



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

Making Affordable Housing a Reality in Cities

Executive Summary

October 2019

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Chapter 1

Introduction

- Defining “affordable housing”, its need
- Typologies, metrics and the deficit
- Costs factors affecting affordability of housing
- Analyzing the Affordable Housing Challenge

Making Affordable Housing a Reality in Cities

Introduction

Affordable housing is broadly defined as “housing which is adequate in quality and location and does not cost so much that it prohibits its occupants meeting other basic living costs or threatens their enjoyment of basic human rights.”

Source - (UN-HABITAT, 2011)

Some of the Causes of Housing Unaffordability

Economic

- 1 Disproportionate rise in housing costs as compared to household incomes
- 2 Insufficient supply of housing due to economic unviability for developers
- 3 Heating or cooling bills related to low incomes, high energy prices and poor energy efficiency of buildings

Demographic

- 4 Household size dynamics (Increased size implies increased spending on other necessities; decreased size implies more families that need homes)
- 5 Population growth (natural and in-migration)
- 6 Ageing population occupying homes which can cater to larger households

Geographic

- 7 Scarcity of land for affordable housing development projects

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Exploring Housing Typologies, Metrics and the Deficit

Housing typologies

- **Household incomes** – low-income, middle-income, middle-upper income and high-income housing.
- **Capacity** – Single family dwelling units or multi-family dwelling units, apartments, condominiums, cooperatives, row houses etc.
- **Providers** – Private housing, public housing or non-profit housing associations (or community housing providers), social housing.
- **Housing tenure** – Home-ownership, rental or lease housing.
- **Occupation** – Key worker housing, student housing, retirement homes, etc.
- **Degree of Formality** – Formal dwellings, informal settlements, etc.

Types of Housing Deficit

Qualitative

Use of substandard building materials, dwellings not served/underserved with proper urban infrastructure and services or housing at precarious locations.

Measuring Affordability

- **Median Multiple*** – Affordable if financed less than three times household's annual median income.
- **Housing Cost Burden**** – Affordable if households paying less than 30% of income on housing.
- **Residual Income** – Uses remaining “residual” income after meeting basic necessities for household

*Recommended by World Bank, UN and Joint Center for Housing Studies, Harvard University, US

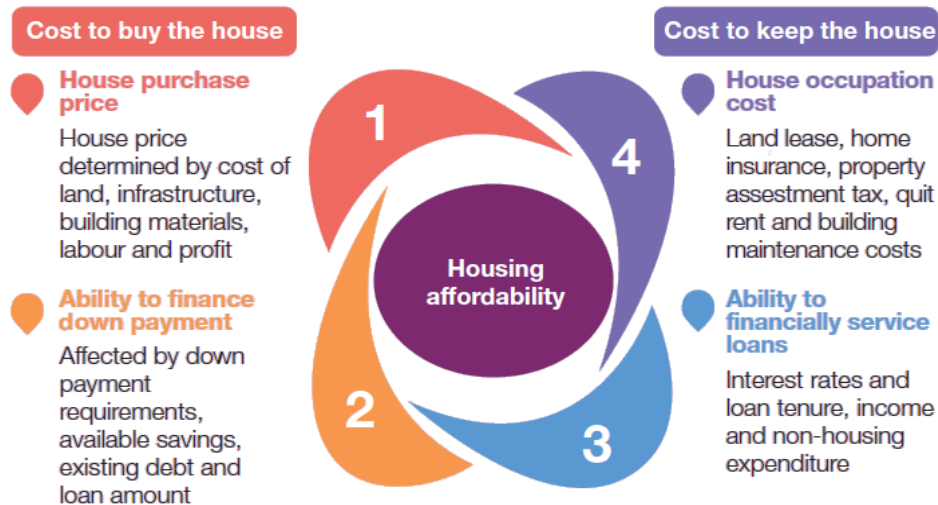
Metric is used in US, Australia and OECD countries. A variant of this metric is the **30:40 indicator where households having below 40% of annual median income spend less than 30% of income on housing

Quantitative

Overcrowding and densification of city or improvised shelters or dwellings having more than one family residing in them.

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Factors affecting housing affordability



Other internal factors determining affordability -

- Housing Type:** Multi-family attached housing is relatively cheaper to construct and maintain per square foot than single family detached homes due to shared roofs, walls, driveways and utility connections. Also requires half the heating and cooling energy per square meter.

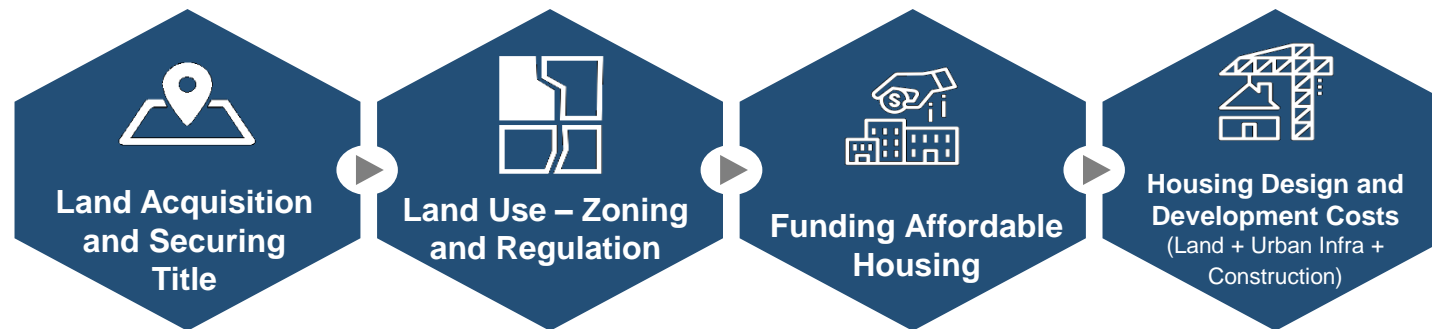
External factors determining affordability

- Location:** Land tends to be costlier in the urban neighbourhoods closer to the centre than on the urban fringes. Conversely, costs for urban infrastructure lower inside the city than on the greenfield site on the periphery.
- Access to community, public and social infrastructure:** Staying closer to environments facilitating communities, access to work and other social infrastructure (schools, hospitals, etc.) makes people invest and own fewer vehicles or drive less, resulting in savings from parking costs and annual vehicle fuel and maintenance costs with regards to transportation.
- Legal, Administrative and Regulatory:** Government policies, zoning, density, height & other regulations all impact affordability. Increased density offers an opportunity to offset high costs and reduce land consumption per unit.
- Financial markets:** Lending rates, interest rates previous sale value and market supply-demand dynamics.

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Analysing the Affordable Housing Challenge

Supply-side value chain – process of building homes to live



Evaluation of current supply and demand value chains allows us to break down the complex challenge of affordable housing and identify opportunities and solutions at each stage.



