is that land would be first transferred by the land owners to the development authority so that the authority obtains access to the entire planning area such as a ‘planning zone’ or a ‘neighbourhood’ which can be served by common infrastructure facilities. The development authority then returns a specific share of the transferred land to the land owners with rights to develop the land for urban use as per the land use plans.

The implicit understanding is that the external development of infrastructure would be the responsibility of DDA and the internal (peripheral) development would be as specified under the alternative models. The cost of external and internal development may have to be borne by the developers of the property who would then recover this cost from the final purchasers of developed property along with the cost of development and other taxes and levies. Thus, the land owners would get a proportion of land back with development rights and external infrastructure and the DDA would get the land for external development and other uses.

The MPD 2021 would remain the planning anchor for the process.

As the process is based on voluntary participation of the land owners and then the private developers who may become partners in the process of property development, the land pooling models would require adequate incentives to the land owners, to the developers and at the same time enable infrastructure development to serve the population which would reside in this new development.

The underlying framework for the three models is similar to the one used in many other land pooling models reviewed in Chapter 2. The Town Planning Schemes in Gujarat or the Land Adjustment Programs in Korea demonstrate the principle of land transfers for planned development. The main difference in these two approaches and the present case is that in Delhi, we are looking at consolidation of large tracts of land for greenfield development.

It may also be important to state the key objectives of the land pooling approaches from different perspectives:

- From the perspective of the development authority, the objective is to achieve planned housing development efficiently and quickly so that the city obtains adequate supply housing stock to meet the rising demand and also to ensure adequate supply of housing to meet the housing needs of the economically weaker sections of the society at affordable prices.
- From the perspective of land owners, the land pooling models should provide adequate incentives for them to supply land for urban use.
- From the perspective of private sector developers (there may also be public sector developers), there should be adequate incentives for them to participate in the development process.
- Finally, proper regulation of the development process with transparency and quality assurance is also necessary to ensure protection of rights of different stake-holders.

Work on all the three models was initiated or carried out by DDA.

3.2 The key processes in land consolidation in the three models of land pooling

We first outline these three main models of land pooling. To formalise the ideas we focus discussion on the basic underlying model for the assembly or pooling of 40 hectares of land. Variations of the basic model arise from the differences in the parameters of FAR, ratios of exchange of land between the land pooling agents (or land owners) and the development authority. There are variations in some of the parameters within each of the three main models because of land pools that are smaller than 40 hectares.

The starting point in the description of any land pooling model is to specify the parameters of land use that is allowed to the land owners who pool their land. The parameters of land use as per the MPD 2021 are summarised in Table 3.1.

Table 3.1: Land use parameters

Land use	% of gross land area (Approximate)
1. Gross residential (Zonal level)	
• Internal roads/ circulation/ tot lots	10.0
• Local commercial	2.5
• Local facilities	2.5
• Net residential	35.0
Sub-total zonal level	(50.0)
2. City level	
• Commercial	5.0
• P & SP	10.0
• Industrial	5.0
• Roads/ circulation	12.0
• Greens	18.0
Sub-total city level	(50.0)
3. Total	100.0

Note: The MPD 2021 provides a range of land use allocations under different conditions. We have chosen a representative percentage distribution within the given range.

The other key parameter determining the development of built up area under different models of land pooling arrangements is the Floor Area Ratio (FAR).

As we had noted previously in Chapter 1, the FAR has been increased under MPD 2021 by about 50% from the basic FAR provided in MPD 2001. We also consider the city level population density envisaged under MPD 2021 as 250-300 persons per hectare (pph) and gross residential level density is 500 pph. The neighbourhood population for 40 hectares of land pooled is therefore 10,000 or dwelling units with an average household size of 4.5 numbering 2224. We have summarised the basic average permitted FAR along with its range below (also in Table 1.3).

a) Residential construction: FAR of 200% of net land
b) Commercial properties: FAR of 125% of net land (the range is 100 to 250%)
c) Industrial properties: FAR of 120% (range of 150 to 200%)
d) Public and Semi-public properties: FAR of 120% (Range of 200 to 400%).

In the case of residential properties also there is considerable variation in the FAR for housing provided in the MPD 2021. There is enhancement of FAR in redevelopment areas subject to a ceiling of 4.0. There is provision of additional 15% FAR for EWS and social housing.

There is a process of consolidation or assembly and transfers between the pooling agents and DDA underlying all three models. We provide an illustration of this process in Charts 1 and 2.

The Model-I considered here is the model of land assembly and development as proposed by the Association of Municipal Development Authorities (AMDA).

We have outlined the steps involved in the assembly and transfer of land in some detail here for the Model-I but they are generally the same for all the three models discussed in this chapter. The differences are largely with respect to the extent of land returned to the land owners, the FAR norms and land use permitted on the returned land. The Model-I implies following steps.

1. Assembly of land in the specified areas by the land holders. The land may be assembled by one single owner of land or assembly may require that an ‘association of land owners’ be formed for the purpose which will have a joint ownership over the assembled land (Boxes 1 and 2 in Chart 3.1). The single owner or the association of owners will be the Land Pooling Entity (LPE). The land records for the purpose would have to be valid with adequate legal documentation.

2. There may be no upper limit on land to be pooled for the specific purpose of transfer to DDA.

3. The ownership of assembled or pooled land is transferred to DDA. This transfer is without any financial transaction. No monetary payment is made by DDA for the land. There is no price specified for the land at this stage. DDA will have to take physical possession of this land (Box 3 in Chart 3.1). The transfer would have to be legally valid.

4. At the time when land is transferred to DDA, the land owner(s) will also get rights to developed land to the extent of 15 per cent of the land that was transferred. The land to be provided under these rights would generally be in the vicinity of the land that was originally pooled as far as possible. Also the site of allocation of developed land will be subject to the zonal plans. The DDA would thus transfer ownership of 15 per cent of pooled land back to the LPE who provided the pooled land. If an 'association' of owners pools and transfers land to DDA, DDA would transfer ownership of 15 per cent of such land to this association for the purpose of development of residential property subject to development norms set for the purpose. The transfer may also be in the form of TDRs. Stamp duty may not be paid because there is no financial transaction between DDA and the LPE (Box 4 in Chart 3.1).

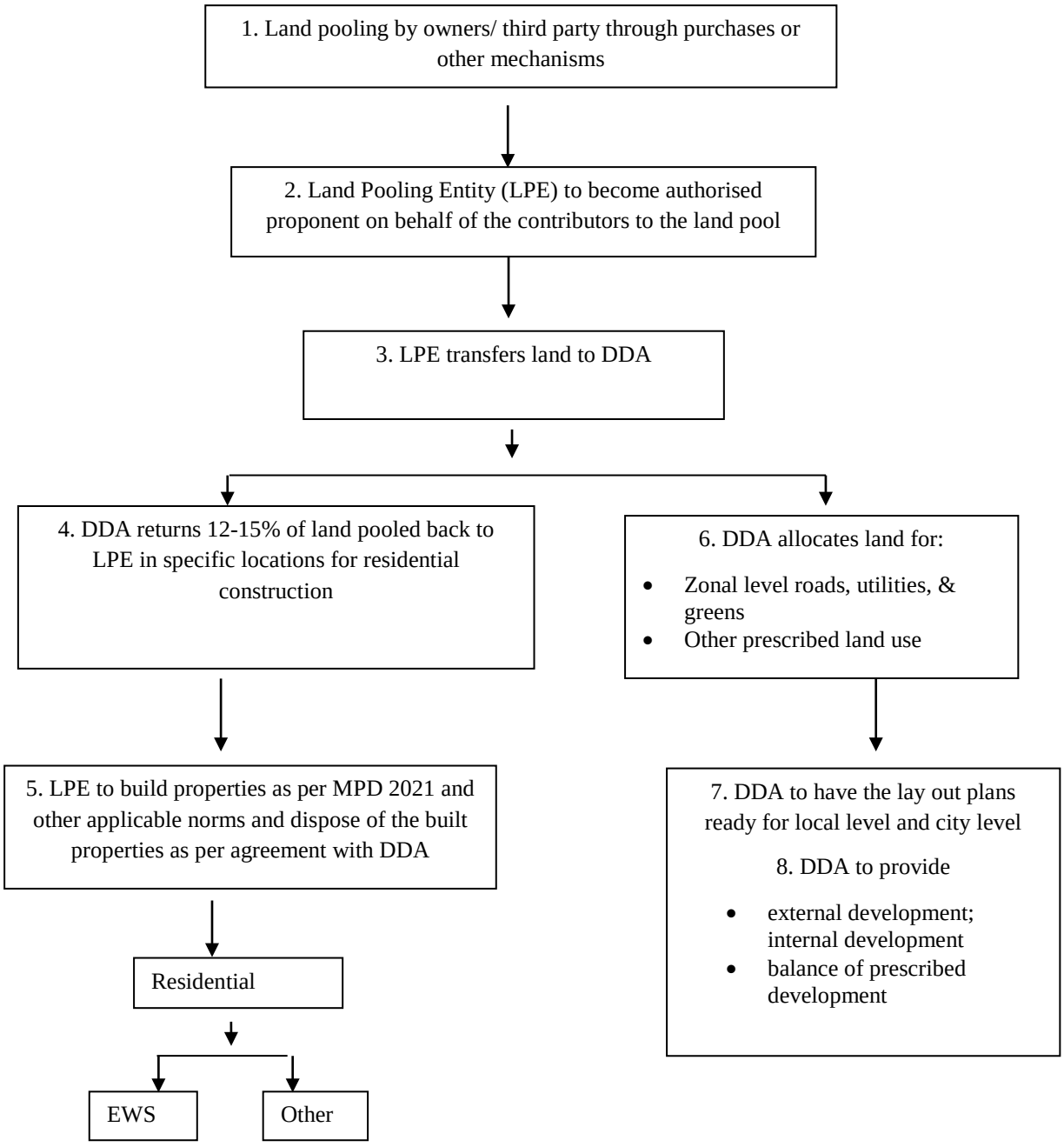
5. The land pooling agent would then be free to build residential property on the land returned by DDA and also dispose of the built property. The LPE may also be free to sell the land to any one else for the purpose of building residential properties. As the LPE is provided with the ownership of the land returned to it, it will be able to carry out further transactions of it with the restriction that the use of land is specified. Whoever is the developer, no EDC or IDC would be charged to them by DDA. (Box 5 in Chart 3.1)

6. DDA gets ownership to 85 per cent of the pooled land without any financial payment. However, DDA will have to carry out at its own cost external and internal development of the area where land is returned to the land pooling entity (Box 6 in Chart 3.1).

7. As per the MPD norms, about 50 per cent of the total zonal area is to be used for gross residential purposes. The net residential area would be 35 per cent of the land pooled. Therefore, after transferring 15 per cent of the land pooled, DDA will have left with it 20 per cent of the net land to be developed as residential property. DDA will also have at its disposal land for developing commercial, neighbourhood facilities, public and semi-public facilities, and industrial uses whether at neighbourhood level or city level. It will also get land for roads, utilities, greens and parks free of cost. DDA may develop these properties either by auctioning land where feasible or on its own. (Box items 7-8 in Chart 3.1). The land owners will get an FAR of 200% for residential construction on the land area returned to them, along with the restrictions if any on the construction of EWS housing under this FAR. The EWS housing may be sold at the market rates.

8. The approach, therefore, is to involve the private sector initially to consolidate land, allow its development on part of this assembled land, and obtain land for generation of revenues for balance of development. The proposed model does not fully specify the development of land beyond the 15 per cent that is returned to the land pooling entity. This may be done by the DDA as per the Master Plan norms.

Chart 3.1: The Urban Development Process under Private Participation (Model I)

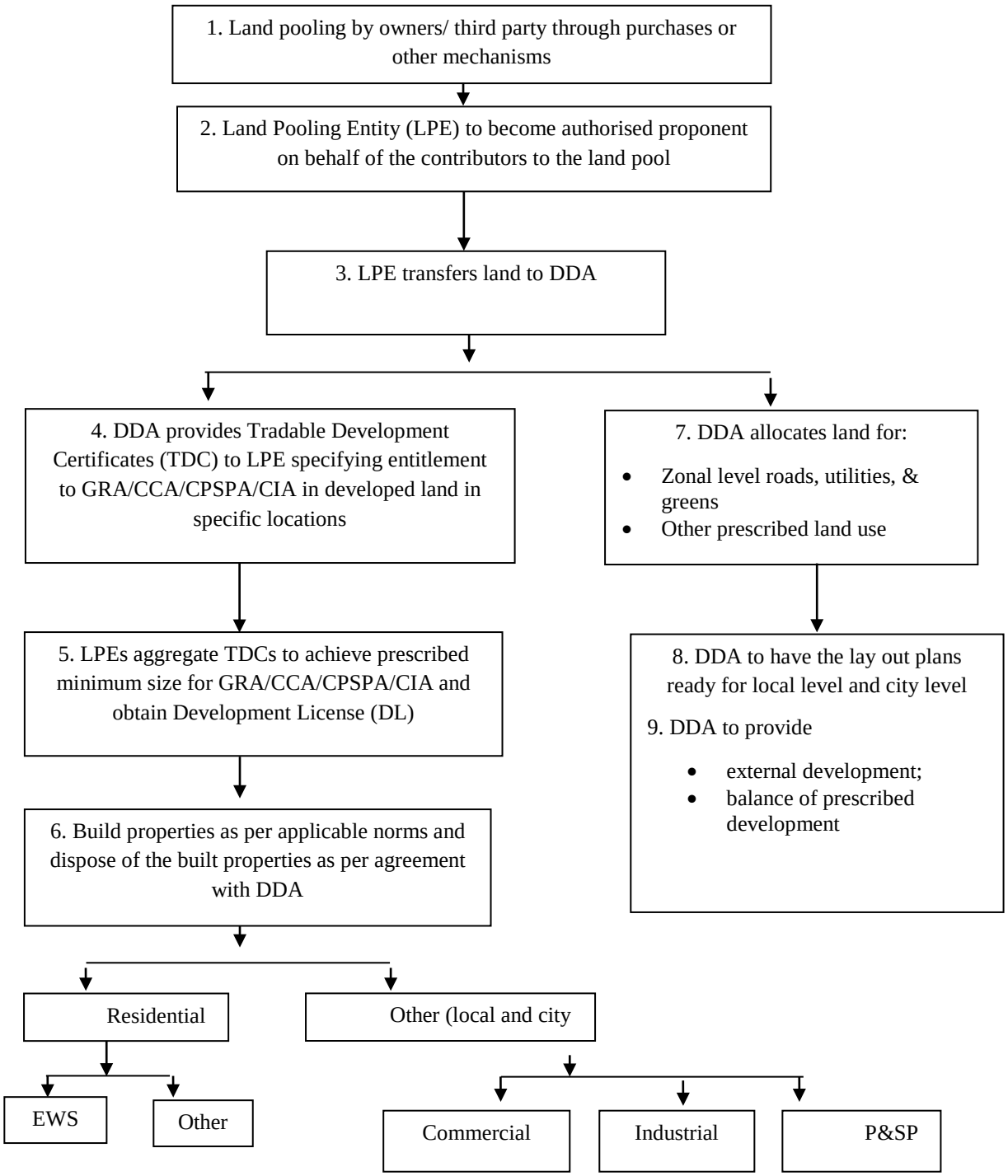


The Models-II and III considered here are the models of land assembly and development proposed by the Planning Department of DDA and the NPIIC of DDA, respectively.

The models imply some steps similar to those noted under Model –I. For clarity we set out all the steps although a number of them are repeated from the discussion on Model-I. The discussion is with reference to the pooling of 40 hectares of land. Between Models I and II, there is variation in the proportion of raw land returned to the LPE, land use allocations in the land returned and the FAR allowed under different land uses. In the discussion below, we note only the process involved and not these parameters. The parameters of land transfer and FAR are discussed subsequently.

1. Assembly of land in the specified areas by the land owners organised as the LPE (Box 1 and 2 in Chart 3.2).
2. The ownership of assembled or pooled land is transferred to DDA. No monetary payment is made by DDA for the land. There is no price specified for the land at this stage. DDA will have to take physical possession of this land (Box 3 in Chart 3.2). The clarity on landownership records would be critical in making the transfer effective.
3. When the land is transferred to DDA, the LPE will get rights to developed land to a specified extent in the land returned by DDA. The return of land may be in the form of TDRs that provide right to develop land in the vicinity of the land that was originally pooled as far as possible subject to land use specifications in the zonal plans. The TDR certificate would specify the location of land which is returned to the LPE where development can take place. The LPE will also get TDRs to develop commercial properties and P&SP properties at the neighbourhood level and city level subject to MPD norms (Box 4 in Chart 3.2). In case there is a minimum land size that is prescribed for development of commercial, industrial or P&SP properties and the TDR allocated for the purpose to an LPE is below this minimum then further pooling of these TDRs would be necessary (Box 5 in Chart 3.2).
4. Once TDR is allocated by DDA, the LPE can build residential property or other property on the land returned and assigned by DDA as per the land use terms and also dispose of the property or the TDR. Whoever is the developer, EDC would be charged to the LPE by DDA on the basis of land returned (Box 6 in Chart 3.2). IDC may not be charged by the DDA but would be charged by the developer/ builder to the consumer just as all other costs would be charged to the consumer. The EDC may also be charged at the time TDR is issued to ensure availability of funds for infrastructure development. In the analysis of Model II, EDC is not recovered from the land owners as higher share of pooled land is retained by DDA than in Model III.
5. DDA gets ownership of balance of the pooled land after returning a specified proportion to LPE.
6. DDA will have land under its control for zonal level roads, utilities, greens and for the development of commercial, industrial and P & SP use after allowing for development of commercial and P&SP by the LPE (Box items 7 in Chart 3.2). In addition DDA may retain some portion of built area for its allocation by specifying proportion of built up area to be marketed by the LPE or those holding TDR.
7. The approach, therefore, is to involve the private sector initially to consolidate land, allow its development on part of this assembled land, obtain revenues for external and internal development and obtain land for balance of development.

Chart 3.2: The Urban Development Process under Private Participation (Models II and III)



Note: GRA= Gross residential area; CCA = City level commercial area; CPSPA= City level public and semi-public area; CIA= City level industrial area;

We now describe the quantitative aspects of the three models.

3.2 Model I

The description here is based on a module of 40 ha. At the neighbourhood level for 10,000 persons, 20 ha area is proposed for residential use including local facilities, parks and circulation as per norms of MPD-2021. The external and internal peripheral development will be provided by the DDA at its own cost, upto the lot/pocket of land to be allotted/returned to the land owner who supplies raw land for pooling. The land owner is not required to pay any charges, such as External Development Charges (EDC), or Internal Development Charges (IDC), Conversion charges, etc. for taking up the development in alternate allotted residential plot.

Break up of land development module of 40 ha: in hectares

Land pooled	40
Gross residential area	20
Net residential area	11
Neighbourhood Facilities	2.5
Park and Playground	4.5
Circulation (Internal)	2.0 (@10% of gross residential area)
Total (Neighbourhood facilities, parks, playground and internal circulation).	9 ha

FAR of 200% on net residential area and additional 15% of FAR for EWS housing leading to total Built Up Area (BUA) of 11*2*(1.15) = 25.3 ha.

a) Number of Dwelling units (DUs)= 2,224 (4.5 persons per DU at 10,000 Population) (on an average gross residential density= @500 persons per ha.)
b) Community service personnel/ economically weaker section/ low income group (CSP/ EWS/ LIG)- 35% of the DUs (additional 15%FAR)

The land owners who pool land and surrender to the government (DDA) would be transferred 12-15% of area pooled as per the lay out plans for residential construction. Thus, on a 40 ha of pooled land the land owners will get back 5 to 6 ha of net residential land on which they can have a BUA of 10 ha to 12 ha including the provision of housing for EWS to the extent of 15% of BUA or 35% of dwelling units (DUs).

Thus, the original land owners will have rights to build residential properties on 6 hectares of land (at 15% land return rule) and the balance 5 hectares would be available to DDA for allocation to other developers. DDA would also have in its possession the balance 29 hectares (out of 40 ha pooled land) to meet all other requirements. While the land owners get back only 6 hectares of fully developed land, they would not be required to pay any other charges.

3.3 Model II

Minimum area for land assembly under this model would be 3 ha (with 15% land returned to owners) and the land returned enhances to 55% of land pooled for 40 ha and above. This model proposes FAR on net residential plot as per MPD- 2021

Break up of land development module of 40 ha

- Land returned to land owners 22 ha
- Net residential land excluding internal roads etc. (50% of land returned) 11 ha
- Basic FAR 200% of net residential land 22 ha
- Total residential floor space permissible 22 ha
- Land for local facilities/ commercial area 2 ha
- Floor space for local facilities (FAR of 120%) and Commercial area (FAR of 125%) 2.4 ha

Out of the 22 ha returned to the land owner, seven hectares are to be used for internal circulation and tot-lots. An additional 15% FAR would be available for EWS housing.

In addition, the land owners also get the development rights for city level development as follows with the same FAR norms as in the local area:

- Land for commercial properties: 0.8 ha
- Land for P&SP properties: 1.2 ha

The DDA will retain 18 ha of land for zonal or master roads, greens and other uses. Based on MPD 2021 norms, the land set aside for roads and greens would be 12 ha. The remaining 6 ha would be exclusively available to DDA for other uses including city level commercial, P&SP and industrial properties in addition to the rights assigned to the land owners to develop 0.8 ha of commercial properties and 1.2 ha of P&SP properties. Total BUA created under this model would be 25.3 ha of residential area including EWS housing and 4.8 ha of other uses or a total of 30.1 ha.

3.4 Model III

This model is more comprehensive of all the three models with respect to the participation of private sector in urban development. It spells out the development strategies for residential, commercial, industrial and public, and semi-public uses of land through public-private partnership. The external development and planning roles are borne by the DDA. The private sector would pool land, provide land to DDA and in turn receive a specified proportion of pooled land with rights to develop land as per the planning norms.

The model specifies that 70% of pooled land would be transferred back to the land owners with rights for development through development licenses. The minimum parcel of land to qualify for development license is as follows:

- Residential- 10.0 ha
- Commercial- 4.00
- Industrial -10.00
- P and SP facilities- 10.00

The minimum lot size that can be surrendered to DDA to participate in the proposed model is 4 hectares. While the land owners will be entitled to rights for development as per the norms indicated in the model, private land owners would have to further pool their rights for

development to get the development licenses as per the above norms. The land owners who pool and surrender land will get in exchange rights to develop residential, commercial, industrial and public/semi-public properties.

Break up of land development module of 40 ha

- Land returned to land owners 28 ha
- Gross residential land including internal roads etc. (50% of land pooled) 20 ha
- Basic FAR 200% of gross residential land 40 ha
- Additional FAR 15% for EWS (on basic FAR) 6 ha
- FAR 200% on 10% surrendered land 2.4 ha
- Total residential floor space permissible- 48.4 ha
- Utilisation of Total Floor Area
  - 25% of non-EWS space for construction of DUs of average area of 80 sqm
  - 75% of non-EWS space for construction of DUs of average area of 155 sqm
  - Residential (EWS) –15% of basic FAR for construction of DUs of average area of 40 sqm
  - Local Facility area- 6 ha of BUA (FAR of 250)
  - Local commercial- 2 ha of BUA (FAR of 250)

In addition, the land owners also get land for developing commercial, industrial and public & semi-public properties with an FAR of 250% at the city level as follows:

- Commercial: 2 ha
- Industrial: 2 ha
- P&SP: 4 ha

In the case of smaller lot sizes of land pooled, the extent of land returned to the land owners and development rights issued vary. Details are taken up in a later chapter.

The main departure from the MPD 2021 norms is the provision of basic FAR of 200% over the “gross residential area”. Although the provisions for ‘internal roads, tot lots still remain within the available gross residential area, the effective FAR on the net area will be in excess of 200%. The basic FAR actually works out to 400% of net residential area because about 50% of the gross residential area is set aside for internal circulation, local facilities/local commercial area. There is additional FAR for EWS housing and on the surrendered land.

The developers or land owners are permitted to market only 60 per cent of the BUA at the city level. In other words, an equivalent of 3.2 ha of land returned to the owner would be available to DDA for its land bank or other uses. Total BUA the private developers/ land owners are permitted to develop is 68.4 ha excluding the land (or FAR) returned to DDA at the city level. The justification for limiting marketing rights of developers/ land owners at the city level is fourfold: (1) there is an additional FAR given to them as 10% of land area retained by DDA (2) the FAR on city level commercial and PSP under Model III is higher at 250 per cent as compared to the MPD norms (3) the private sector participants get development rights for industrial properties also under Model III and (2) additional land or space would be required by DDA for meeting the needs of public or semi-public entities that

may not be foreseen. The later analysis shows that this exchange of land for additional FAR does not make Model III unattractive.

Land owners pay EDC and IDC

The three alternative models of land pooling differ in the extent to which private sector is involved in the development of land pooled. All three models rely on the private sector to achieve the objective of land assembly. They differ on the extent of land returned to the land owners, rights of land use, FAR allowed and so on once the land is pooled. The cost of land development is recovered from the land owners to the extent that certain proportion of land is retained by DDA after pooling, EDC and IDC may be recovered from the private sector when the properties are being built. If EDC and IDC are not recovered a larger proportion of land is retained by DDA. The basic approach to the ratios of land returned to owners to the land pooled, allocation of rights to develop different types of properties and the FAR allowed for different types of land use are in principle intended to achieve development of urban amenities while maintaining commercial viability of the propositions.

3.5 Wider Participation by the Land Owners

In order to make land assembly and development through PPP successful, it is imperative to make land pooling attractive to all land owners. There is also a case to provide incentive to have larger size of land pools so that the TDRs allocated can be more efficiently used and Models I and II have specified land use allocations for different land pools.

In the case of Model-I there is no indication of different land size categories and it is assumed in this analysis that the proportions of 12% and 15% will hold good for all land pool sizes.

The allocation of land use and other parameters specified in Models II and III are summarised in Table 3.2 below.

Table 3.2 Parameters Relating to Land Pooling, Transfer and Retention by DDA and Utilisation of Land Returned to LPE under Models II and III

Land category	Min size (ha)	Max size (ha)	Distribution of Land Pooled			Utilisation of Land Returned to LPE (%)				
			Retained by DDA (%)	Returned to LPE (%)	Total (%)	Gross residen-tial	City level Comer-cial	City level PSP	City level indus-trial	Total
Model II										
A	40.0	None	45	55	100	91	4	5	0	100
B	20.0	40	60	40	100	91	4	5	0	100
C	10.0	20	75	25	100	96	4	0	0	100
D	3.0	10	85	15	100	93	7	0	0	100
Model III										
A	40.0	-	30	70	100	72	7	14	7	100
B	20.0	38.5	35	65	100	76	8	8	8	100
C	10.0	19.2	40	60	100	84	8	0	8	100
D	2.0	9.6	60	40	100	100	0	0	0	100

This broad approach of land pooling with the involvement of private sector is an alternative to the traditional method of land acquisition under the Land Acquisition Act. These alternatives are proposed to make land acquisition faster and also more equitable to the land owners. The approach relies on voluntary participation of the various private sector stake holders, including farmer land owners and its success in achieving planned development depends on the incentives that will lead to voluntary participation. In the next chapter we examine the economic returns to the private sector participants from the three alternative models of land pooling.

Chapter 4
Evaluation of the Alternative Models of Land Pooling

4.1. Backdrop

Three main variants of the PPP approach to land pooling considered in this study were described in the previous chapter. In this chapter we evaluate the three models based on the Internal Rate of Return to the private sector participants in land pooling and development under the three models.

All three models involve varying costs and benefits to different stake holders. We first re-iterate the perspectives of different stake holders.

1. The land owners:

They get revenue by first transferring their lands to the government and then disposing off their TDRs either by direct sale to others or by obtaining development licenses (TDLs) for building properties in the land returned by the government to them and then disposing off these properties.

Their returns are from property disposal after netting out the EDC and IDC they may have to pay, cost of developing and building properties if they choose to build properties on the land returned to them by DDA. Their costs include income from alternative uses of land if any that they are foregoing by pooling and sharing it with DDA, which is reflected in the price of land.

If the land owners sell their land to someone else, rather than participate in land pooling directly, right at the beginning then their revenue considerations would be limited to the sale value of their land. The costs would be the income stream may have realised either by the prevailing usage of land or by participating in land pooling.

In the present analysis we are examining the costs and returns for the entire chain of activities from land pooling to the sale of final properties.

2. The private property developers/ builders

The private sector real estate developers need to acquire land for development and construction. If they become Land pooling entities (LPEs) by purchasing land from original owners, their cost would include cost of land, charges to be paid to DDA in the form of EDC and IDC, cost of land development, construction and any other costs that may be specified by the DDA.

The revenue would be realised from the sale of properties built.

3. The DDA

DDA has a number of goals: (1) planned development of urban areas as indicated in the MPD (2) development of properties for housing and other purposes at an affordable price, especially for the bulk of the population whose income levels would be in the lower and middle income brackets (3) provision of housing to the EWS segment of the society and (4) provision of amenities or the essential infrastructure services to the people who will reside in these new urban areas.

The DDA reflects the perspectives of the final consumer and society at large. The concerns relating to quality of life in the urban area, efficiency and sustainability of the urban economy that develops in the new areas are to be kept in view by the DDA. Synergy of services and development across the city will have to be achieved.

In this framework, DDA will have to ensure that the planned development takes place and the essential services are made available to the people who will live in these areas. The finances required for the purpose would have to be generated.

In essence, the cost for DDA would be any balance of financial requirements in the development of urban areas over and above what may be generated through appropriate pricing of assets and services in the process of development. It would provide the basic planning support for development: preparation of zonal plans and land use specification. It would also ensure development of infrastructure facilities such as roads, water supply, sanitation, power, parks and greens. DDA will have to ensure that the services would be sustainable over a long term in collaboration with the other civic authorities.

Besides the grants from the government at the Centre or the State, its revenues would be the realisation of funds from EDC and IDC levied on the property developers wherever appropriate. It may also get revenue from sale of balance of land available after allocation to other specified uses or from sale of properties developed by it on the land it has retained in the land pooling and transfer arrangement.