Demand-side value chain – ability to finance and afford homes to live

Supply-side Challenges

Chapter 2

Land Acquisition & Securing Title

Making Affordable Housing a Reality in Cities – Supply side Challenges

Land Acquisition Techniques

Characteristics	Land Pooling / Land readjustment	Negotiated Settlements	Formal Acquisition
Applicability	<ul style="list-style-type: none"> When scattered and unsuitable allocation hinders private sector land development; older urban structures have to be reorganized; Need for provisioning urban infrastructure and services. 	<ul style="list-style-type: none"> When seller wants to voluntarily sell off the land and is primarily looking for financial compensation. When government wants to provide an opportunity to negotiate through an open market than expropriation. 	<ul style="list-style-type: none"> When voluntary methods and negotiated settlements are no longer an option with landowners Access to land is deemed imperative by the local authority
Mechanism of acquisition	<ul style="list-style-type: none"> Transfer ownership rights to a single agency or government body 	<ul style="list-style-type: none"> A negotiated settlement framework for trading parties have to comply. 	<ul style="list-style-type: none"> Compel owners to sell land or involuntary eviction thereby displacing residents by enforcement of statutory powers.
Exchange method	<ul style="list-style-type: none"> Return a smaller portion of the developed land to the original owner equivalent to owners' original land market value. 	<ul style="list-style-type: none"> Agreement having terms of the settlement, land to be transferred, financial compensation and possibility of continued use of land 	<ul style="list-style-type: none"> Compensate owners a certain value of their plots.
Benefits	<ul style="list-style-type: none"> Less cumbersome and ensures planned development of the land Can provide increased equity in land distribution 	<ul style="list-style-type: none"> Affected parties are not forced to accept compensation at the book rate defined by the governing body 	<ul style="list-style-type: none"> Provides immediate access to the land at market value.
Limitations	<ul style="list-style-type: none"> No guarantee of development on land. Land can be used as an investment instrument 	<ul style="list-style-type: none"> Process requires specialized skills - negotiators and valuation surveyors 	<ul style="list-style-type: none"> Costly and unpopular as social impact assessment needs to be carried out along with a resettlement plan.

Making Affordable Housing a Reality in Cities – Supply side Challenges

The Importance of Securing Title

Housing investments depend on whether a legal title exists for the land and security through land tenure and property rights .

Land Tenure models include –

- **Individual ownership** - Well suited for those seeking titles in the formal markets having reasonable employment and can secure access to credit.
- **Affordable rental market** – Mostly applies for those –
 - who cannot afford to service a loan (e.g. key worker groups like teachers, nurses, etc.) or
 - those who keep moving around for career opportunities or
 - ageing population looking for short term security

Emphasis on property rights –

- For the formal sector, **collective tenure mechanisms** where land access rights are shared by group of people like Community Land Trusts (CLTs), cooperatives etc are common.
- For the informal sector, mechanisms like Right to the city (in Brazil), temporary occupation licenses (in Kenya and Uganda), certificate of rights (in Botswana), Anticretico (in Bolivia), 10 year leases (In India) have been highly effective.

Improving access to the city and provisioning urban services could encourage investment in formal titles.

Leveraging Potential of Untapped Land Market Partnerships with Municipal Land Banks and Land Trusts

Mechanisms where land banks are partnering with land trusts as preferred parties for lands released by municipal land banks could ease land acquisition for affordable housing. In the US, the city of Albany, New York the Albany County Land Bank (ACLB) and Albany Community Land Trust (ACLT) are working together to address vacancy and abandonment, and preserving housing affordability.

Supply-side Challenges

Chapter 3

Land Use - Zoning and Regulations

Making Affordable Housing a Reality in Cities – Supply side Challenges

Zoning – An Overview

Densification

Increased use of both horizontal and vertical space within a given area accompanied by a considerable increase in the thresholds for the number of people and housing units for that area. Emphasizes on containing urban sprawl.

Intensification

Focuses on infill development (i.e. development on developed or undeveloped land within the city) rather than at the peripheral farmland. Closely related to the idea of urban containment encouraging the idea of development and redevelopment within an area.

Greenfield Sites for Housing

Advantages

- Eases congestion in cities
- Allows for larger sized homes as land supply not constrained.
- Easy to scale projects and achieve economies of scale
- Clean-slate development with no baggage on previous land-ownership and state of the land acquired for housing development.

Disadvantages

- Increased commute times as economic opportunities/jobs are in core cities.
- High costs of setting up urban infrastructure and services especially when development projects are few to justify costs in infrastructure
- Usually developed on arable lands and could affect wildlife with species losing their habitat.
- Increased urban sprawl encourages sedentary lifestyles

Brownfield Sites for Housing

Advantages

- Reduces sprawl and encourages land reuse
- Connectivity to urban and reliable public transport infrastructure
- Encourages high density living thereby making better use of land allocated to housing.
- Accessibility to more jobs opportunities.
- Revitalization of previously vacant or abandoned neighbourhoods

Disadvantages

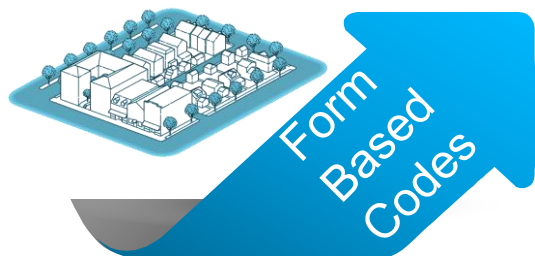
- High cost of housing owing to increased demand in cities core.
- Can lead to gentrification pushing those with lower means to urban fringes
- Development can be a tedious process with challenges in land conditions, access to machinery in congested areas, etc.

Making Affordable Housing a Reality in Cities – Supply side Challenges

Zoning – Some Innovations



- Moving from traditional rule-based models to “dynamic systems” where incentives are designed dynamically based on real-time data feeds.
- Datasets like commute times, unit costs, amenities scores, and health outcomes feed into a machine learning model that yields maximum happiness of residents represented by a set of optimal target values.
- The goal is to optimize for social, cultural and economic benefits, correcting for externalities through the token system, and rewarding pro-social behaviour.
- A token based system could act as a currency in capturing market demand on things or amenities that could be added to or removed from the community in improving overall happiness. For example, a token incentivizing access to key workers in the neighbourhood facing shortage.



- Alternative to conventional zoning practices where the emphasis is more on the relationship of building structures to the urban form (rather than land use or density), the diversity of land use (mixed-use, mixed-income groups, etc.) and on urban environments that balance the needs of motor vehicles and pedestrians.
- Form-based codes are prescriptive (i.e. building height and placement on the lot, windows and doors facing the street, etc.) and predictable that enables streamlining of administrative approvals if codes have been followed without deviation. In case of deviation, only changes need to be reviewed.

654 cities globally meet criteria for form-based codes. These include cities like Miami, Denver, Los Angeles, Denver, Calgary, Abu Dhabi and Dammam.

Making Affordable Housing a Reality in Cities – Supply side Challenges

Zoning – Mixed Use, Mixed Income (Inclusionary Zoning)



MIXED LAND USE



INCLUSIONARY ZONING



INCREASED AFFORDABILITY

- **Co-location or immediate proximity** of homes, workplaces and services in buildings, neighbourhoods and districts. Developments could range from a single building to large scale neighbourhood.
- Reduces commute times, revitalizes neighbourhoods and accommodates higher housing densities

- A government intervention **mandating or incentivizing** a portion of residential housing to **include housing for low and middle income** households
- Requires developers to **build a specified number of homes negotiated** with the planning authorities or as a proportion of development value.
- Developers volunteer to build affordable housing based on some incentives

Socio-spatial equality and reduced occupational polarization where those in high-income occupations (characterized by those from the knowledge economy) were experiencing improved affordability than those with lower income occupations (e.g. social and public service, trade and manufacturing, etc.)