To understand how each of the three alternative models meets the residential housing needs, based on the discussion in Chapter 3, we summarise how a population of 10,000 can be accommodated in a gross neighbourhood area of 40 hectares, to illustrate the analysis under the ‘base case’ scenario:

As per the current planning norms, in the 40 ha pooled area, gross residential area is about 50 per cent. Within this, net residential area that becomes available would be a little more than half of gross residential area. At an FAR of 200, the built up area (BUA) would be 22 ha. Under a set of normative assumptions of housing floor space per dwelling unit (DU) distribution of DUs in this neighbourhood is provided in Table 4.1.

The three models we have examined differ in the way they address this requirement.

Table 4.1: Distribution of Residential Built Up Area by types of Housing in a Neighbourhood area of 40 ha as per the MPD-2021 Planning Norms

Type	Area per DU (sqm)	Number	Built up area (ha)
EWS/ LIG (35% of DU)	30	780	2.3
MIG (15% of DU)	90	333	3.0
Other (50% of DU)	150	1111	16.7
All		2224	22.0

Note: Based on household size of 4.5 these dwelling units accommodate population of10000. The calculations are approximate to round off the number of units. In all three models, EWS housing gets additional 15% FAR besides the basic FAR of 200. The additional FAR would give additional BUA of 3.3 ha and the population accommodated would rise to 15,000 or a density of 750 persons per ha of gross residential area.

4. Combining the various perspectives

We do not attempt to integrate the various perspectives in this analysis directly. An overview of the implications of different models to the diverse perspectives is provided in the concluding chapter. The focus of analysis here is the degree of economic incentive that the private sector- including the land owners- would be provided under different models while meeting the various planning norms because this is the critical issue in making the PPP approach feasible. If the incentives are inadequate, the private sector participation would not be forthcoming. The second important consideration would also be the affordability of housing properties, emerging from the various models. While the emerging market demand would be one of the factors affecting prices, the quantum of housing stock that would be supplied would be the other factor. We estimate the rate of return to the LPEs, private developers or builders based on a specified price level for properties. The rate of return would be based on parameters that have been specified under alternative models of land pooling.

The extent of finances required by the DDA to achieve balance of development is not examined here and will require separate analysis.

4.2 Economic parameters for assessing viability of the alternative models of land pooling

The assessment of economic feasibility requires assessment of the costs and revenues from land development.

In terms of costs, the main parameters which need to be specified are:

1. Price of land which the LPE may have to pay for pooling land. For the private parties who pool land for development, land is a major cost item. Even for the land owners who may also build properties and sell, cost of land represents its opportunity cost.

2. Cost of EDC and IDC that would have to be incurred either partially or fully by the developers/ builders in the course of development of properties.

3. Cost of construction.

4. Contingency cost that may have to be provided to meet any variations in the assumptions relating to prices and other risks in operations. We have considered land cost and the cost relating to EDC and IDC are more likely to be affected by contingencies.

On the revenue side, the main parameters that need to be specified are the prices of built up properties that would be sold after construction.

We have made an attempt to compile available information to specify these economic parameters.

However, we do not take into account various taxes and duties that may have to be paid in the process of development of properties as these are the same across the three different models of land pooling. The issue of stamp duty on the transactions in land between the DDA and the land owners on the one hand and the transactions in TDRs will need to be decided by an official mechanism.

Price of Land

There have not been large scale purchases of land in Delhi for housing development in the recent years. The data available from DDA provides information on a few acquisitions exceeding 50 hectares since 2007-08 (Table 4.2).

Table 4.2: Information on land acquisition by DDA in the recent years

	Eastern Zone		Western Zone		Southern Zone		Northern Zone	
Year	**Area acquired (ha)**	**Rs lakh/ha**	**Area acquired (ha)**	**Rs lakh/ha**	**Area acquired (ha)**	**Rs lakh/ha**	**Area acquired (ha)**	**Rs lakh/ha**
2001-02	0.00		0.23	38.78	0.50	47.29	66.04	132.97
2002-03	0.00		633.81	56.00	6.04	64.64	444.56	45.20
2003-04	0.00		0.53	196.79	1.49	75.59	245.51	113.27
2004-05	25.34	3.14	1.44	740.95	0.10	1995.84	261.83	48.47
2005-06	0.53	335.06	160.94	84.61	7.61	129.06	3238.35	54.57
2006-07	0.00		51.75	169.52	0.54	170.20	4.82	60.55
2007-08	1.83	131.12	248.26	61.30	0.00		0.00	
2008-09	0.17	64.73	124.08	64.73	3.05	664.09	169.00	68.20
2009-10	1.64	1838.96	0.00		0.19	20.94	0.99	67.97
2010-11	0.43	67.44	0.00		1.28	115.72	0.00	

Source: DDA

In the Western Zone, there were two acquisitions in 2007-08 and 2008-09 each with more than 100 hectares of land. The price paid was about Rs 60 lakh per hectare. In the year 2006-07 there was one acquisition where land was acquired at Rs 1.7 crore per hectare. In 2005-06, another purchase was made at Rs 84.6 lakh per hectare in the Western zone. The prices would vary depending on the land use to which the land is put, the extent of infrastructure available and so on.

In the North Zone, relatively large purchases were made between 2002-03 to 2005-06 and another purchase in 2008-09. In 2005-06, about 3200 hectare of land was acquired at Rs 55 lakh per hectare. One of the earlier purchases in 2003-04 was at a price of Rs 1.1 crore per hectare. The price paid in 2008-09 for acquisition of 169 hectares was Rs 68 lakh per hectare.

The more recent relatively large purchases were therefore at a price of about Rs 65 lakh per hectare. However, as we noted earlier, the prices vary considerably by the land use and also extent of infrastructure development in the area.

We have also examined the advertised prices of land properties in Delhi from the data available in a real estate property related website, maintained by Magicbricks, a private company. The data relating to the property advertisements in the quarter July-December 2011 are summarised in Table 4.3 below.

Table 4.3: Advertised Sale Prices of Land Property in Delhi during July-December 2011

Area	Average Plot Size in Sqm	Rs Per Sqm	Rs lakh Per hectare
West			
Dwarka	133.3	76,156	7615.6
Dwarka Sector-23	199.2	177,600	17760.0
Najafgarh	123.8	17,640	1764.0
Paschim Vihar	187.2	435,806	43580.6
Rohini Sector-24	62.4	277,357	27735.7
Rohini Sector-28	221.7	218,867	21886.7
Uttam Nagar	127.5	52,558	5255.8
South			
Chattarpur	194.2	49,801	4980.1
Defence Colony	460.2	851,770	85177.0
East of Kailash	210.0	542,111	54211.1
Greater Kailash I	481.3	599,663	59966.3
Greater Kailash II	439.2	671,047	67104.7
New Friends Colony	837.5	567,606	56760.6
Vasant Vihar	562.5	1,102,832	110283.2
North			
Burari	83.6	23,442	2344.2

Source: Data obtained from Magicbricks, Times Business Solutions Ltd.

The advertised prices are extremely high, the lowest being Rs 17.64 crore per hectare in West Delhi. However, the plots that are advertised are extremely small relative to the land pooling that is required for next phase of development in Delhi. In the data cited here, the largest plot size is 837 sqm in size, barely a tenth of a hectare. Moreover, these are advertised prices and actual price at which the land is transacted in likely to be lower. These properties are located in areas where external development is already accomplished and nearly the entire piece of land may be available for construction. Nevertheless, these prices indicate the significant value that can be derived from land development for urban use.

It is difficult to translate these prices into prices of raw or undeveloped land. But the pattern of prices shows that land is more expensive in areas where infrastructure has developed fully and economic opportunities are greater. The price of land in the transactions reported in Najafgarh is Rs 17.64 crore whereas it is Rs 23.44 crore in Burari and Rs 52.56 crore per hectare in Uttam Nagar. The prices zoom in the more developed areas such as Rohini, Dwarka and South Delhi. If the ratio of a plot of developed land to gross area that is acquired for development is 25% and if the ratio of built up area in the developed land to such area in new construction is 2 (FAR may be higher in the developed localities), the price of land in new areas may be 12.5% of the developed areas. The infrastructure development may further reduce the price in the new areas. Based on the above patterns, the price of land in the undeveloped areas is therefore likely to be less than 10% of the advertised price in developed locations. If we take Burari, Najafgarh and Dwarka as the reference points, the price range is Rs 2 to 7 crore per hectare.

The land prices are, therefore, likely to be ranging from Rs 3 crore to 7 crore per hectare for pooling land for development. We may note that in the original documentation of the models, price of land was assumed to be Rs 0.7 lakh to Rs 5 crore per hectare.

Cost of External Development and Internal Development

Infrastructure amenities would have to be provided to the population which would occupy the new urban extensions. While DDA and other civic agencies will have to provide infrastructure, building such infrastructure should be done along with the construction of properties for residential or other purposes. Financing of infrastructure development would be an important issue to be resolved for efficient development of properties.

While some of the costs of infrastructure development may not be recovered from the consumers directly, nevertheless, substantial amounts would have to be recovered to avoid both financial constraints on development and also cross-subsidisation of development from other sources of taxation.

We have attempted to assess the cost of external development based on the data available from DDA for its projects (Table 4.4).

Taking into account the costs associated with roads, water supply, sanitation, electricity supply and development of parks we computed the cost of external development and internal development for three different types of projects undertaken by DDA.

Table 4.4: Cost of Development of Infrastructure in Selected projects of DDA: External and Internal Development (Rs lakh per hectare)

Sl. No.	Project name	External Development	Internal Development
I.	Plotted development		
1	36 residential plots	30.7	160.9
2	Alternative Plotted Development, Dwarka	87.3	126.4
II.	Housing projects		
3	760 LIG houses	81.5	381.2
4	810 EWS houses, Dwarka Phase II	199.5	236.0
5	1800 LIG Houses, Rohini IV & V	415.1	211.5
6	608 HIG Houses, Rohini IV	553.3	157.6
III.	Developing land		
7	Dev. Of 157.83 ha, Rohini IV & V	57.5	109.8
8	Dev. of 157.83 ha, Rohini IV & V	61.6	85.1

Data source: DDA

There is considerable variation in the costs involved in the external development and internal development across projects. External development charges are higher in the housing projects as compared to plotted development or development of land alone. The lower costs in the case of plotted development projects may be because these projects are relatively smaller and a part of larger schemes and therefore may have the benefit of existing infrastructure. Nevertheless, it should be recognised that infrastructure costs may vary from place to place depending on topography, density of population accommodated and type of material used for construction. In the case of two projects where only land development was involved (under

item III in Table 4.4 above), the external development cost is estimated at about Rs 60 lakh per hectare and in the case of Internal Development, the cost is Rs 1 crore per hectare.

The initial documentation of the models (I, II and III) indicated that an external development cost of Rs 1.5 crore per hectare and a similar cost of Internal Development (Rs 1.5 crore/ ha) may be appropriate.

We have also considered the cost of infrastructure development estimated by the High Powered Expert Committee (HPEC) of Ministry of Urban Development. The HPEC has provided average per capita expenditures for all urban areas and for Class IA cities specifically in the country for creating different types of urban infrastructure. The estimates are based on JNNURM projects. Table 4.5 provides the estimates.

Table 4.5: Estimates of Investments for Greenfield Urban Infrastructure

Sl No.	Item	Average Rs Per capita	Rs Per Capita for Class IA Cities
1	Water supply	5099	3517
2	Sewerage	4704	3360
3	Solid waste management	391	900
4	Urban Roads	22974	23460
5	Storm water drains	3526	4140
6	Street lighting	366	2491
7	Total	37060	37868

Source: Report of the High Powered Expert Committee on Urban Infrastructure

The estimates for Class IA cities may reflect to some extent the requirement of resources for City also. There will be variations but it is a benchmark figure for the present study. We also note that the estimates do not include the cost of development of electricity infrastructure, except for the street lighting. Our review of the DDA projects shows that considerable expenditure is incurred on electricity infrastructure. The estimates also do not include development of greens and parks.

The per capita expenditure in Table 4.5 can be translated into per hectare of pooled land on the basis of density norm of 10,000 population per 40 hectare. At the aggregate level, the per capita investment of Rs 37,868 translates into Rs 94.67 lakh. The electricity expenditure based on the data in Table 4.5 above works out to about Rs 6.25 lakh per hectare of pooled land which is quite low as compared to the DDA project experience of about Rs 20 lakh per hectare. The development of greens and neighbourhood parks also varies across projects. We have taken a figure of Rs 20 lakh per hectare towards this expenditure. Together with these additions, the estimate of investments in external infrastructure based on HPEC estimate works out to Rs 1.27 crore per hectare.

However, as some of these estimates are based on older data, we have used a figure of Rs 1.5 crore per hectare of pooled land as the ‘external investment expenditure’ or the External Development Charges (EDC) to be paid by the developers of land to DDA for the baseline scenario wherever applicable. We have also made an adjustment for the cases where the FAR varies across models on the assumption that when density of population per hectare of urban area increases, the infrastructure requirements are also higher. This assumption may be questioned on the basis of some economies of scale that may accrue to the service providers in areas of higher density. But on balance, it may be more realistic to assume higher infrastructure requirements when population density increases as reflected by higher FAR.

The adjustment is based on (1) taking the present specification of Model-II as the standard norm of FAR and (2) the ratio of overall FAR under the alternative models to the Model-II FAR. The baseline cost of EDC corresponding to the FAR norms of Model-II is Rs 1.5 crore per hectare of total land returned to the owner.

As we noted earlier, the 'internal development expenditure' or the Internal Development Charges (IDC) varies considerably depending on the lay out for the properties. The documentation of the three alternative models assumes an IDC of Rs 1.25 crore to Rs 2.5 crore of pooled land. These costs include internal roads, local parks, water supply and sewerage lines within the neighbourhood and electricity infrastructure. Based on a review of the available information, we have taken a baseline figure of Rs 1.5 crore per hectare of net developed land as the IDC incurred by the developers and then charged to the consumers. The same charge is applied to development of properties for P&SP, commercial and industrial use also.

There is also the question of different requirements of infrastructure for different types of land use. However, it is difficult to specify different levels of EDC and IDC for different land uses. Therefore, we have used the same EDC and IDC charges for all the land uses in this analysis.

Details of calculation of EDC and IDC for different models are provided in Table 4.6. We note that the EDC and IDC per hectare of net developed land (roughly the plinth area) is generally higher for Model III because of the higher FAR in this model as compared to this model. We should also point out that EDC is paid by the developer only in Model III in the baseline scenario. IDC is paid by the developer in Models II and III.

Cost of Construction of Properties

The cost of construction also varies across individual properties depending on the materials used and type of construction. We have taken uniform rates for construction cost as follows:

1. Residential, EWS construction: Rs 2800 per sqft of BUA
2. Residential, non-EWS construction: Rs 3000 per sqft of BUA
3. Commercial, local and also city level: Rs 3000 per sqft
4. P&SP, local and also city level: Rs 3000 per sqft
5. Industrial: Rs 3000 per sqft

These costs include all labour, materials and related expenses except for taxes and levies that the consumers bear directly.

Table 4.6: EDC and IDC under the Three Models of Land Pooling

Sl. No.	Item	Units	Model- I		Model-II	Model-III
			12.5% returned	**15% returned**		
I	General parameters (for the case of 40 ha pooled land)					
I.1	Land pooled	ha	40.0	40.0	40.0	40.0
I.2	Land returned to owners	% of pooled	12.5	15.0	55.0	70.0
		ha	5.0	6.0	22.0	28.0
I.3	Net developed land (NDL) $	ha	5.0	6.0	15.0	21.0
I.4	Potential Built Up Area (BUA)	ha	10.0	12.0	30.1	68.4
I.5	FAR (BUA/NDL)	Factor	2.00	2.00	2.13	3.26
I.6	BUA per ha of land returned to owners	ha	2.00	2.00	1.37	2.44
I.7	BUA available to land owner per ha of land pooled	ha	0.25	0.30	0.76	1.71
I.8	Population accommodated per ha of land returned to owners #	Thousand	0.91*	0.91*	0.68**	1.01**
II	Cost of EDC based on current norms					
II.1	EDC per ha of gross area (urban area)	Rs crore/ha			1.50	
II.2	EDC/ ha of NDL (60% of gross area is NDL) based on current density of population or FAR	Rs crore/ha of NDL			2.50	
II.3	EDC/ ha of NDL based on the ratio of Effective FAR to current planning norm	Rs crore/ha of NDL	2.34	2.34	2.50	3.83
III	Calculation of IDC (the same procedure as EDC except that IDC is per ha of BUA))					
III.1	IDC per ha of NDL based on current norms	Rs crore/ ha			1.50	
III.2	IDC/ ha of NDL based on the ratio of Effective FAR to current planning norm	Rs crore/ ha	1.41	1.41	1.50	2.30

Note: * = excluding population in the additional FAR of 15% for EWS housing; **= includes population in the additional 15% FAR for EWS housing; $ = 7 ha is deducted from the gross residential area for internal circulation and tot lots etc. in Models II and III; #= calculated based on the assumption that 10,000 population can be accommodated in 22 ha of BUA (Table 4.1) and for EWS, 1 ha of BUA accommodates 1500 population.

Contingencies

Given the relatively long period of the development process, there may be escalations in costs due to unforeseen factors. We have applied a contingency cost of 12% on land cost, EDC and IDC in arriving at total cost of development of properties. Although all components of costs and revenues may vary over the years because of different factors, we have carried out the analysis in 'constant prices' prevailing now. Again, unless we can specify different rates of

change over time for different items of costs and revenue, the assumption of 'constant prices' provides a good bench mark for the analysis. The provision for contingency is also in constant prices.

Revenue Stream or Price of Properties

The price at which properties are sold would depend on the supply and demand conditions. One guidance to specify the prices of properties that may be developed under the proposed models is the prevailing prices. It is also necessary to keep in view that the development of new urban extensions should lead to affordable housing.

The data available from the 'listed' or advertised prices point to variations across the region (Table 4.7).

Table 4.7: The Residential Housing Property Prices in NCR

Area	Range of Prices Rs/ sqft	Circle rates Rs/ sqft
Dwarka	6500-8000	8101
Rohini	4500-6500-10,000	4444
Gurgaon	4000-6000-8000	
Noida	3000-5000	
Ghaziabad	3000-4000	

Source: (1) For range of property prices: India Apartment Index, Vol 1, Issue 1, April-June 2011, Magicbricks; (2) For Circle Rates: Delhi Government Gazette Notification.

Keeping in view the information on prevailing property prices, we have used the following prices for properties that the private developers/ builders/ LPEs may need to take as a parameter for evaluating land pooling opportunities.

1. Residential, EWS: Rs 3500 per sqft of BUA
2. Residential, non-EWS: Rs 5000 per sqft of BUA
3. Commercial, local: Rs 4,000 per sq ft of BUA
4. P & SP local: Rs 3,000 per sqft of BUA
5. Commercial, local and also city level: Rs 5000 per sqft
6. P&SP, local and also city level: Rs 5000 per sqft
7. Industrial: Rs 5000 per sqft

We also note that in Models II and III we assume that EWS housing is handed over to DDA free of cost in the baseline scenario.

This completes the accounting of the basic parameters of costs and prices that are used in the evaluation of the alternative models of land pooling. The variations in the baseline scenario are provided to assess the sensitivity of the results of the baseline scenario.

4.3 Preliminary Assessment of the Models

Model I

We begin with the specification of various parameters under the model, with respect to transfer of land, FAR allowed, any other costs and then revenue from development and

disposal of properties. We first develop a ‘base case’ in which the parameters specified refer to a benchmark case. Variations of this base case will be taken up subsequently.

The key parameters are provided in Chart 4.1 for the case of land pooling of 40 hectares of land and return of 15 per cent of pooled land to the LPE. We examine subsequently the return to the LPE when the ratio of returned land to pooled land varies. However, the methodology for assessment remains the same as the one for 15 per cent land return.

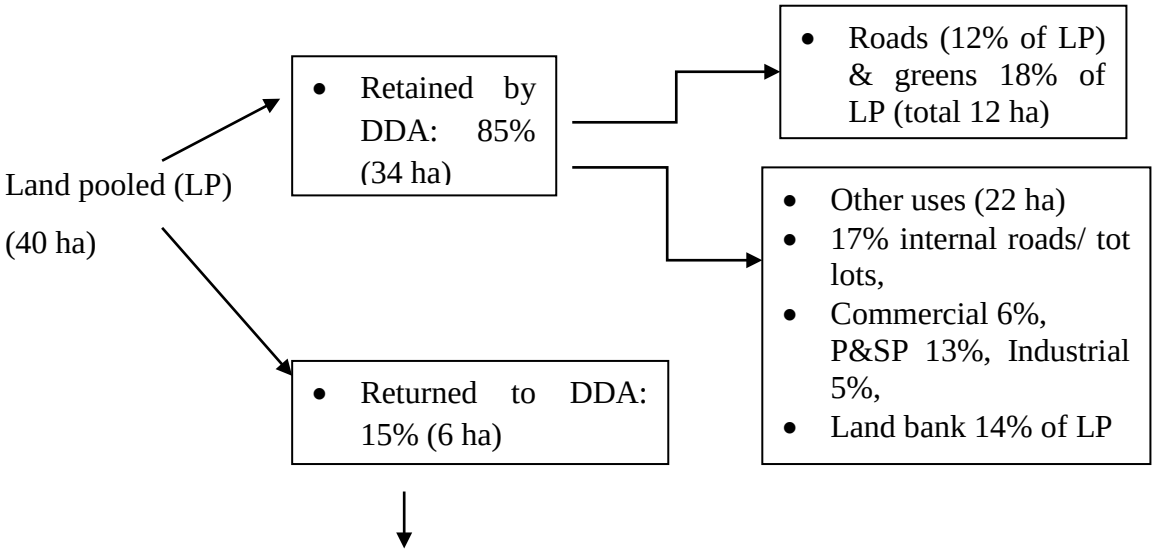
The Model-I is simple in its specification.

- The LPE would get 15 per cent of developed land in return from DDA for the raw land pooled by them and transferred to DDA.
- The LPE does not have to pay EDC to DDA. DDA will have to incur these costs. However, IDC would be incurred by the developer.
- The LPE will get an FAR of 200 per cent of land returned to them for constructing residential property. Thus, in the case of pooling of 40 hectares of land, the LPE will get 6 hectares of land with an FAR of 200 for building residential property. An additional FAR of 15 per cent on the 200 is also possible but since the EWS units would be transferred to the DDA at cost price, it has no implication to the IRR calculation. Accordingly, we have not included the additional FAR of 15 per cent in our calculation of IRR in this model.

The assumptions made for estimating the rate of return for the LPE are provided in Table 4.8, assuming that the LPE will continue to develop the properties as well.

Chart 4.1: Land use allocation under Land Pooling Model I

(Pool size: 40 ha and above; Option where 15% pooled land is returned to LPA)



Type of use	% of LP	Area (ha)	FAR (Factor)	BUA (ha)
Local level				
Net residential	15.0	6.0	2.0	12.0
Commercial				
Facilities				
Internal roads/ tot lots				
Sub-total	15.0	6.0		12.0
City level				
Commercial				
P&SP				
Industrial				
Sub-total	0.0	0.0		0.0
Reserved for DDA for P&SP and Commercial use (land bank of DDA)				
Grand total	15.0	6.0		12.0

Note: LP = Land pooled; This allocation of pooled land to the LPE cannot accommodate population of 10,000. However, DDA may allocate additional land for development to any other agency or to itself for residential construction from this pooled land.

We may also note that in the 12 ha of BUA, based on the proportions of different types of dwelling units indicated in Table 4.1, the BUA developed by the LPE will accommodate only 5460 population. If we include the population accommodated by additional 15 per cent FAR for EWS, then the population accommodated can go up by another 2700. The land that will remain with DDA will have to be used to build the additional housing that may accommodate population that can be accommodated as per the MPD norm of upto 10,000 population in a gross residential area of 20 ha.

Table 4.8: The parameters of cost and revenue to the LPE under the 'base case' for Model-I

Item	Unit	Value
Price of land	Rs crore/ hectare of pooled land	5.0
EDC on land utilized	Rs crore/ hectare of net developed land	Not incurred
IDC on land utilized	Rs crore/ hectare of net developed land	1.41
Cost of construction		
• For LIG houses	Rs/ sqft of BUA	2000
• For Other houses	Rs/ sqft of BUA	2500
Contingency charges	12% on land cost, EDC and IDC	
Price of built up property		
• For LIG houses	Rs/ sqft of BUA	3500
• For Other houses	Rs/ sqft of BUA	5000
Time required for land pooling to be completed, land to be returned and to begin construction	Year	1
Time required for construction to be completed and handing over the houses to the consumers	Years	5 or 10 years in alternative model specification

Note:

i. For the purpose of calculating the rate of return, we have used two alternative time horizons for the completion of land development- from land pooling to disposal of properties. The specification provides a range of results to assess the profitability of land pooling proposal from the land owner's perspective. The framework of two alternative time horizons is applied in the analysis of all three models.

ii. While the total time required for construction is taken as 5 years from the start of land pooling, we assume that, the LPE or a developer will be able to begin disposal from the third year in equal proportion: one third of property to be sold in year 3, another third in year 4 and the balance 1/3 in year 5.

iii. Cost of land is incurred in the first year itself. The other costs of construction are spread uniformly over the five years.

iv. In the case of 10 year model, the land purchases are spread over first three years, construction costs are incurred starting from the fourth year over a 5 year period in equal proportion. Land disposal is spread over 6 year period starting from the 5^{th} year of commencement of land pooling.

The assumptions relating to cost of EDC, IDC, construction cost and price of built up properties is based on a review of a number of data sources noted earlier.

Based on these parameters, the present value of cost for the LPE is:

Land cost + $\sum(1+r)^{-(t-1)}$ $(\text{Cost of construction})_t$ t = 2, -- 5, where t = the year in which land pooling would be done.

The present value of revenue is:

$\sum(1+r)^{-t}$ (Sale value of EWS housing sold + Sale value of other housing sold)$_t$ t = 3,4, 5 where t = the year in which land pooling would be done.

The IRR is calculated so that the present value of cost is equal to the present value of revenue. The estimated IRR for the 10 year project horizon is 3.22% and for 5-year horizon, it is 3.67%.

The rate of return would be higher if greater proportion of land is returned to the LPE, if higher FAR is allowed or if BUA is sold at higher prices than we have assumed.

Model II

As in the case of Model I we first develop a 'base case' and variations of this base case will be taken up subsequently.

The key parameters are provided in Chart 4.2 for the case of land pooling of 40 hectares of land. The base case involves return of 55 per cent of pooled land to the LPE by DDA. The methodology for assessment in the variants of the base case remains the same as the one discussed here.

In this model, the LPE gets back rights to develop 55 per cent of the land pooled through TDRs for 22 hectares (55% of pooled land). Out of this,

Net area available for residential development: 11 ha

Neighbourhood facilities (P&SP): 1.2 ha

Local commercial: 0.8 ha

City level commercial: 0.8 ha

City level P&SP: 1.2 ha

The details of land use allocation are indicated in Chart 4.2.

In the baseline scenario we have assumed that EDC is not charged to the LPE. The IDC would have to be incurred by the LPE and then recovered from the consumers as a cost item. We also assume that the EWS housing is built only on the additional 15% FAR developer will get.

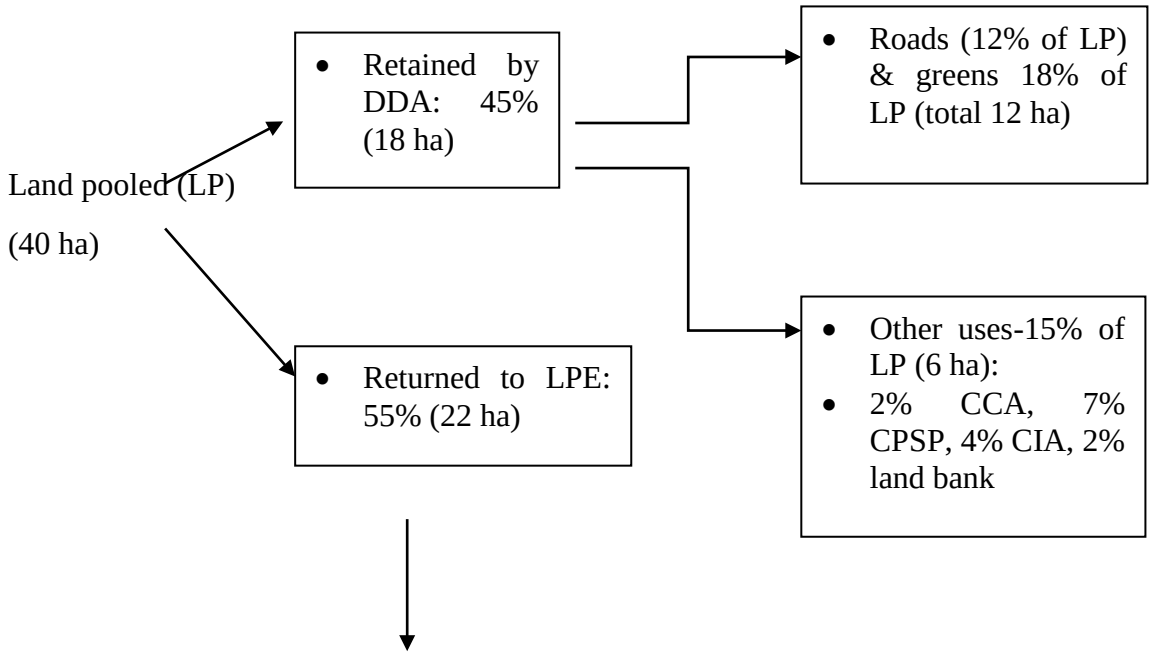
The FARs permitted for different land use categories are indicated in Chart 4.2.

LPE will get additional FAR of 15 per cent of the FAR allowed on the net land for residential construction for EWS housing. The EWS dwelling units would be handed over to DDA at free of cost.

The assumptions made for estimating the rate of return for the LPE are the same as in the case of Model- I except that we make additional assumptions on the cost of construction of

commercial and P&SP properties and their sale values. The assumptions are summarised in Table 4.9. As in the case of Model- I we also assume that the LPE will develop the properties as well, in addition to land pooling.