Making Affordable Housing a Reality in Cities – Supply side Challenges

Land Use Regulations

Among the many land-use regulations, imposing **minimum lot sizes**, **maximum Floor-to-Area Ratio (FAR) or Floor Space Index (FSI) and height restrictions**, **minimum parking requirements**, and **urban sprawl** have a more supply-limiting and cost-increasing effect than others forcing people to either live at the periphery or occupy smaller spaces (sometimes illegally and informally)

1

Urban sprawl is attributed towards increased commute times, higher vehicle emissions undercutting the benefits of vertical growth and higher densities (i.e. economies of scale and increased community interactions)



In Beijing, building height restrictions in inner city resulted in 12% expansion of its city boundaries and an increase on 20% on house prices.

2

FSI limits drives developers to grow vertically implying lower floor area for development i.e. lower supply of smaller apartments (due to increased unit cost of development) especially where land costs are high.



In Indian cities, FSIs are particularly low (1.5 in Chennai, 3.25 in Bengaluru and 3.5 in Mumbai) whereas in Singapore and Tokyo it is as high as 25 and 20 respectively. Mumbai provides additional FSI for a fee or Transferable Development Rights or incentivize developers to undertake public infrastructure development/maintenance projects.

3

Height restrictions impact overall housing supply even for those with high incomes who can afford homes at a premium and have them compete with middle or low income households in the same market.



In order to grow vertically and to ensure profitability, the difference between the market price per unit area and total cost (of land and construction) needs to be greater. Vertical growth needs to be evaluated in context so it does not overshadow other important structures in the neighbourhood and is environmentally sustainable.

Beyond a certain height threshold, costs to add an additional floor increases as costs associated with grade of raw materials, structural framework, civil works etc. required. Building heights have impact on CO2 emissions as well.

4

Minimum parking requirements affect residential development and increasing pressure on rents/house prices.



Mexico city has repealed minimum parking requirements. Seattle has passed a bill minimizing parking requirements and unbundling parking from leases in new developments.

Making Affordable Housing a Reality in Cities – Supply side Challenges

Land Use Regulations

Challenges

Underutilized Land / Property

Absence of policies to incentivize development on underutilized / undeveloped / vacant land / properties in cities also contribute to shortage of housing supply. It also contributes to speculative land banking that drives up prices of homes.

Nimbyism

Resistance from residents in building affordable housing over concerns of negative impact to their neighbourhoods (also popularly known as Not In My Back Yard or Nimbyism).

What cities are doing or can do about them?

- In Melbourne, abnormally low water consumption is being monitored to arrive at “speculative vacancies”. Similarly, Paris is analyzing electricity consumption at vacant homes and offices. Detroit is using geo-spatial analysis with a combination of on-ground surveys and site photos cross-referenced with municipal data to arrive at vacancy rates.
 - Vancouver, Paris and Melbourne have implemented a vacancy tax to improve utilization rates of vacant land/properties.
 - Saudi Arabia has implemented a “white land tax” to encourage land owners to develop idle plots for residential use.
 - Policy enforcement to bring vacant properties into the affordable housing market. In Barcelona, banks have been asked to turn repossessed homes unoccupied for two years into affordable housing.
 - Los Angeles recently passed a Motel Conversion Ordinance which allows conversion of motels into permanent supportive housing for the homeless even if the motel didn't conform to current zoning requirements.
-
- Use social media and other communication channels to understand neighbourhood sentiments and work on negotiating an appealing solution on both sides.
 - Co-opt opposition into new development by implementing Tax Incremental Transfers (where incumbent residents share tax revenues coming from new development in the form of rebates) or reductions in their own property taxes.