Chart 4.2: Land use allocation for Land Pooling Model II
(Pool size: 40 ha and above)



Type of use	% of LP	Area (ha)	FAR (Ratio to Net land)	BUA (ha)
Zonal level				
Net residential	27.5	11.0	2.0	22.0
Commercial	2.0	0.8	1.25	1.0
Facilities	3.0	1.2	1.20	1.4
Internal roads/ tot lots	17.5	7.0		
Sub-total	50.0	20.0		24.4
City level				
Commercial	2.0	0.8	1.25	1.0
P&SP	3.0	1.2	1.20	1.4
Industrial	0.0	0.0		0.0
Sub-total	5.0	2.0		2.4
Grand total	55.0	22.0		26.8

Note: The allocations are based on the documentation received from DDA on Model-II. The BUA above does not include BUA of 3.3 ha arising from the additional FAR of 15% of basic FAR for EWS housing.

Table 4.9: The parameters of cost and revenue under the 'base case' for Model-II

Item	Unit	Value
Price of land	Rs crore/ hectare of pooled land	5.0
EDC	Rs crore/ hectare of net developed land	Not charged to land owner
IDC	Rs crore/ hectare of net developed land	1.5
Cost of construction (on BUA)		
• For non-EWS residential units	Rs/ sqft of BUA	2500
• For EWS residential units	Rs/ sqft of BUA	2000
• For local commercial	Rs/ sqft of BUA	2500
• For local facilities (P&SP)	Rs/ sqft of BUA	2500
• For city level commercial	Rs/ sqft of BUA	2800
• For city level P&SP	Rs/ sqft of BUA	2500
Contingency	12% of land cost, EDC and IDC	
Price of built up property		
• For residential units (non-EWS)	Rs/ sqft of BUA	5000
• For local commercial	Rs/ sqft of BUA	4000
• For local facilities (P&SP)	Rs/ sqft of BUA	3000
• For city level commercial	Rs/ sqft of BUA	5000
• For city level P&SP	Rs/ sqft of BUA	5000
Time required for land pooling to be completed, land to be returned and to begin construction	Year	1
Time required for construction to be completed and handing over the houses to the consumers	Years	5-10 years

Note:

i. While the total time required for construction is taken as 5 years from the start of land pooling, we assume that, the LPE or a developer will be able to begin disposal from the third year in equal proportion: one third of property to be sold in year 3, another third in year 4 and the balance 1/3 in year 5.

ii. Cost of land is incurred in the first year itself. The other costs of construction are spread uniformly over the five years.

iii. In the case of 10 year model, the land purchases are spread over first three years, construction costs are incurred starting from the fourth year over a 5 year period in equal proportion. Land disposal is spread over 6 year period starting from the 5th year of commencement of land pooling.

iv. In the baseline scenario EWS DUs are to be handed over to the DDA at zero cost.

Based on these parameters, the estimated IRR for the base case is 14.69 per cent in the 10-year project horizon model and 17.68 per cent in the 5-year horizon model.

Model III

As in the case of Models I and II we first develop a 'base case' and variations of this base case will be taken up subsequently.

The key parameters are provided in Chart 4.3 for the case of pooling of 40 hectares of land. The methodology for assessment in the variants of the base case remains the same as the one discussed here.

In this model, the LPE gets rights to develop 70 per cent of the land pooled. In the case of land pooling of 40 ha, the LPE will get TDRs to develop 28 hectares (70% of pooled land).

Out of this,

Area available for residential housing, internal circulation and tot lots: 16.8 ha.

Neighbourhood facilities (P&SP): 2.4 ha

Local commercial: 0.8 ha

City level commercial: 2 ha

City level P&SP: 4 ha

City level industrial: 2 ha

We also note that only 60% of the City level built up area is marketed by the developers and the rest is handed over to DDA. The rationale behind this reduction in marketing rights of city level area has been explained earlier (section 3.4 in Chapter 3).

The details of land use allocation are also indicated in Chart 4.3.

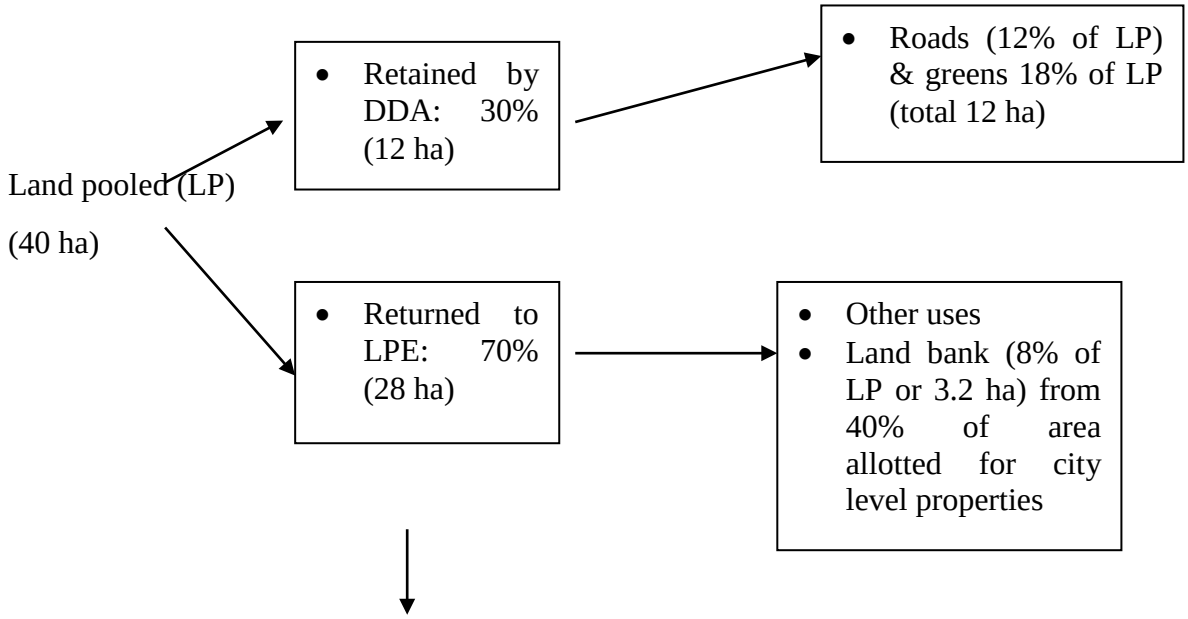
The LPE has to pay specified EDC to DDA, incur IDC and then recover all the costs from the consumers.

The LPE will build EWS housing on 6 ha BUA and hand over to DDA free of charge as part of the agreement.

The FAR permitted for different land use categories is also indicated in Chart 4.3. The FAR provided are higher than the average norms provided by MPD-2021. But as a consequence, the quantum of housing that becomes available under the model is also significantly greater.

The assumptions made for estimating the rate of return for the LPE are the same as in the case of Model II except that we now provide for the cost and revenue from industrial properties to be built by the LPE. The assumptions are summarised in Table 4.10. As in the case of Model I we also assume that the LPE will continue to develop the properties as well.

Chart 4.3: Land use parameters for Land Pooling Model III
(Pool size: 40 ha and above)



Type of use	% of LP	Area (ha)	FAR	BUA (ha)
Zonal level				
Residential (including internal roads/ tot lots)	42.0	16.8	2.0 of gross residential area+ 15% of gross residential area for EWS +10% of land retained by DDA	2* 20* (1+ .15)+ 2*0.1*12 = 48.4
Commercial	2.0	0.8	2.50	2.0
Facilities	6.0	2.4	2.50	6.0
Internal roads/ tot lots				
Sub-total	50.0	20.0		56.4
City level				
Commercial	3.0	1.2	2.5	3.0
P&SP	6.0	2.4	2.5	6.0
Industrial	3.0	1.2	2.5	3.0
Sub-total	12.0	4.8		12.0
Reserved for DDA for P&SP and Commercial use (land bank of DDA): derived from the specification that the land owner/ developer would market only 60% of the allotted area.	8.0	3.2		
Grand total	70.0	28.0		68.4

Note: The model parameters result in a residential BUA of 48.4 ha from the land pool of 40 ha and as a consequence the model accommodates more than 20,000 population.

Table 4.10: The parameters of cost and revenue under the 'base case' for Model-III

Item	Unit	Value
Price of land	Rs crore/ hectare of pooled land	5.0
EDC on land utilized	Rs crore/ hectare of net developed land	3.86
IDC on land utilized	Rs crore/ hectare of net developed land	2.32
Cost of construction		
• For EWS houses	Rs/ sqft of BUA	2000
• For Other houses	Rs/ sqft of BUA	2500
• For local commercial	Rs/ sqft of BUA	2500
• For local facilities (P&SP)	Rs/ sqft of BUA	2500
• For city level commercial	Rs/ sqft of BUA	2800
• For city level P&SP	Rs/ sqft of BUA	2500
• For city level industrial	Rs/ sqft of BUA	2~~8~~5<u></u>00
Contingency	12% of land cost, EDC and IDC	
Price of built up property		
• For EWS houses	Rs/ sqft of BUA	Not marketed
• For Other houses	Rs/ sqft of BUA	5000
• For local commercial	Rs/ sqft of BUA	4000
• For local facilities (P&SP)	Rs/ sqft of BUA	3000
• For city level commercial	Rs/ sqft of BUA	5000
• For city level P&SP	Rs/ sqft of BUA	5000
• For city level industrial	Rs/ sqft of BUA	5000
Time required for land pooling to be completed, land to be returned and to begin construction	Year	1
Time required for construction to be completed and handing over the houses to the consumers	Years	5 and 10 years

Note:

i. While the total time required for construction is taken as 5 years from the start of land pooling, we assume that, the LPE or a developer will be able to begin disposal from the third year in equal proportion: one third of property to be sold in year 3, another third in year 4 and the balance 1/3 in year 5.

ii. Cost of land is incurred in the first year itself. The other costs of construction are spread uniformly over the five years.

iii. In the case of 10 year model, the land purchases are spread over first three years, construction costs are incurred starting from the fourth year over a 5 year period in equal proportion. Land disposal is spread over 6 year period starting from the 5^{th} year of commencement of land pooling.

Based on these parameters, the estimated IRR for the 'base case' works out to be 28.03 per cent in the 10-year project horizon model and 31.49 per cent in the case of 5-year horizon model.

A summary of the Preliminary Assessment

The 'base case' scenario presented for the three models shows that the incentives to the private sector vary considerably across the three models. There are some critical assumptions that can affect the returns to the private sector in the framework we have adopted for analysis.

These critical points are:

Model I:

- The land returned to LPE as a ratio of land pooled.
- FAR norms remain as per the MPD-2021 average norms.
- The EDC is not charged to the developer. But the IDC is to be incurred by the developer.

Model II:

- The land returned to LPE as a ratio of land pooled.
- FAR norms remain as per the MPD-2021 average norms and additional FAR for EWS housing.
- EWS housing to be handed over to DDA at free of cost.
- EDC is not charged to the developer. IDC is to be incurred by the developer.

Model III:

- FAR for residential housing provided on the 'gross residential area' and additional FAR for EWS housing
- EWS housing to be provided free of cost to DDA.
- LPE is involved in all aspects of urban development: residential, commercial, P&SP and industrial properties.
- DDA gets 40% share in the developed BUA for city level commercial, P & SP and industrial properties.
- EDC and IDC are charged to the private sector developer/ land owner.

Thus, the models differ in two key parameters: (1) land returned to LPE as a proportion of land pooled and (2) FAR allowed. The variation actually determines the return to private sector agencies who are to be the partners for developing the new urban areas.

In all the three models, price of land used for land pooling is critical to the economic viability of land pooling and development.

We present some simulations of the base case for the three models to assess the sensitivity of the results to some of the critical assumptions.

At a general level, we should also note that the final price of housing that determines IRR from different approaches would also be equally important. Given the pressures on housing that are likely from the increasing population of Delhi, increased availability of housing can keep the prices affordable. Competition in the industry is required to keep housing prices in check. Therefore, we also require approaches that can create more housing quickly.

Finally, besides the increased supply of housing, there is also the need for water, sanitation, power and transportation. Capacity of the city to provide these services should also be taken into account in raising supply of housing.

4.4. Detailed Analysis

We first present a comparison of the base scenario itself under a time horizon of five years and 10 years. The construction is spread over a five year period and the revenue begins with the sale of properties in Year-3. In the case of a 10-Year model, revenues begin to be realized in Year-5 and they are spread over the next 5 years. The results under two time-horizon models are presented in Table 4.11. The table also provides the results for the four land pool categories for which land pooling is offered.

Table 4.11: Calculation of IRR in the Base Scenario under Two Time Horizons: 5-Years and 10- Years after land pooling

Sl. No.	Item	Units	Model- I		Model-II	Model-III
			Land returned 15%	Land returned 12.5%		
I	**Land pool of 40 ha and above**					
I.1	10 year model	%	3.22	-0.08	14.69	28.03
I.2	5 year model	%	3.67	-0.10	17.68	31.49
II	**Land pool of 20 to 39 ha**					
II.1	10 year model	%	As in I.1	As in I.1	9.65	27.08
II.2	5 year model	%	As in I.2	As in I.2	11.90	30.57
III	**Land pool of 10 to 19 ha**					
III.1	10 year model	%	As in I.1	As in I.1	10.66	26.24
III.2	5 year model	%	As in I.2	As in I.2	13.13	29.78
IV	**Land pool of 3 to 9 ha**					
IV.1	10 year model	%	As in I.1	As in I.1	2.59	21.75
IV.2	5 year model	%	As in I.2	As in I.2	3.29	25.46

These baseline results point to some important patterns in the rate of return on investment in land pooling and development.

- First, a general point: as revenues are realised in the 5-Year Model much earlier than in the 10-Year model, the IRR in the former case is higher than in the latter. The implication clearly is that processes and procedures that allow completion of the projects quickly will attract more competition and funds into land pooling and development.
- The IRR is just about 3.7% in the case of Model I in the 5-Year or 10-Year alternatives even when 15% of land is returned to the owner as developed land. This clearly is not an attractive return to private investors under the given parameters of the model, including the assumed price of final properties.
- The Model-II provides an IRR of 17.68% under the 5-Year time horizon. This rate of return drops sharply for the lower land size categories. We also note that the return is slightly higher in the case of land pooling of 10-19 ha as compared to the land pooling of 20-39 ha, mainly on account of allocation of higher proportion of land to residential construction in the smaller land pool and the associated higher FAR. If we increase the land share of the owners in the land pooling arrangement, the IRR in that case would rise. But the reason for differential rates of land shares in different land categories was to provide an incentive for the small land owners to pool their land into larger parcels.
- Model III provides the highest returns to investment among the three models in both the time horizons. The rate of return is generally higher for the land pooling of larger sizes. The estimated return remains high in all size categories of land pooling relative to the other two models.

The differences in the IRR across the three models draw out the factors that critically affect IRR in these three models. One is the FAR that is different across models. Second is the ratio of land returned to LPEs to the pooled land.

There are other parameters that affect the findings on IRR. First is the cost of land which the LPEs and land developers/ builders should take into account. Second is the rate at which the EWS housing is handed over to DDA: in Models II and III, we have assumed that EWS housing is transferred free of cost to DDA which in turn may dispose of the property at some pre-determined rates.

We have carried out some simulations of the model to calculate IRR under alternative assumptions on some of the key parameters of land pooling models. The various simulations are:

1. **Land Price:** Three simulations were carried out besides the baseline case of Rs 5 crore per hectare. The alternative land prices used are Rs 3 crore, Rs 7 crore and Rs 10 crore per hectare. The other assumptions are as in the baseline case.

2. **FAR alternatives:** Two alternatives besides the baseline case are simulated in the case of Models I and II. The alternative FAR for residential construction is 250% and 300%. All other assumptions in these cases are the baseline case.

3. **EDC and IDC:** In the case of EDC, the baseline scenario is Rs 1.5 crore per hectare of pooled land. The alternatives are Rs 1 crore per ha and Rs 3 crore per ha. The EDC alternatives are effective only in the case of Model III to show the sensitivity of the results to this assumption. In the case of Model II simulations are carried out only in the case of IDC as land owners are not charged for EDC. We do not carry out simulations of EDC in the case of Model I because the land owners are not paying for these costs as they are parting with much larger share of land pooled by them in this Model. In the case of Model I we have not carried out simulations on IDC because the IRR in the baseline scenario is quite low and reduction in IDC would not make significant difference to the IRR.

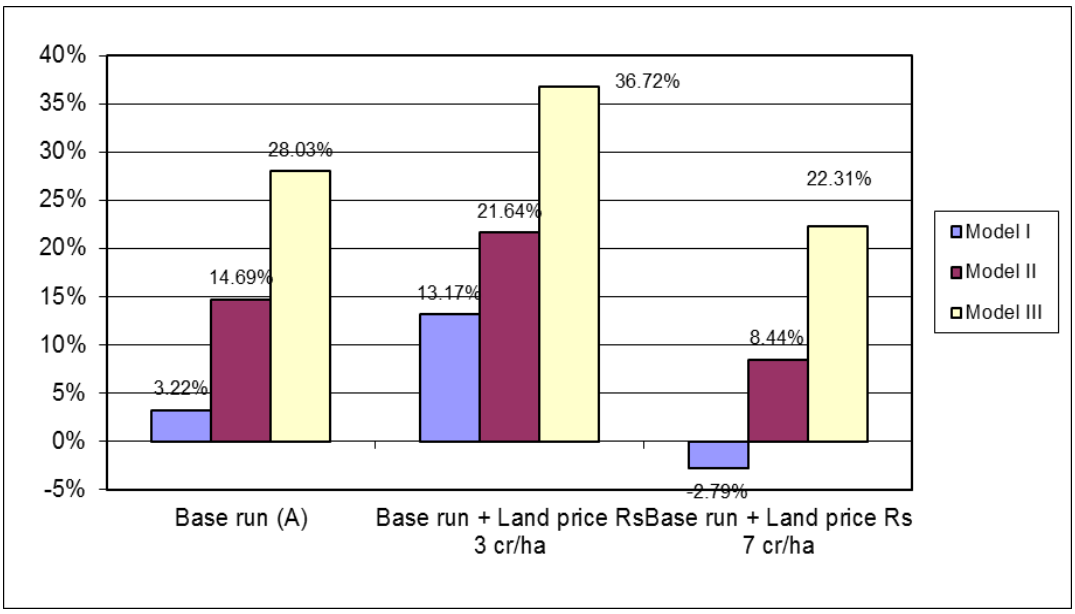
4. **FAR on Gross residential area:** In the case of Model –II we carry out a simulation where the FAR of 200% is applied on gross residential area available to LPE. The simulation is almost equivalent to making Model-II similar to Model- III, but EDC is not charged to land owners in Model II unlike in Model III.

5. **EWS housing disposal:** 50% of EWS housing is transferred to DDA at free of cost; the remaining 50% is transferred to DDA at a price equal to cost of construction. The simulations are carried out in the case of Models II.
6. **Percentage of land returned to LPE out of land pooled:** In the case of Model-II we carry out a few additional simulations. The percentage of pooled land returned to the LPE is increased from 55% to 60% and 65%. In one simulation where the percentage of land returned to the LPE is 65% along with 50% of EWS housing being transferred to DDA at a price equal to construction cost, we also increase FAR on residential housing to 250% from the baseline scenario of 200%. These simulations demonstrate the impact of various changes on IRR in the case of Model-II.

The findings of alternative simulations are summarized in Table 4.12 for the case of land pooling of 40 hectares. The key points are:

- The Model-I provides the lowest IRR among three models. When land price is reduced to Rs 3 crore per hectare from Rs 5 crore of the baseline scenario, in the 10-Year time horizon case, the IRR rises to 13.17% when 15% of pooled land is returned to the LPE. When this percentage of returned land is only 12.5% the IRR drops to 9.49%. Similar pattern emerges when the time horizon is 5-Years. Chart 4.4 illustrates the result in the case of 15% return of land to land owners in the 10-year project horizon models.

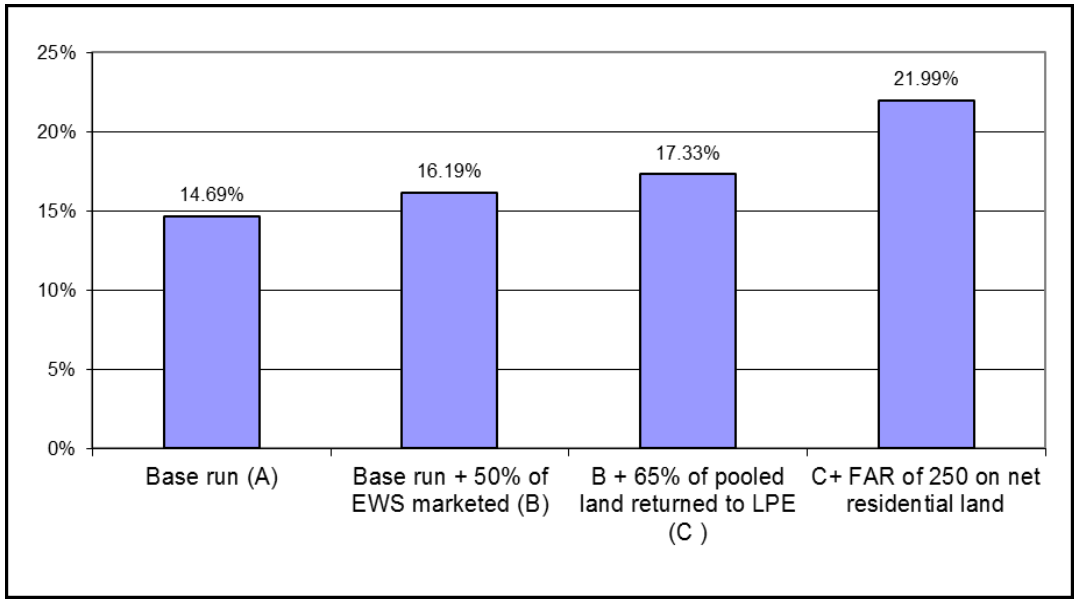
Chart 4.4: IRR under Alternative Land Prices in the 10-Year Project Horizon



Note: Model I here is the case with 15% return of pooled land to the owners.

- In Model-II, when land price is dropped to Rs 3 crore from the baseline scenario of Rs 5 crore per hectare, the IRR increases to 24.72% from 17.68% in the baseline scenario when the time horizon is 5-Years in both the cases (Table 4.12).
- As the percentage of land returned to LPE increases to 60 from 55%, the IRR increases from 14.69% in the baseline case to 16.09% in Model-II, 10-Year horizon. When we specify that 50% of EWS housing can be marketed, the IRR rises further. In the case when the percentage of land returned to LPE is 65%, with half of EWS housing to be transferred at construction cost price and FAR for residential housing at 250%, there is an increase in IRR to 21.99% as compared to the baseline case of 14.69%. While the detailed results are provided in Table 4.12, the improvement in IRR in Model-II under alternative specifications of land transfer ratio, marketing of EWS and FAR on residential construction is illustrated in Chart 4.5.

Chart 4.5: Improvement in IRR in Model-II under Alternative Specifications, 10-Year Project Horizon



- The 10-Year horizon model under the baseline scenario provides an IRR of 28.03% for Model-III and the 5-Year horizon model provides an IRR of 31.49%. Under the scenario of land price of Rs 7 crore per hectare, the IRR in 10-year project horizon is 22.31% (Chart 4.4 above). When land price increases to Rs 10 crore per hectare, the IRR drops to 16.34% under the 10-Year horizon and 19.66% under the 5-Year horizon model (Table 4.12).

The results of analysis have provided us with the rate of return on investment that the private sector participants may get from the three alternative models of land pooling analysed here under specified conditions. An important point to re-iterate is the results of simulation on land prices. Given that the different land pooling arrangements are estimated to provide different returns, what would be the implications of competition for for land. In the case of Model III, we note that at a land price of Rs 10 crore per hectare, the IRR drops to just below 20 per cent, a bench mark in our analysis of 5 year project implementation period. The higher land prices are likely to be internalised by the land owners. However, when the estimated IRR is lower than a bench mark of 20 per cent, the pressure would be to increase the final property price. Land prices may have to drop if there is likely to be no demand for higher valued properties.

Table 4.12: Summary of the IRR under Selected Alternative Scenarios

S.No.	Simulations	10 year IRR				5 year IRR			
		Model I		Model II	Model III	Model I		Model II	Model III
1)	Land Price (Rs crore/ha)	max	min			max	min		
i.	3	13.17%	9.49%	21.64%	36.72%	14.18%	10.45%	24.72%	38.77%
ii.	5*	3.22%	-0.08%	14.69%	28.03%	3.67%	-0.10%	17.68%	31.49%
iii.	7	-2.79%	-5.89%	8.44%	22.31%	-3.28%	-7.02%	10.39%	25.98%
iv.	10	-5.69%	-8.70%	3.11%	16.34%	-6.77%	-10.49%	3.91%	19.66%
2)	FAR (with Rs 5 cr/ha)								
i.	200*	3.22%	-0.08%	14.69%	NA	3.67%	-0.10%	17.68%	NA
ii.	250	7.46%	4.00%	17.86%	NA	8.32%	4.55%	21.13%	NA
iii.	300	11.08%	7.48%	20.54%	NA	12.09%	8.34%	23.94%	NA
3)	EDC (Rs crore/ha)								
i.	1	NA	NA	14.69%	28.66%	NA	NA	17.68%	32.21%
ii.	1.5*	1.39%	-1.79%	14.69%	28.03%	1.55%	-2.05%	17.68%	31.49%
iii.	3	NA	NA	14.69%	26.11%	NA	NA	17.68%	29.30%
iv.	4	NA	NA	14.69%	24.79%	NA	NA	17.68%	27.80%
4)	IDC (Rs crore/ha)								
i.	1	NA	NA	14.96%	28.41%	NA	NA	18.00%	31.92%
ii.	1.5*	3.22%	-0.08%	14.69%	28.03%	3.67%	-0.10%	17.68%	31.49%
iii.	3	NA	NA	13.87%	26.89%	NA	NA	16.68%	30.19%
iv.	4	NA	NA	13.32%	26.11%	NA	NA	16.01%	29.30%
5)	FAR calculated on (with Rs 5 cr/ha land price)								
i.	Net residential area*	NA	NA	14.69%	NA	NA	NA	17.68%	NA
ii.	Gross residential area	NA	NA	23.45%	NA	NA	NA	26.86%	NA
6)	EWS selling price								
i.	50% of EWS sold at cost price	NA	NA	16.19%	29.37%	NA	NA	19.50%	33.02%
7)	Share of land returned in PPP Model								
i.	60%	NA	NA	16.09%	NA	NA	NA	19.21%	NA
ii.	60% (with 50% EWS marketed)	NA	NA	17.33%	NA	NA	NA	20.71%	NA
iii.	65% (with 50% EWS marketed)	NA	NA	18.66%	NA	NA	NA	22.14%	NA
iv.	65% (with 50% EWS marketed and FAR of 250)	NA	NA	21.99%	NA	NA	NA	25.63%	NA

Note: * = Baseline scenario.

4.5 Sensitivity of Model III performance to additional changes in parameters

In the previous section, different assumptions of parameters were applied for Model II to determine the conditions under which the IRR for the model would improve. It was seen that raising FAR and marketing option for EWS housing were two important factors that could improve IRR significantly in Model II. In the same manner, it would be instructive to examine the performance of Model III under different assumptions to determine the conditions under which IRR may decline given the high rates of return presently seen. We have carried out simulations of the economic model of IRR under following conditions for Model III:

i. Increase in EDC given that infrastructure costs can be expected to be higher when density of housing and population would be higher under Model III as compared to the other models. In the analysis provided in the previous section we had seen that when base EDC was raised from Rs 1.5 crore per ha of land pooled to Rs 4 crore per ha of land pooled IRR dropped from 28.03% to 24.79% when the project execution time is 10-years. We therefore, examine the implications to IRR when the EDC charges rise further because of the potential for such increase given the higher infrastructure needs resulting from higher FAR on built up area under the model.

ii. Variations in FAR are introduced in Model III to examine the implications of lower FAR than what is specified in the model. The application of FAR on gross residential area, as specified in Model III is a deviation from the current MPD norms. We examine the likely implications of lower FAR under Model III on its IRR.

iii. Variations in land-return share of land owners under the proposed Model III of PPP. The basic share of land owners in the pooled land is specified as 70 per cent of pooled land under Model III. However, the FAR applied is on the basis of the entire pooled land and not on the share of land owners alone because nearly all housing development is by the private sector. It is because of this specification, the effective FAR (Built up area to net land area used for construction) under Model III is substantially higher than in the other models. In this sense, it is not the land-return share of land owners alone that will affect the IRR of Model III but the change in the specification that FAR is applicable on the land returned to the owners. This change in specification dramatically alters the incentives for land pooling under this model. We have carried out a set of simulations where we apply the FAR norms on land returned to the land owners and when land shares are varied.

<u>Infrastructure costs and Model III:</u>

We obtained the base case scenarios on the basis of EDC of Rs 1.5 crore per hectare of pooled land after a review of information available from a number of projects of DDA and also the assessment available from the High Powered Expert Committee mentioned earlier in this report. We adjusted upwards the EDC for Model III proportionately to the effective FAR to reflect higher density in this model relative to the Model II which adopts the MPD norms. The EDC charges were applied only under Model III and not under the other two models. Given the potential for higher infrastructure costs, we have carried out

simulations where EDC charges go up to Rs 10.7 crore per ha of pooled land. The results are summarized in Table 4.13.

Table 4.13 Impact of higher infrastructure cost on economic viability of Model III

Sl. No.	EDC per hectare of land pooled (Rs crore)	IRR (%) for Model III	
		5- year project execution	10- year project execution
1	1.3	32.21	28.66
2	2.0	31.49	28.03
3	4.0	29.30	26.11
4	5.4	27.80	24.79
5	6.7	25.35	23.44
6	8.0	24.71	22.05
7	9.3	23.10	20.63
8	10.7	21.46	19.16

Notes:
(1) The above EDC for Model III is derived by scaling up the charges to take into account the higher density as compared to the MPD norms reflected in Model II. Thus, EDC of Rs 7 crore per hectare in the case of Model II is higher for Model III at Rs 9.3 crore per hectare of pooled land in Model III.
(2) The calculations are for land pooling of 40 hectares or more.