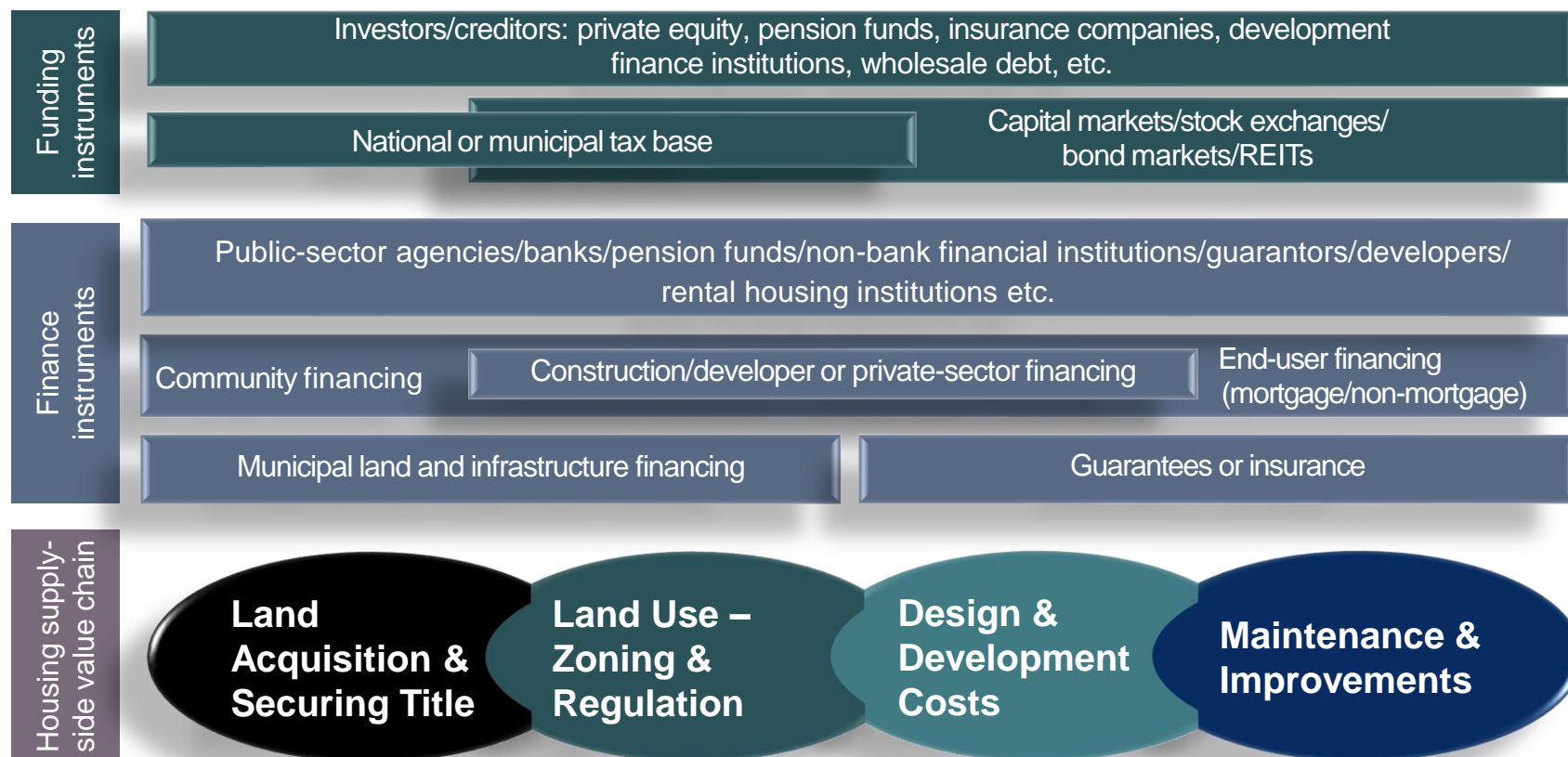
Supply-side Challenges

Chapter 4

Affordable Housing Finance

Making Affordable Housing a Reality in Cities – Supply side Challenges

The Housing Finance Value Chain



Making Affordable Housing a Reality in Cities – Supply side Challenges

Funding Sources

► Government

- **Providing tax incentives/grants/exemptions towards construction of affordable homes** (e.g. New York 421a property tax reforms to re-incentivize construction in areas of the city by exempting property taxes for newly constructed affordable multifamily homes)
- **Facilitating debt through low interest rates or discounts.** (e.g. In Vienna, the Limited Profit Housing Act limits the profit developers can make from building housing units. To make housing construction viable for developers, funding is provided at a very low rate of 1% for 30 years.)
- **Act as guarantors for debt, allowing small-scale housing developers or community housing providers (CHPs) to build affordable homes** (e.g. In Australia, National Housing Finance and Investment Corporation (NHFIC) will operate as an affordable housing bond aggregator guaranteed by the government aggregating borrowing requirements of Community Housing Providers and issue bonds to the wholesale market

Urban Wealth Funds

- Fund guided by long term vision of the city and designed to improve housing supply and optimizing housing production in the city
- Designed to have the private sector collaborate with the city government on housing development projects in the city to share risks (as well as benefits) realized in the process.

Hamburg's HafenCity GmbH is an example



► Institutional Investors & Creditors

- Includes **private equity funds, insurance companies, pension funds, banks, development finance institutions (DFIs)** (including Community Development Financial Institutions (CDFIs), and **wholesale debt markets**,
- In emerging economies where access to formal instruments is particularly challenging for low to middle income segments, **microfinance institutions (MFIs)** – regulated and unregulated - **credit unions, cooperatives, home supply retailers and end-user or consumer financing companies** (other than banks) are particularly active.

Microbuild Fund

- Offers capital to MFIs who in turn provide housing microloans to help households build incrementally, step-by-step, loan by loan.
- Also offers institutional technical assistance to MFIs in developing or refining their housing products to enable them to scale their offerings.

Lent to 42 institutions in 25 countries

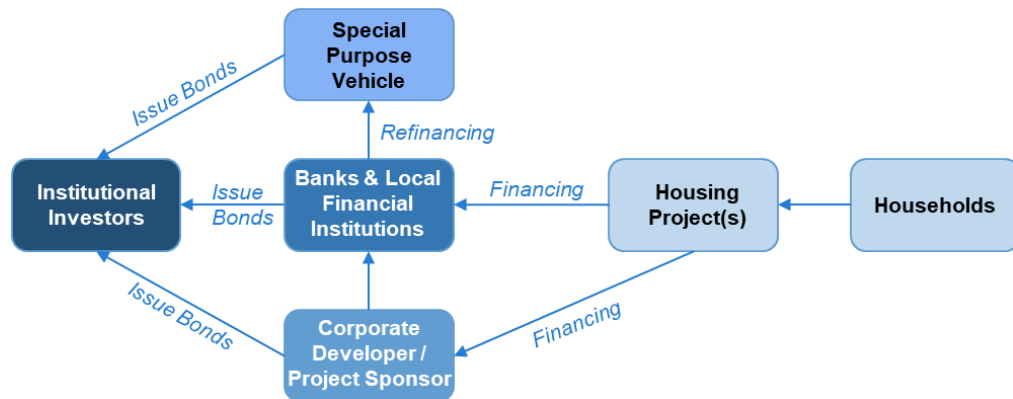


Making Affordable Housing a Reality in Cities – Supply side Challenges

Funding Sources

► Capital Markets

- **Local Currency Bond Markets (LCBMs)** – Helps reach a broader spectrum of private and smaller institutional market investors providing long term access to finance. LCBMs also contribute to a more diversified and balanced financial system which is more resilient to financial shocks.
- **Residential Mortgage & Equity REITs** – Retail and institutional investors purchase shares that pays dividends on the income generated through rent collection, mortgage payments or capital appreciation. Popular in Singapore, HongKong and US.



Housing Partnership Equity Trust

A Trust of 14 high-performing housing providers with an investment of \$100 million from Citibank, Morgan Stanley, Prudential Financial Inc., the John D. and Catherine T. MacArthur Foundation, and the Ford Foundation.

It acquires multifamily properties in order to support low and middle income households across the country by preserving affordable housing while yielding good risk-adjusted returns.

Making Affordable Housing a Reality in Cities – Supply side Challenges

Financing Across the Value Chain

Using city revenue for developing urban services & infrastructure

Land value is increased through planned regulations that favours investment and then captured by all stakeholders.

- **Developer instruments –**
 - Developer extractions (in-kind contributions) to finance part (or all) of infrastructure,
 - Land access charges or purchase of development rights, or
 - Land re-adjustment
- **Tax based instruments –**
 - Property tax
 - Betterment tax
 - Tax Increment Financing
 - Development Impact tax (not based on cost of infrastructure)

City Financing

Funding from developers and private sector on real estate investments

- Applied across the value chain to recover costs for land, infrastructure, home construction costs as well as operation & maintenance costs (in case of rental housing)
- Used for **funding large scale projects**, making it commercially more attractive (**economies of scale**) for developers and **encouraging competitiveness**.
- For small developers, project financing typically occurs through informal lenders or through partnership or revenue sharing agreements with landowners.
- Helps boost economic activity and increased investment in social and economic infrastructure.

Private Sector Financing

Pooling funds at community level into housing related investments

Operates alongside additional government mechanisms to further lower costs via per unit subsidies.

Models used include –

- Establishment of community land trusts and non-profit REITs as vehicles.
- Providing debt with local government as a guarantor for loans.
- Setting up a city level community fund that issues bonds and in turn receives government contributions for supporting infrastructure.

Community Financing

Making Affordable Housing a Reality in Cities – Supply side Challenges

Financing Mechanisms – Some Examples

Employers Supported City Housing

- Employers with offices in global cities where housing markets are tough are seeing a challenge in recruiting top talent. In London, a recent survey by CBI/CBRE revealed that **66% of companies are facing negative impact with entry level recruitment due to housing costs and availability**
- In the US, Facebook and Google have invested in housing for their workers. Employers like IKEA (in Reykjavik, Iceland), Lego (in Billund, Denmark), Samsung (in Seoul and Suwon) and Alibaba (in Hangzhou) have started providing for the housing needs of their employees as well.
- Employers are **also addressing demand-side challenges** and providing perks to employees by offering help in meeting housing costs either in the form of loans, subsidies or mortgage deals. In China, Shenzhen based Tencent offers interest free loans to help employees buy property. Further, Starbucks offers its full time workers in China subsidies to cover their rent.