As the results indicate, the 'bench mark' IRR of 20 per cent is likely even when the infrastructure charges rise substantially upto Rs 9.3 crore per hectare if prpject implementation is 5 years. In this analysis, IDC is maintained at the 'baseline' level and if the IDC also increases then the IRR would be lower than indicated in the table above. The simulation is carried out to provide a reasonable bound on EDC at which IRR on Model III may remain attractive to the private sector while maintaining the prices of final property at the levels assumed in the analysis.

Variations in FAR under Model III:

The FAR specified for Model III is above the MPD norms in terms of FAR on net residential area and also city level properties. If the FAR assumptions under Model III are changed, IRR for the model would be affected. The IRR obtained under different assumptions of FAR under Model III is summarized in Table 4.14.

As FAR is reduced, the IRR declines. When the FAR on residential housing is reduced from 200% or gross area to 175% of gross area the IRR drops by 3.7 percentage points in the 10-year project execution model and 3.4 percentage points in the 5-year execution model.

When FAR for city level development is reduced from 250% to 175% IRR declines from 28.03% for 10 year project execution horizon to 25.83% (Sl. Nos. 1 and 4 in Table 4.14).

If the additional FAR of 10% of surrendered land is removed, the IRR drops by about 1 percentage point (Sl. No. 5 as compared to Sl. No. 1 in Table 4.14).

In all these variations, IRR remains above 20%`when the project implementation horizon is 10 years. The returns are higher when the project implementation period is 5 years.

Table 4.14 Impact of changes in FAR in Model III

Sl. No.	FAR				IRR	
	Residential area (on gross residential area)	City Commercial	City P & SP	City Industrial	5-year project execution	10- year project execution
1	200	250	250	250	31.49	28.03
2	175	250	250	250	29.88	26.29
3	150	250	250	250	28.02	24.35
4	200	175	175	175	29.57	25.83
5	200 and no additional FAR of 10% of surrendered land	250	250	250	30.55	27.08
6	175 and no additional FAR of 10% of surrendered land	250	250	250	28.96	25.38
7	150 and no additional FAR of 10% of surrendered land	250	250	250	27.13	23.49

Note: The calculations are for land pooling of 40 hectares or more. In simulations 1-3, construction cost of 15% of additional FAR for EWS is factored in and 200 FAR on 10% of surrendered land is also factored in.

Variations in Land Return Share of Land Owners under Model III:

As noted earlier, the land return share by itself has no impact on the IRR calculations for Model III unless FAR is applied only on land returned to the land owners. Incorporating this change in model specification and then altering the land return share we have obtained the IRR for different scenarios. For a comparison we have also provided the IRR under all three Models I-III for the base case scenarios. The findings are in Table 4.15.

When FAR is applied on land returned (200 FAR on land returned rather than land pooled), the IRR on Model III declines to 26.03% from the baseline of 31.49% where the land-return share of land owners is 70% for the project implementation period of 5 years. The decline is sharp but still higher than the baseline scenario of Model II. The FAR on gross area, development rights for city level properties and additional FAR of 10% on land retained by DDA help raise IRR for this version of Model III as compared to original Model II. But when FAR is applied on gross residential area under Model II, the IRR is greater than in the now

revised Model III (Table 4.12) because under Model II EDC is not charged to the land owners/ developers.

The model now- with FAR being applied on land returned- is substantially different from the original Model III. The IRR remains at or above 20% in the 10-year project execution horizon even when the land-return ratio drops to 60% (Table 4.15).

Table 4.15 Impact of changes in land-return ratio in Model III

SL. No.	Land returned as % of land pooled	FAR on land returned (residential)	IRR %	
			5-year project execution	10-year project execution
1	70	200	26.03	22.35
2	65	200	25.09	21.41
3	60	200	24.08	20.42
Baseline scenarios (also given in Table 4.12)				
4	Model I (max)	As per MPD	3.67	3.22
5	Model I (min)	As per MPD	-0.10	-0.08
6	Model II	As per MPD	17.68	14.69
7	Model III	200	31.49	28.03

Note: The calculations are for land pooling of 40 ha or more. All the other parameters are as per the analysis carried out for the baseline scenario of Table 4.12.

The alternative scenarios of Model III incorporating different assumptions of parameters show that the economic performance of the Model III remains attractive provided all the parameters can be predicted with accuracy. There is need to provide some margin in the assessment to take into account this uncertainty to retain the attractiveness of the proposed model of PPP to the land owners to participate in the process of development.

In the next chapter of this report we provide an assessment of the overall findings of this evaluation.

Chapter 5
Implementation of Land Pooling

1. Findings of IRR analysis

The analysis in the previous chapter pointed to the higher IRR in the case of Model III relative to the other two models. In Model II, the rate of return under the 10-year implementation plan is about 14.69 per cent in the baseline scenario with land price of Rs 5 crore per hectare and FAR of 200 per cent of net land for residential construction. In Model II, where FAR is on gross residential area and 60 per cent of land is returned to the owners subject to other MPD land use and development conditions, the IRR is estimated at 16.09 per cent in the 10-year model and 19.21 per cent in the 5-year model. The IRR drops sharply when the land price is Rs 10 crore per hectare in the 10-year and 5-year models by 10 to 12 percentage points in Models-II and III. However, the IRR remains close to 20 per cent in Model III even when the land price is Rs 10 crore per hectare when project period is 5 years. In the case of Model-II the IRR drops below 5 per cent when land price is raised to Rs 10 crore per hectare.

It should be noted that the IRR here represents the return on project cost and it is annual return for the project duration. The rate of return on investment is determined by the demand conditions, competition in the market and prices of inputs. In a post-fact situation, actual return on investments may vary from the planning stage. In the case of infrastructure projects, 20 per cent rate of return after taking into account viability gap funding, is considered for financial support. The 'bankable projects' usually require a minimum rate of return of 20 per cent.

Given this criterion, the Model III is the only one that meets the 20 per cent rate of return under alternative scenarios presented in Chapter 4.

Model II provides rate of return of higher than 20 per cent when the land price is Rs 3 crore per hectare, if the FAR is calculated on 'gross residential area' rather than 'net residential area', or FAR is increased to 250 per cent, or 50 per cent of EWS housing is priced at construction cost, or 60 per cent of pooled land is returned to the land owners rather than 55 per cent in the 40 hectare land pooling case. All these cases except for the case of land price of Rs 3 crore per hectare and FAR on gross residential area, lead to above 20 per cent IRR when the time horizon for the project is 5 years. In the case when time horizon extends to 10 years, the IRR drops below 20 per cent.

Model I provides IRR much lower than 20 per cent in all the alternative scenarios we have examined.

2. Overall Assessment and an Optimal Model of Land pooling

The analysis of alternative models presented purely in terms of IRR is clearly not conclusive although it does clarify the likelihood of attractiveness of the proposed model to the private sector including land owners to pool land and create new housing stock.

It is equally important that the benefits of planned development are fully realised whichever model is selected. Benefits are obtained when there is planned development. In the absence of effective planned development, growth of unauthorised colonies without access to proper infrastructure cannot be avoided given the rising need for housing in Delhi. The housing and other facilities that would be developed through the land pooling approach should meet the social needs of the citizens beyond just houses. Managing the supply of land for the purpose is a responsibility of the urban authorities.

Besides the financial performance, the TOR for this study also indicated that the land pooling model should involve minimal government intervention and that it should have the role of a facilitator. An optimal model would, therefore, should be based on (1) financial performance that would attract private sector participation (2) public policy objective of creation of adequate housing stock to meet demand from all sections of the society so that planned development becomes affordable, inclusive and therefore effective (3) public policy purpose of creating physical and social infrastructure for residents so that the living conditions enhance productive capacities of the city and (4) the government intervention is focused on achieving benefits of planned development in a sustainable manner.

The three models we have considered have their own strengths and weaknesses in terms of the broad criteria for an assessment we have outlined above. Two important indicators which influence the success of alternative models in meeting the various objectives are (1) IRR and (2) amount of built up space which may be distributed in different land use categories. We should then examine whether the other objectives set for land pooling approach to development can be achieved through different measures of policy.

The performance of alternative models in terms of IRR has been dealt with extensively in the previous chapter. Model III provides IRR of above 25% in the 5- year project implementation period and also under the10-year implementation period under the baseline assumptions. Model II provides return of less than 20% in the 5 year implementation period and about 15% under 10 year implementation period. Model I provides less than 5% return under either of the two implementation schedules. When the parameters are altered, in some simulations, IRR rises above 20% in Model II, but the changes imply that the FAR would have to be increased to achieve this benchmark. Therefore, in order to meet the objectives of creating housing stock at reasonable prices and attract private sector participation, the FAR norms of MPD would have to be reviewed.

An issue that is related to the FAR is the density of housing or housing construction on a given area of land. If the density is greater, the population accommodated is greater and therefore, infrastructure development would have to be more intensive. FAR is calculated on ‘gross residential area’ in Model III and also the FAR is 250 for city level development. In contrast Model II provides for residential FAR of 200% on net residential area and FAR of 120-125% for city level construction. Therefore, the density is expected to be greater in Model III than in Model II. Table 5.1 below illustrates this point.

Table 5.1 The higher housing density under Model III

Sl. No.	Criterion	Model I (max land return of 15%)	Model II (land return of 55%)	Model III (land return of 70%)
1	Land pooled (ha)	40	40	40
2	Land returned to owners (ha)	6	22	28
	Land available for housing and local facilities (ha)	6	13	13
	Land available for city level development (ha)	0	2	4.8
3	Built up area (residential+ local facilities + city level) (ha)	12	30.1	68.4
4	Ratio of BUA/Land returned to owners	2.0	1.37	2.44
5	Ratio of BUA/Land pooled	0.30	0.76	1.71

Note: BUA here refers to the construction carried out by the private sector partners only.

Under Model II, the DDA would be left with 15% of pooled land after accounting for 30% for external roads and greens. In a 40 ha pooling, DDA will have 6 ha for further development and the overall density will depend on the use of this land. In the case of Model III, DDA will have 3.2 ha for further development at the city level.

The higher density will imply the need for more intensive infrastructure. However, the infrastructure costs or EDC may not be strictly proportional to density. As we have indicated in the previous chapter if Model II requires an EDC of Rs 2 crore per hectare of land pooled then the Model III would require an EDC of Rs 4 crore if the costs are linearly related to FAR. The Model III provides an IRR of 24.79% for the 10- year project schedule when EDC is Rs 5.4 crore per hectare.

Just as the FAR specification for Model II can be increased to find a level of FAR that provides a reasonable return, the FAR in Model III can also be reduced if the EDC is not sustainable. The analysis presented here shows that even an EDC of upto Rs 5.4 crore per hectare would provide IRR of close to 25% in Model III. In Model II so far we have assumed that EDC would not be charged because of higher ratio of land retained by DDA from the land pooling.

The key benefit from Model III, therefore, is the higher level of housing stock that would be delivered as compared to Model II while being attractive to the private sector. The effective ratio of land returned to the land owner is 65% under Model III for the 40 hectare land pool after taking into account the specification that only 60% of city level development can be marketed by the private sector partners, as compared to 55% under Model II. Any further reduction in this ratio would reduce the rate of return under Model III.

These points are further illustrated in Tables 5.2 and 5.3. In Table 5.2, it is seen that as ‘land returned ratio’ increases from 55% of land pooled to 70% of land pooled, the IRR for Model II increases from 15.58% to 19.46%, or close to the basic benchmark IRR of 20%. When residential FAR increases from 200% of net residential area to 300% of net residential

area and land returned ratio is 70%, the IRR increases to 25.12%, a rate which would allow some risk allowance for the projects. However, in these estimates, EDC is to be borne by DDA. The final variant of Model II in Table 5.2 relates to application of FAR on gross residential area rather than net residential area with an FAR of 200%. The IRR in this case rises to 27.93% if EDC is not charged and a lower 26.13% if EDC is charged (Rs 1.5 crore per ha for the standard Model II).

Thus, if the land return ratio is as per Model III and FAR of 200% is applied on gross residential area, leaving all other parameters at Model II, then the IRR for a 10-year project horizon gets close to Model III. The Model III IRR is still higher than in this variant of Model II. The ratio of BUA to land returned to the land owners/ developers under Model III is higher than in the different variants of Model II as Model III allows additional FAR on land surrendered to DDA.

Table 5.2 A Matrix of IRR and the Ratio of BUA to Land Returned Ratio under Different Variants of Model II and Comparison with Model III: 10-year project schedule

Sl. No.	Land Return Ratio	FAR on Net Residential Area (EDC not charged)			FAR on Gross Residenctial Area	
		200	250	300	200 (without EDC)	200 (With EDC)
	IRR % for diffreent scenarios					
	Variants of Model II					
1	55	14.69	17.86	20.54	23.45	21.82
2	60	16.09	19.28	21.97	24.89	23.20
3	65	17.38	20.59	23.29	26.21	24.48
4	70	18.58	21.80	24.51	27.44	25.66
	Model III					28.03
	Ratio of BUA to Land Returned to Owners for different scenarios					
	Variants of Model II					
1	55	1.37	1.66	1.95	2.31	2.31
2	60	1.37	1.66	1.95	2.31	2.31
3	65	1.37	1.66	1.95	2.31	2.31
4	70	1.37	1.66	1.95	2.31	2.31
	Model III					2.48

Note: The ratio of BUA to land retunred under Model III does not exactly match with the ratio in Table 5.1 because the area specified for local facilities and local commercial area is based on population based norms rather than fixed areas. In Table 5.1 the ratio is derived based on fixed areas. All calculations refer to land pooling of 40 hectares. All other assumptions of Models II and III continue to hold.

As the search for a model that may give better returns to the private sector partners in development can begin with relaxing some assumptions of Model II, we can also relax assumptions of Model III to see if reduction in land return ratio or FAR would mean significant reduction in IRR and density of housing. Table 5.3 provides some indication of these changes in assumptions for a variant of Model III. We reduce FAR applicable under

Model III by first respecifying that FAR is applied on gross residential area which is 50% of land returned to owners. In the standard Model III gross residential area is taken as 50% of land pooled.

Table 5.3 A Matrix of IRR and BUA to Land Returned Ratio under Different Variants of Model III: 10-year project schedule

Sl. No.	Land Return Ratio	FAR on Net Residential Area (%)		
		150	175	200
		IRR % for different scenarios (EDC is charged)		
1	55	15.66	17.61	19.37
2	60	16.73	18.67	20.42
3	65	17.73	19.67	21.41
4	70	18.68	20.61	22.35
		Ratio of BUA to Land Returned to Owners for different scenarios		
1	55	1.46	1.66	1.85
2	60	1.44	1.63	1.82
3	65	1.42	1.60	1.79
4	70	1.40	1.58	1.76

Note: The ratio of BAU to land returned varies for different scenarios unlike in Table 5.2 because the FAR on land surrendered to DDA reduces when land return ratio increases moderating the effect of higher land return ratio on BAU.

From the perspective of IRR, creation of large quantum of housing stock created at relatively reasonable prices, and provision of EWS housing Model III meets these objectives more than Model II. The uncertainties associated with the various parameters of the economic model used for analysis indicate that a margin above 20% benchmark appears necessary. Reducing the land share of land owners in Model III, therefore, is likely to make Model III less attractive especially in the context of likelihood of higher EDC.