Opportunity Zones (O-Zones) – Tax Breaks to Incentivize Investment

- O-zones are designated low-income areas in which investors can get various tax breaks from projects which meet specified criteria, which could include building affordable housing
- In the US, a census tract qualifies as an O-Zone if it has a poverty rate of 20% or greater, or if its median household income is less than 80% of the surrounding neighbourhood. The tax breaks encourage investment for at least a ten-year period.
- City governments can **invest property tax revenues to improve basic urban services and infrastructure** incentivizing developers towards investing in building affordable residential units
- O-Zones could also **help fight gentrification** where investors offer cheap loans and subsidized mortgages for locals to reap benefits from rising property values and getting priced out.

Making Affordable Housing a Reality in Cities – Supply side Challenges

Financing Mechanisms – Special Cases

Islamic Finance



- In Islamic countries, raising capital for housing (and in general) requires following basic principles of Islamic Finance which seeks profit over interest.
- Loans are often made on intangibles (like business experience and character) allowing for investment in certain projects, such as affordable housing schemes, that are rejected by conventional lending institutions due to insufficient collateral to be acceptable to Islamic banks on a profit sharing basis.

Sukuk (Islamic bonds) for affordable housing construction finance

In a first global Islamic transaction of its kind, a bond has been structured to have credit investors' risk position clearly defined and mitigated for a residential development project in Sentul, Kuala Lumpur. The product is designed to monetize sales upfront for improved cash flows allowing the developer to procure lower weighted average cost of capital and lower leverage on its balance sheet without straining shareholders to inject equity for the fund's operations.

Impact Investing



- In the 2018 Annual Impact Assessment Survey conducted by the Global Impact Investing Network of 229 organizations that collectively manage USD 228 billion in impact investing assets, **55% of investors confirmed that they tracked financial performance with the Sustainable Development Goals.**
- In the context of affordable housing, raising capital for **development projects that employ energy efficient solutions and sustainable forms of development has also gained prominence** as investors demand positive social change along with investment returns.

Build Opportunity Fund

The Housing Partnership Network, a US business collaborative of 100 affordable housing and community development non-profits, have created the "Build Opportunity Fund", an impact investing vehicle providing capital at an enterprise level for high-performing non-profit developers (determined in terms of creditworthiness and investment potential).

Supply-side Challenges

Chapter 5

Design Considerations & Construction
Costs

Making Affordable Housing a Reality in Cities – Supply side Challenges

Hard Costs and Soft Costs of Construction

Hard Costs

Refers to land costs (acquisition and titling), development of essential urban infrastructure, landscaping, raw materials and labour costs.

Consists of project financing services, professional services (of consultants, designers etc.), sales and marketing costs, taxes and other overheads (licenses, permits, fees, registration etc.)

Soft Costs

- In different parts of the world, land costs account for varying proportions of overall costs depending on land tenure, titling and allocation arrangements, level of social and economic development witnessed in a region.
 - A study benchmarking **housing construction costs across 30 African cities** revealed **construction costs constitute a major proportion of the overall project costs** (between 35% and 72% respectively) **followed by land and infrastructure costs** (between 11% and 45% respectively)
 - **In India**, the opposite is true. **Land costs can vary between 50-60% of the total project costs followed by construction costs that range between 30-40%**. Infrastructure costs vary with the availability of municipal services.
- Municipal spending on providing for **urban infrastructure and services** in any city is **strongly and non-linearly correlated to population density**.
 - A study of about 8,600 municipalities of Brazil, Chile, Ecuador and Mexico revealed that **per capita expenditure on providing urban services was lowest when population density is close to 9000 residents per square kilometre**.
- With reference to soft costs, the costs for obtaining construction permits (as a percentage of gross national income) and property registration (as percentage of estimated property value) can also add to the risk-adjusted cost of capital and overall project costs.
 - A study comparing the evidence collected on **land use regulations from 600 cities in 180 countries of the developing world (focused on Latin American and Asian cities)** revealed that it takes on an average 16 procedures and about 5 months to obtain a construction permit while property registration takes about 7 steps and 2 months. The **cost of obtaining construction permit was about 450% of per capita income** and the **cost of property registration represented 7% of the property value**.

Making Affordable Housing a Reality in Cities – Supply side Challenges

Innovation in Design

Optimizing Space

- **Designing efficient interiors/corridors and using smaller spaces** that require less energy or resources. Low-rise multifamily units (three to four storeys) could save space by being situated as row houses and connected through passages having two lifts (one at each end of the row) shared between these buildings instead of having a stair-case and lift for each building that incurs more costs. This would however, require cities to change building codes.

MIT's Media Lab developed a 200 square foot prototype apartment using sensors and IoT to perform like a structure three times its size by using hand-gestures/voice commands to flip, move and stow the home's transformable furniture.
- **Shared Living or Co-living** offers a profitable solution to increasing real estate values, pressure of maximizing profit per-square foot, shortage of affordable housing supply and increased disconnection in society. **Common** and **WeLive** are two examples of this model. It also provides for multi-generational, multi-family and community based housing for homeless, low-income and middle-income households/individuals
- **Tiny Homes or micro-housing** are small yet exquisitely designed dwellings compressed with essentials of a home into a compact space (not larger than 500 square foot in US). Backyard houses implement this concept by converting little spaces like attics and garages into living spaces. Boston, runs a “build-it-yourself” campaign on the “plugin house” which homeowners can build in their backyards and rent to low income tenants.

Los Angeles has launched a pilot program that involves offering loans of 75,000 USD to homeowners to build backyard houses and rent them to homeless city residents. The rent is subsidized from the city and the loan to homeowners is forgiven after 10 years who can subsequently rent their backyard houses to low income residents or turn it into a short term rental property.

Green Roofs

Green roofs is a concept of having a roof of a building or home covered with vegetation, soil, drainage layers, roof barriers and irrigation systems that can have cost-saving and environmental benefits when designing for affordable housing.

Denver passed a legislation in late 2017 called the “Green Roof initiative” that would require buildings (including upcoming affordable housing projects) bigger than 25,000 square feet to have green roofs or solar panels. While projects would witness increase in upfront costs, lower-income communities would benefit in the long term as they usually experience more air and water pollution given the location of their neighbourhoods. It could also bring down energy bills.

Making Affordable Housing a Reality in Cities – Supply side Challenges

Innovation in Construction Techniques & Materials

3D Printing

Ensures affordability through low labour costs and inexpensive materials. Beijing has built a 3D printed house that can withstand an 8.0 magnitude earthquake. A Shanghai firm, WinSun has developed a technology that can print 10 detached single-story homes in one day. However, a regulatory landscape that allows multi-story construction of 3D printed homes is still far from reality.

The Dutch city of Eindhoven plans to host the world's first commercial housing project on 3D concrete printing of five houses, first building a single-floor three room house followed by four multi-story units



Sections of the structure or the entire structure built in a factory (off-site) and then assembled on-site. Effective construction method where homes can be designed to look-alike and allow for production-based techniques to achieve economies of scale rather than developing customized versions for each home.

Prefabrication

Dweller, a startup in the City of Portland, helps homeowners develop tiny home rentals through pre-fabrication where homeowners have no upfront costs provided they rent the unit to tenants. 70% of this rental income is then retained to cover costs.

Alternate Materials & Building Blocks

- Nearly 35% of cement can be replaced with **fly ash (or Pozzolana material)** as a blending material for structural considerations. In Nigeria, a Pozzolana Cement plant has been piloted for cement production could save developers as much as 30% than using imported materials.
- Cement-coated expanded polystyrene (EPS)** panels are being experimented in Kenya for construction of homes reducing construction costs for a developer by 25% while cutting construction time by half.
- Cross Laminated Timber** is now being adopted in countries like US, Canada, Sweden, UK and Australia respectively who have changed their building codes to allow construction of timber framed structures. In US, Portland, Oregon awarded an affordable housing project of 60 units as the country's first high rise built from wood.
- Uniform and rectangular **Compressed Earth Blocks** and **Interlocking Stabilized Soil (earth) Blocks (SSB or ISSB)** are used with traditional building materials like clay, loam and sand minimizing the use of cement.. Interlocking bricks use the principle of Lego-blocks that can be clicked onto each other, minimizing the need for cement or mortar.

Making Affordable Housing a Reality in Cities – Supply side Challenges

Improving Construction Productivity

Government

Factors affecting productivity and raising construction costs include -

- Bureaucracy & red tapism,
- Corruption,
- Complicated building codes and permitting processes
- Highly fragmented construction market (of small scale to large scale developers)

In the US, City of Portland estimated that **“government fees” added approx. 13% of the total development cost of housing**. Taking cognizance, the city waived development charges on construction of Accessory Dwelling Units (ADUs) which had been preventing many homeowners from starting their development. **Post the waiver, ADU applications shot up from 50 in 2009 to 200 in 2013.**

Developer

Factors contributing to low productivity include –

- Inefficient project management practices,
- Lack of investment in technology, research and development,
- Lack of focus on skill improvement and training

Barcelona Housing Systems has designed a modular and standardized manufacturing system where pre-fabricated housing **components manufactured offsite are assembled by non-skilled workers onsite in half the time** of the traditional construction process.

TraceAir, a California based start-up, has developed a software that **analyzes photos from the construction site and compares them with photos from the previous week** along with the original blueprints to determine work progress.

Labour

Factors contributing to low productivity include –

- Shortage of skilled labour
- High levels of cost inflation

London has established the **Mayor’s Construction Academy (MCA)** to address for skill shortages and training of construction project managers in the city while also focusing on involving communities currently underrepresented in the construction workforce. It is also establishing a **‘Quality Mark’** to identify and accredit high-quality construction skills training providers in the city.

- Tools like **Building information Modelling (BIM)** can help identify issues early on without having to physically construct the structure.
- **Buildings as Material Banks (BAMB)** can ensure building materials are tagged and monitored.
- Advanced automated equipment like **self-driving bulldozers** and **bricklaying robots** (e.g. Hadrian X) can impact productivity levels as well.

Demand-side Challenges

Chapter 6

Overview

- Determining Eligibility
- Evaluate Purchase Model – To Rent or to Own
- Credit Financing

Making Affordable Housing a Reality in Cities – Demand-side Challenges

Determining Eligibility


Targeted Approach

- Aimed towards vulnerable populations and those with low or moderate income are targeted for provision of affordable housing. (e.g. USA, Canada, Malaysia, India)
- Eligibility in these countries is determined by the type of housing, income profiles and other socio-economic characteristics

Universal Approach

- Considers the entire population to be eligible for affordable housing. (e.g. Singapore, Netherlands, Sweden and Denmark)
- Generally applied in countries with extremely low levels of poverty that doesn't demand a targeted approach.

The Housing Ladder

Target income	Housing type	Government support for home seekers/renters
 Median income	Affordable homeownership (social and private)	<ul style="list-style-type: none"> • Grants – home start initiatives for first homes • Exemptions – stamp duty waivers/concessions • Credit – mortgages, shared equity
	Market rental housing	<ul style="list-style-type: none"> • Rental support – housing vouchers, rent assistance programmes
	Affordable rental housing	<ul style="list-style-type: none"> • Grants – housing preservation grants • Exemptions – tax reliefs
	Social rental housing	<ul style="list-style-type: none"> • Grants – operating subsidies, capital grants, etc. • Support services – income support, allowances
Very low income		

Eligibility in Singapore

Caters to 'family units' preferably married couples. Widowed persons with children are considered family units. Single persons need to be 35 years old to purchase flats and choose from few flat types. Unmarried persons (even with children) are treated as singles. Older residents (without families) are encouraged to sell their flats and move to smaller ones, sublet spare rooms, or trade in remaining flat lease to the housing board in exchange for a monthly cash payout.

Eligibility in Dupnitsa, Bulgaria

For the newly constructed housing units, the city stipulated that home seekers be Bulgarian citizens living at least 5 years in the city; having no owned properties (including suitable for permanent dwelling) or motor vehicles, of a total value greater than the market value of a dwelling in the city. It then introduced second level ranking based on employment, age, education, health and family status.

Eligibility in Poznan, Poland

Focuses on retaining university graduates and young talent by offering affordable rentals for up to 10 years. Tenants should have graduated from the university within the last five years, below 36 years of age, and should not own any other apartment in the city. Tenants have upper and lower income limits stipulated and are required to work in or run a business in the city.

Making Affordable Housing a Reality in Cities – Demand-side Challenges

Evaluating Purchase Model – To Rent or to Own

- Improved sense of security.
- Allows for capturing benefits from property appreciation.
- Effective collateral for financing debt

BENEFITS



CHALLENGES

- Often restricts labour mobility, generates longer commutes impacting productivity and therefore business.
- Expensive transaction – High acquisition, transfer and processing costs

Build to Rent (BTR) – An Emerging Model for Affordable Housing

Owned and operated by a single institution, BTR can provide for both market rent and sub-market rental properties. It provides long-term rental options for those who are not in a position to purchase a property due to affordability, locational or lifestyle choices among other reasons. For developers, this model mitigates settlement risks, avoids the unsteady environment of build-to-sell format, guarantees long term cash flows and provides a diversified investment and risk portfolio making it a viable model.

Affordable housing requires a mix of multiple tenures – rental or homeownership or a set of tenures in between leading from rental to ownership.

Long term tenants need to be incentivized towards private homeownership so that others in the social housing waitlist can be accommodated.

London has developed a Living Rent program that requires homes to have lower rents so that savings from the rent can go on a deposit to buy a new home with tenants encouraged into homeownership within 10 years.

In Melbourne, The Melbourne Apartment Project (MAP) is encouraging low-income households availing social housing to buy homes based on a model of cross subsidization (i.e. market rate homes covering costs for social housing.)

- Lower capital requirements
- Does not necessitate citizenship or domicile requirements.
- Shared maintenance and operations costs (in case multiple tenants live together)

BENEFITS



CHALLENGES

- Less profitable to develop rental market than home ownership
- Lack of government focus on rental markets
- Difficult to evict non-paying tenants in case of unclear lease provisions

Making Affordable Housing a Reality in Cities – Demand-side Challenges

Credit Financing – Rental and Ownership

For Rental Housing

- **Social Rental** - Government support includes loans, operational subsidies, interest subsidies, guarantees, supplemental income support, tax reductions.
- Institutional investors (mostly micro-finance institutions) provide market loans to tenants (sometimes guaranteed by the government or Interest subsidies which can lower interest payments on loans)

Cost price rental housing (i.e. rents based on the cost of making the home and not its market value) could supplement private market rate housing in cities to support those with lowest disposable incomes. Non-profit housing providers could engage with for-profit developers to bring in a mix of social and market housing while government gets to retain ownership (and ground rents) in the region.