Improving the IRR in Model II will require increasing FAR and increasing land share of land owners in land pool. Increased FAR would also mean EDC waiver would not be justified. In other words, the Model II would have to be closer to Model III to achieve the multiple goals of attractive IRR and also deliver adequate housing supply.

We have summarised the strengths and weaknesses of the three models more fully in Table 5.4.

Table 5.4 Summary of the strengths and weaknesses of the three models of land pooling

Criterion	Model I	Model II	Model III	Remarks
Financial viability	The IRR in the various alternative scenarios turns out to be quite low. When the land price is as low as Rs 3 crore per ha the IRR is 14.18% under the 5-year project execution and when the land-return ratio is 15%. The low land-return ratios of 12.5% and 15% would make the model unattractive as a PPP proposition even when the returned land is 'developed' and there is no EDC to be paid by the private party.	The IRR in the baseline model is 17.68% for the 5-year horizon model and 14.69% for the 10-year horizon model both below the 20% mark which may be the lowest return needed to attract investments. Only when parameters affecting returns are relaxed, the model becomes attractive. For instance when FAR is applied on gross residential area rather than net residential area, the IRR is 27% in the 5-year project horizon and about 24% in the 10-year project horizon. However, we should also note that EDC has not been charged to the private party in this formulation.	The IRR in the baseline scenario is 31.5% in the 5-year project horizon and 28% in the 10-year project horizon. The model assumes that EDC is charged to the private party who get the development rights. The IRR remains above 20% when the land price is upto Rs 7 crore per ha or EDC charges rise to about Rs 9 crore per ha of land pooled.	Model III provides the highest returns to the private sector partners in land pooling. The returns are attractive under a wide range of parameter values.
Social commitments: Housing stock supply	The model is relatively under-specified in the sense that it is not clear what would happen to the land retained by DDA. On the	The housing stock supplied is as per the MPD 2021 expectations of density.	Because of higher FAR relative to the other two models, the potential for housing stock supplied is well	The housing stock supply would be the highest in Model III, given the higher FAR allowed. The

Criterion	Model I	Model II	Model III	Remarks
	basis of land returned to the land owner, the housing stock created is well below the MPD 2021 norms of density.		above the expectations of MPD 2021 on per hectare of land developed.	final property prices are expected to be lower under Model III because of higher supply of housing stock.
Social commitments: Housing stock supply for Economically Weaker sections	There is no specific provision. But if the requirement of 15% of BUA is to be provided to EWS housing at cost price, the EWS housing norms would be met.	The EWS housing norms are met at 15% of the BUA. But to improve financial sustainability of the model, EWS housing may have to be marketed.	The EWS housing is developed at 15% of the BUA and supplied to the government at zero cost.	The supply of EWS housing can be expected at a much lower cost under Model III.
Social commitments: quality of living	DDA will retain 85-88% of land pooled for infrastructure development and any other purposes. Land for development of various P & SP properties or other properties consistent with the plans would be with the DDA.	The same as in Model I although the extent of land available would be less than in Model I.	The development rights for P & SP and Commercial property would be mainly with the private party. DDA will have rights over the development of city level commercial and P&SP property to a specified extent. DDA will have the authority to approve the type of facility that would come up under the MPD norms.	Benefits of planned development include a superior quality of life when planning provides adequate land/ space for all social needs. While Models I and II leave more space with the DDA for future use, DDA will have a significant role in ensuring that the social infrastructure that will develop is consistent with the planned development. Providing attractive returns would

Criterion	Model I	Model II	Model III	Remarks
				also require that the private party must develop good quality housing.
Quality of living: Infrastructure development	Planned development will take place. However, there will be pressures on the new housing development quickly because the supply of housing stock would be relatively small. The actual population density can be expected to be higher than planned putting pressure on infrastructure.	The same as in Model I	Infrastructure requirements are explicitly higher than in the other two models because of higher FAR. Infrastructure would have to cater to more concentrated housing density. The costs would be higher. The model parameters do allow for higher infrastructure costs.	Higher density of housing would require more intensive infrastructure. The requirements are explicit. But if housing supply is inadequate, the actual density is likely to increase even in the other models relative to the planned densities.
Practical implications to implementation	A key issue is the availability of developed land for returning to the land owners who pool land in the vicinity of land pooled. DDA presently may not have such land and will prove to be a hindrance.	Demonstrating commercial attractiveness of the model will be crucial. The changes that may be required will also have to be consistent with the MPD 2021 provisions.	The higher FAR allowed under Model III implies that infrastructure plans would have to take into account he higher density of population to be accommodated in the urban extensions. Further, the regulatory issues such as the MPD 2021 provisions on FAR would have to be resolved.	There are a number of implementation concerns in all the three models. Detailed plan to address the issues relating to the selected model is needed.

The summary re-iterates the superiority of Model III in terms of its financial viability for the private sector to participate in the urban development and larger supply of housing stock. In essence Model III transfers the development responsibility to the private sector more fully while retaining the regulatory control. Model II does provide IRR close to 20% or better when some conditions Model II are relaxed. But the relaxation also implies that there would be a deviation from the MPD 2021 specifications just as in the case of Model III.

The analysis shows that there is no unique model that can meet all objectives. Models II and III under a set of assumptions meet the criteria set for PPP approach to land pooling and development. While Model III does not require any changes in terms of its key parameters to meet these criteria, Model II will require changes in FAR and land return ratio bringing it closer to the features of Model III to make it attractive to private sector participation and also deliver on the objective of reasonably priced housing. We also find that Model III retains its attractiveness in terms of IRR even when EDC charges are increased upto Rs 6-7 crore per hectare of pooled land. If housing density of Model III implies that EDC would be even greater, either DDA would have to share the EDC costs or reduce FAR to a point where EDC is sustainable. The analysis highlights that review is needed with regard to FAR specification for development in the urban extensions to meet the housing needs of rapidly increasing population of Delhi.

2. Implementation of Land Pooling Scheme

Choice of a land pooling model is only the first step in implementing a land pooling scheme for land consolidation and development.

There are a number of issues which need to be addressed in implementing such a scheme.

At a broad level, the study is also required to specify the functions of the government in a facilitating role and to indicate the role of the private sector.

Keeping in view lessons from the other urban development experiences, we have identified some of the main functions the government should take on and the functions the private parties should undertake in different stages of implementation of the land pooling process.

Application of policy

As there are aspects of land pooling arrangements specific to the areas where urban development is to take place, the policy should be applied to the urban extensions specifically so that other parts of Delhi are not affected by the land pooling scheme. The approach followed in the other states where development policies are applied to specific new townships or projects should also be adopted in the land pooling approach in Delhi.

Forging partnerships

It will be of critical importance for the government to establish a transparent communication channel with all the stakeholders in the development of identified urban extensions through a land pooling process.

The land owners, private developers and the financial agencies would have to be fully informed of the policy and the process. Although consultations have been held with the industry and land owners in the past, communicating the final choice of the approach in a consultative format would be important.

In order to ensure transparent and efficient process of the scheme, there may be a need for streamlining the official procedures across government agencies for the stake holders. This should be established in advance.

Planning

Planning at the zonal level and above should be done by the DDA. This will be necessary to ensure that all the necessary amenities are specified in the plans for the population as a whole that will reside in these urban extensions. The planning will take into account the whole of population rather than just the specific areas within a zone.

The specific local lay out plans will be prepared by the developer of specific property, subject to the approval of DDA through an efficient mechanism. This will help in ensuring that the plans comply with regulations relating to building plans and internal infrastructure.

The functions of the utility agencies and other civic authorities should be coordinated with the planning activities: for the purpose of records of properties, supply of water, sanitation, power and communication.

External Infrastructure

Infrastructure development is critical to the success of establishing new urban settlements. Transportation infrastructure is among the most important pre-requisites for urban development. The land pooling models make provisions for land for roads. However, this land would be available only when land pooling is completed in a specified area. An alternative is to take up infrastructure development based on zonal level plans first. There may be three options to obtain land for infrastructure:

a. Acquire land under the provisions of Land Acquisition Act and proceed with the development.
b. Negotiate with the land owners to exchange land needed for roads with a specified FAR, consistent with the land pooling model, in the neighbourhood where land pooling would be carried out.
c. Set in motion land pooling closer to the area where roads are to be constructed and allocate land back to the owners in the vicinity of roads so that development can begin in this portion more quickly. Adequate compensatory FAR may be provided to those providing land for roads if raw/ and or developed land cannot be provided immediately for lack of a land bank.

Acquisition of land by the government is possible under the Land Acquisition Act. In both UP and Haryana, land has been acquired by the state for infrastructure. In UP, land was acquired for housing development as well. While land acquisition for infrastructure

development is possible, options b and c above are more consistent with the approach of land pooling models.

Once the land is acquired, actual infrastructure development may be based on implementation of projects by the government agencies or through private sector participation. This choice may be determined by available capacity within the government for execution of projects and the options available outside the government.

The government will have to ensure speedy assembly of land for infrastructure and execution of projects. Planning for basic infrastructure will have to be carried out by the government at the zonal level and implementation monitored by it.

Details of land pooling model

Even as Model-III may be adopted, some fine tuning of the model may be needed to make it more practical. Some areas where further consideration may be given are:

- If the differential rates of sharing of land between the land owners and DDA do not lead to greater efficiency or speed, it may be necessary to adopt a uniform rate of land sharing. It may not be practical to decrease the rate of return to the land owners for smaller land pools. Even setting a minimum land size may not be practical if it deters or delays land pooling. However, in cases where the land returned to the owners is less than the minimum needed for development license then TDRs for such land pools may not specify a land site in return and the owners will have to sell their development rights to others who may qualify for a development license.
- Two important instruments that will be critical to the process are (1) Transferable Development Rights (TDRs) and (2) Transferable Development Licenses (TDLs). The TDRs will be issued specifying the extent of land that would be returned to the holder of a TDR. It should also specify the location of the land- in terms of a locality or group of neighbourhoods- in which pooled land is transferred to DDA and on the basis of which the TDR is issued, with the exception of the cases where the land returned is less than the minimum needed to get a TDL. One TDR should be issued for total amount of land transferred by the land owner to DDA in each transaction.
- The TDL is issued in return for TDRs to specify the exact location of land assigned to the holder of TDR if the extent of land represented by the TDR meets the minimum land size for a development license. If TDRs are aggregated into single ownership, contiguous land sites may be allocated if such plots are available. In such cases the location of largest land holding in the TDR should determine the location where development license may be issued. Alternatively, TDLs would specify land sites in different locations. Assigning specific land for development by those holding development licenses will be a complex but essential process.
- DDA will have to facilitate trading in TDRs and TDLs so that a competitive and transparent process is available to those who may wish to participate in buying or selling development rights. There will have to be allocation rules to avoid discretion. There can be auctions of TDRs and TDLs if necessary so that the small land owners will have access to larger market.
- There should be no payment of stamp duty on transactions relating to TDR and TDL primarily because the transactions are transfers of land assets. As the land transferred to DDA is to be used for the amenities to the larger community, the exemption from stamp duty at this stage will reduce the cost of such amenities to the community.

- While no financial transactions are involved until the issue of TDLs, when the actual development plans are submitted by the holders of TDLs the EDC or IDC charges would have to be paid to DDA or incurred depending on who will implement the relevant infrastructure development.

Land records and records of development entities

Efficient implementation of land pooling is possible only if proper land ownership records are available with the land owners at the time of transfer of land to DDA in return for TDRs. DDA should have the efficient mechanism to verify the records and take possession of the land based on these records. In case of invalid documentation, steps would have to be taken to remedy the situation.

When TDRs are issued, they specify only rights over specific land size and land use. They may not specify location of land on which these rights can be exercised. Only when TDLs are issued, location of land would be specified. The TDLs can be issued only when significant portion of land is pooled.

Development licenses are issued to entities to enable them to proceed with the development plans. TDLs will be issued for development of land that is above a specified minimum size so that planned development objectives are met. While the TDLs may be issued on the basis of underlying TDRs, actual permission for taking up construction of properties would be based on an assessment of the technical and financial capacity of the developer. The normal process of approvals of the plans and the buildings would be followed.

Timeline for the process

It will be necessary to specify a time line for the process.

The time limit will have to be specified for land pooling. This may be a year once the scheme is announced. TDRs would have to be issued immediately after verifying the land records. Once a minimum neighbourhood level land pooling is achieved, the development licenses can be issued for that particular neighbourhood. ***This also should have a time limit of 3-4 months***. The TDLs may also have a time limit. ***If the construction process does not begin within a year of issuing TDL, there may be a need for renewal of TDL which may entail a penalty***. Similarly the building process also should be completed within a time period specified in the plans.

The timeline may include incentives for quicker implementation: for land pooling and also completion of projects. This may be in the form of preferences for location of land returned to the owners for development or some reduction in EDC. The incentives to achieve timely performance may also recognition of the performance of the entities involved.

Setting up procedures for implementation of the scheme

Several processes would have to be specified to implement the land poling scheme. Some of these procedures would be (1) formats in which the details of land pooled would be provided to the DDA against which TDRs would be issued. (2) The process of issuing TDR and the

format of TDR itself (3) process of issuing TDLs including the format for TDL (4) monitoring the utilization of the TDLs.

To facilitate the process, it would be important to establish registries of developers and providers of other technical services for the benefit of land owners and the owners of TDRs and TDLs.

Promoting competition, quality and customer satisfaction

The incentives for timely completion of land pooling and beginning of development tasks are one part of the framework for promoting competition. But there is also need to promote quality, innovation and customer satisfaction. Rating of buildings for a variety of indicators that the customers look for should be provided by an independent agency. Competition may be promoted by transparent information on the costs and prices of properties that are developed and offered to the customers. Mandatory sharing of information on properties should be undertaken.

Grievance redressal mechanisms

There will be a need to provide these channels to minimise the cost of inefficiencies. The system may prove to be inaccessible to small land owners, small developers and individual customers who buy property.

We have outlined a range of areas where attention is required for effective implementation of the land pooling approach to developing urban extensions in Delhi. The experiences of the other states and elsewhere will also help in designing the steps and procedures. Specifying the actual steps of the implementation process in detail and simulating them to test the robustness of the systems will be essential to ensure effectiveness of the processes. The administrative structures necessary for the implementation of the scheme with adequate powers and resources should be established.

References

1. Master Plan for Delhi – 2021, Delhi Development Authority, 2010, New Delhi.

2. Report on Indian Urban Infrastructure and Services, The High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services, National Institute of Urban Affairs, March 2011, New Delhi.

3. Alternative Modes of Assembly and Development of Land and Housing in the NCT of Delhi – Association of Municipalities and Development Authorities (AMDA), September 2009, New Delhi.

4. India Apartment Index, Vol. 1, Issue 1, April-June 2011, Magic bricks.com

5. Delhi Government Gazette Notification, Accessed from internet; notification dated 4/2/2011.

6. Kumar, H. and R. Somanathan, "Mapping Indian Districts Across Census Years, 1971-2001", Centre for Development Economics, Working Paper No. 176, March 2009, Accessed from http://econpapers.repec.org/cdecdewps/176.htm