- **Private Rental** - Countries (and sometimes local authorities) also regulate rents through **rent controls** to keep them below market rates. A **rental regulatory framework** could minimize vacancy, mandate inclusionary zoning, prevent segregation, and protects both landlords and tenants from unfairness

In Scotland, The Private Housing Act of 2016 gave authorities in cities such as Aberdeen, Edinburgh and Glasgow the right to cap rent rises of certain properties to one per cent above inflation.

For Ownership



Homebuyers purchase homes and look to commoditize homes as an “investment” instrument. For government provided subsidies or grants, intended beneficiaries are unable to avail them because they lack access to information or the resources to execute transactions to that benefit.

Homebuyers are unable to benefit from low-interest rate loans on homes and have to depend on other market instruments to make down payments. In US, UK, Australia and Canada, those who cannot afford downpayments can borrow the necessary money and pay private mortgage insurance or a mortgage indemnity guarantee to compensate the lender for being higher risk.

Loftium, a Seattle based start-up, finances down payments for homes by taking a share of the revenues earned from renting the property on Airbnb from 1 to 3 years helping buyers improve savings and therefore greater access to credit through mortgages.

- **Fintech Lenders** – Faster loan processing than traditional lenders with lower default rate. In Australia, LoanDolphin uses a bidding platform to capture the customer’s risk profile allowing mortgage brokers and lenders to bid for better deals. Another fintech firm, Tala, uses data such as merchant transactions and SMS messages to determine creditworthiness.
- **Crowdfunding** - HomeFundMe, an app by a US mortgage banking firm, helps homebuyers crowdsource downpayments by seeking gifts from friends, family members and employers.

Making Affordable Housing a Reality in Cities – Demand-side Challenges

Government Supported Financing and Not-for-profit assistance

Mechanisms to retain subsidies and preserve affordability in the long term are needed

Subsidy Recapture

Funder claims back most of the subsidies (and associated appreciation) when supported homes are resold in the market. These funds captured are then invested in new homes.

Subsidy Retention

Funding agency would lock all subsidies (and appreciation) into the resale value, inherently lowering the price for the next qualified buyer.

Usually, government or not-for-profit initiatives provide grants, interest-free loans or a deferred-interest mortgage loan recovered at resale to home buyer.

- **London** has a **Help-to-Buy** program providing equity loans for new homes
- **San Francisco** has the **Below Market-Rate Down Payment Assistance Loan Program** (BMR DALP) that provides eligible buyers of below market rate homes
- **Austin** provides an interest free loan to buyers less than or equal to 80% of median family income looking for homes within city limits.

Shared Ownership

- Homebuyers enter into an agreement with an entity (e.g. housing association, community provider, government etc.) and pays rent for the part of the property the entity owns while staying in it.
- The model allows the buyer to increase their stake in the property by buying it out until the buyer owns the property outright. This could be in cash or a separate shared ownership mortgage which covers this cost.
- The flexibility to increase equity stake in one's property at will when it is affordable to the tenant is what makes homebuyers choose this model.

Shared-equity Ownership

- Involves giving up part of the future property appreciation (or depreciation) in exchange for support from the government/private-sector
- The buyer pays a small proportion of the down payment topped up by a low or no cost “equity” loan from the government/private program, along with mortgage paying for the remainder of the property.
- Loan is repaid in full at the end of the term proportionate to the value (appreciated or depreciated) of the property at sale.

Shared ownership helps reduce mortgage costs whereas shared equity helps those looking for low down payment

Making Affordable Housing a Reality in Cities – Demand-side Challenges

Credit Access for Informal Settlements

- Private mortgage lenders have a limited understanding of underwriting informal segments preventing them from venturing down market.
- Local governments need to enforce measures that strengthen credit assessment, underwriting and risk management in creating a viable credit market for private investors in this segment.

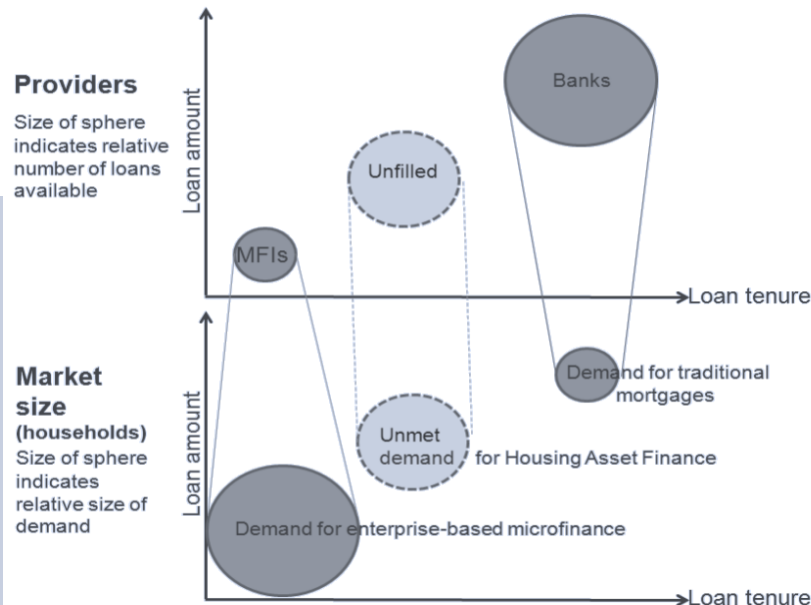
Fintech companies like **Tala** have started leveraging alternative data to determine creditworthiness. It approves micro-loans for borrowers lacking credit history by crunching over 10,000 data points including behavioural data, merchant transactions, SMS messages (as a proxy for traditional financial data) from the applicant's smartphone.

- When borrowing money to improve informal settlements, the risk of default can get lower when money is spent on tangible improvements (either structurally or from a durability standpoint) that increases the resale value (or rental value) of the settlement in case default occurs.
- These improvements create a credit market with the underlying real estate and its improvements as an alternative collateral.

Home Asset Loan Finance (HALF)

- Developed by the Affordable Housing Institute, HALF are a series of progressive loans on informal settlements as a real estate asset, each a little bigger, little longer and at a lower interest rate than the previous loan (i.e. lower spread) with origination costs recovered over a longer period.
- Each physical improvements (structural integrity) helps borrowers draw higher loans and for longer tenures.
- Factors like longevity of occupancy, ability for resale in the informal market and connectedness to municipal services also determine access to this type of finance.

The concept has been implemented in Peru (Mi Banco, Mi Casa), Mexico (Patrimonio Hoy), South Africa (Kuyasa Fund) and India (Sewa Grih Rin).



Chapter 7

Recommendations

Addressing Supply-side and Demand-side Challenges of Affordable Housing

Making Affordable Housing a Reality in Cities

Supply-side Recommendations

Role of Cities

- The land acquisition process should be transparent and fair. Cities should use statutory rights to expropriate lands only after exhausting voluntary methods such as land pooling and negotiated settlements.
- Cities should emphasize property rights (e.g. measures preventing forced evacuations and unjust relocations) over formal property titles, support the development of collective tenure operatives (e.g. community land trusts) and explore municipal land bank partnerships to release land for affordable housing.
- Cities should explore the transition from conventional segregation of single-use land to more mixed use, including inclusionary zoning to help prevent low-income households being pushed out into the suburbs.
- Cities need to outline a research-based, long-term vision of anticipated growth for the next 25-30 years with a plan to phase housing development in key areas. A flexible and transparent land policy should encourage different forms of development that create avenues for affordable housing, accounting for land holdings of all public agencies.
- Financing models should go beyond meeting initial costs and seek to ensure long-term affordability.
- Tax credits are not a viable solution in the long term. Real estate developers can be incentivized to provide affordable housing units through measures such as relaxation in development controls (e.g. height, density, building setback, energy efficiency), bonus systems, fast track approvals, and reduction, exemption, or refund of application fees, infrastructure charges or rates for such projects. When relaxing restrictions, cities need to account for environmental effects and effects on other local structures.
- Sound urban planning and an integrated urban development framework are needed to ensure infrastructure is rolled out in tandem with affordable housing projects on green field sites.



Making Affordable Housing a Reality in Cities

Supply-side Recommendations

Role of Cities

- Cities should explore tools to generate funds for infrastructure development, such as developer or employer contributions, land access charges from lease of public land assets, and sale of development rights to fund infrastructure development.
- Taxation can be structured to raise funds for urban infrastructure or incentivizing developers to do so. Taxation models can also help optimize land use by disincentivizing lands or properties being left vacant.
- Redevelopment should be encouraged where practical, such as conversion of offices or 'repurposing' underutilized or decommissioned land or buildings to improve housing supply.
- When cities have informal settlements, they should identify mechanisms to provide alternative housing or improve living conditions.
- ICT tools can help to streamline regulatory requirements into a single integrated system for approvals and monitoring of compliance.
- Smart grids can help alleviate pressure on energy in cities with a growing population.
- To address labor shortages, cities need to work with the construction industry to identify skill gaps and develop strategies to encourage training.
- Cities can encourage large, medium and small real estate developers to participate collectively in large-scale affordable housing projects, with a master developer guiding smaller-scale developers with experience of affordable housing.



Making Affordable Housing a Reality in Cities

Supply-side Recommendations



Role of Private Sector

Investors -

- The private sector needs to embrace innovative technologies to finance land acquisition, securing title, development of urban infrastructure, construction and subsequent operation and maintenance of affordable housing. Crowdfunding and blockchain offer potential, as do Islamic bonds (sukuk) in Islamic countries.
- In developing countries, where it is complex or impossible to raise funds from capital markets, the private sector needs to work with national or state governments to set up mortgage liquidity facilities and develop a secondary mortgage market.
- Where it does not yet exist, the private sector can develop the residential Real Estate Investment Trust (REIT) market, which can become a useful tool in scaling the supply of rental units in the city.
- Impact investing in affordable, energy-efficient housing can help bring positive social change along with investment returns.

Employers –

- Work with the community on provision of affordable housing, as employees will benefit from affordable homes that do not require long commutes.

Making Affordable Housing a Reality in Cities

Supply-side Recommendations



**Land Acquisition
& Securing Title**



**Land Use - Zoning
& Regulation**



**Funding Affordable
Housing**



**Housing Design &
Development Costs**
(Land + Urban Infra +
Construction)

Role of Private Sector

Developers –

- Investment in sustainable design concepts and energy-efficient housing can help optimize space (particularly co-living, micro-housing and macro-housing) and reduce energy costs (with use of green roofs and energy efficiency measures).
- Developers should stay abreast of innovative construction techniques such as 3D printing and pre-fabrication, which are evolving rapidly and could soon reach the mainstream.
- Alternative materials to cement and concrete should be explored with a view to reducing costs without sacrificing significant strength or durability.
- Advanced automated equipment and tools such as Building Information Modelling, Building Automation and Control, and material passports could improve productivity.
- Developers should work with educational institutions to increase investment in research and encourage skills development.

Making Affordable Housing a Reality in Cities

Supply-side Recommendations



**Land Acquisition
& Securing Title**



**Land Use - Zoning
& Regulation**



**Funding Affordable
Housing**



**Housing Design &
Development Costs**
(Land + Urban Infra +
Construction)

Role of non-profit sector

Housing providers -

- Work with city governments and the private sector on ways to offer alternative tenure models for those unable to access social housing or afford private rental housing. Mechanisms could include shared ownership, shared equity ownership, and community housing providers investing in market-rate housing and using revenues to subsidize affordable housing.

Financiers -

- Explore avenues to develop more community land trusts and non-profit residential REITs.
- Work with private sector investors, governments and international organizations to raise long-term funding and develop financial products that encourage private investment through government guarantees. Leverage funding channels such as foundation grants, charities, donations, local bond issues, government contributions to supporting infrastructure and loans backed by government or international financial organizations.

Making Affordable Housing a Reality in Cities

Supply-side Recommendations



Role of Non-Profit Sector

Advocate and support -

- Help would-be homeowners and self-builders to access information on issues such as land use regulations, legislative instruments, property rights, acquisition mechanisms, titling processes, building codes, low-cost construction techniques and energy efficient housing.
- Create awareness on the benefits of mixed-income, mixed-use development to address concerns around Nimbyism.
- Provide technical support services to communities that want to undertake self-construction or retrofit projects.

Making Affordable Housing a Reality in Cities

Demand-side Recommendations

Role of City Government

- Deploy clear and transparent rules to determine eligibility and identify beneficiaries for affordable housing, accounting for characteristics such as occupation (e.g. higher priority for key workers), years of residency, income, household size, age, health risks and productivity.
- Encourage a balanced mix of tenure models ranging from rental housing, including long term leases, through shared-equity ownership and shared ownership to complete homeownership.
- Develop a regulatory framework that protects tenants without distorting supply, and protects landlords from the unfair effects of first-generation rent controls.
- Reach out to community representatives, private developers and employers to discuss their opinions and concerns related to affordable housing projects.
- Use regulations to encourage uptake of new technologies, while addressing risks such as privacy.



**Determining
Eligibility**



**Evaluate
Purchase Model –
Rent or Own**



**Access to
Credit**

Making Affordable Housing a Reality in Cities

Demand-side Recommendations



**Determining
Eligibility**



**Evaluate
Purchase Model –
Rent or Own**



**Access to
Credit**

Role of Private Sector

Investors –

- Develop innovative ways of establishing creditworthiness and serving low-income households wanting to improve their informal housing.

Developers –

- Explore the potential of diversifying tenure structures through models such as build-to-rent and long-term rentals.

Employers –

- Consider supporting employees to meet housing costs through loans, subsidies or mortgage deals.

Role of Non-Profit Sector

- Explore innovative methods to provide financial assistance to the informal sector, working where helpful with the private sector and city government.
- Provide education to improve the financial literacy of borrowers, helping them to plan expenses and minimize costs of construction or home improvement.

For queries or further
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