# urban villages

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# **Urban villages:** co-productive urban design in China and India

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*Submitted March 2020 in total fulfilment of the requirements of the degree of PhD*

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# Declaration

This is to certify that:
i) the thesis comprises only my original work towards the degree of PhD,
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The maps in this research are laid out and exported with a colour scheme that is intended to be viewed on a printed double-sized A4 format.

**Acknowledgements**
This research is supported by an Australian Government Research Training Program Scholarship. This research project has been approved by the University of Melbourne Human Research Ethics Committee. All participants have been rendered anonymous.

I am indebted to the many local guides and translators that assisted me throughout my fieldwork, without which this thesis would not have been possible. My thanks go out to Lai Zhipeng, Wan Huiying, Dandan Geng, Junjie Su, Neha Ballal and Anushritha Sunil. This thesis has further benefitted enormously from countless conversations with Kim Dovey, Elek Pafka, Ishita Chatterjee, Jonathan Daly, Claire Collie, Eileen Sim, Tanzil Shafique, Shiyu Yang, Deshia Yulian and many others. I also thank for the critical input provided by my panel members Ross King and Jianfei Zhu as well as the two international examiners.

# Abstract

An urban village is an erstwhile rural village that is enveloped by the formal city while retaining distinct social and morphological characteristics. Through extensive mapping and comparison of twelve urban villages in Beijing, Guangzhou, Delhi and Bangalore, this research articulates the development of urban villages through multiple scales, agents and increments over time. The thesis shows that the current narrative that urban villages are overrun or absorbed by the formal city and displaced from their land is incomplete. Villagers are engaged in a co-production process with the state – at once formal and informal – as villagers extend, densify and diversify the village. This involves the production of new public spaces through the intensification of pre-urban routes and subdivision of agricultural land. A new functional mix emerges, geared to the livelihoods of the low-income population. Densification generates a more intense use of public space while upper-floor cantilevering challenges the liveability of public space below. Ground-floor interfaces emerge that afford temporary appropriations and a social life that is critical to the effective management of public space. Self-organized forms of governance mediate these adaptations through an adaptive process that responds to and anticipates formal regulation. The thesis contributes to the fields of urban morphology and informal urbanism.

# Index of content


One.
**Introduction**
**006**

*Informal urbanism*
**007**

*Upgrading*
**010**

*Urban design*
**014**

*China & India*
**019**

Two.
**Becoming urban**
**022**

*Urban morphology*
**023**

*Urban commons*
**030**

*Urban codes*
**038**

Three.
**Comparative mapping**
**046**

*Mapping informality*
**047**

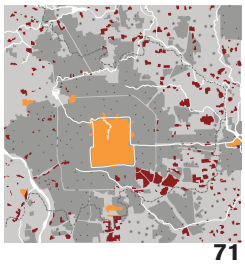
*Metropolitan scale*
**055**

*Village scale*
**059**

*Transect scale*
**063**

*Interface scale*
**065**

Four.
**Beijing**
**070**

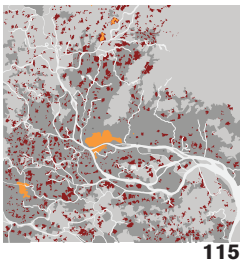

**71**

**77**

**88**

**100**

Five.
**Guangzhou**
**114**

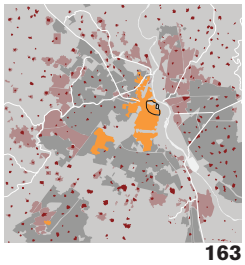

**115**

**121**

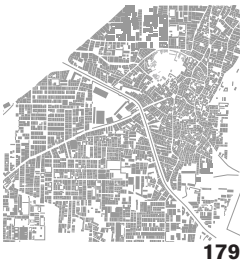
**133**

**146**

Six.
**Delhi**
**162**

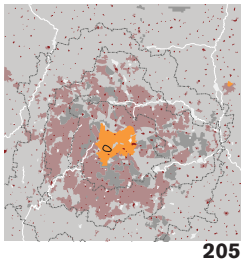

**163**

**169**


**179**

**191**

Seven.
**Bangalore**
**204**


**205**

**212**

**222**

**234**

Eight.
**Comparison**
**248**

*Village extension & subdivision*
**249**

*Architectural densification & diversification*
**260**

*Interface intensification*
**271**

Nine.
**Co-production**
**286**

*Formalization*
**287**

*Experimentation*
**294**

*Mediation*
**298**

*Bibliography*
**310**

# chapter 1 Introduction

**The simplest definition of an urban village is the process by which an erstwhile rural village becomes part of the city and goes through a socio-spatial transformation process that makes it distinctly different from rural villages on the one hand, and the surrounding urban fabric on the other. The principle dynamic that underlies the emergence of these urban villages is the rapid urbanization of a densely populated countryside, under conditions of weak or inconsistent government policy regarding land and housing** (Leaf, 2011; McGee, 1991)**. Rather than a 'smooth' urban process, whereby villages and rural holdings become integrated serviced urban plots under municipal governance, their status as rural settlements leads to an urbanization process that is negotiated at every step. The most intense negotiation takes place on the former farmland – which is claimed by villagers, informal developers and government. As the area of agricultural land diminishes, the expanding city forces the native villagers to look for other means of subsistence** (Tang & Chung, 2002; Tyagi, 1982)**. One of the key means is the laying out, construction and renting out of housing and other amenities for the new migrants that accompany this urbanization process. Villagers and migrants alike have limited access to government services on account of their status in society or their financial capabilities** (Kumar, 2015; Leaf, 2007)**. The process of urbanization within villages is characterized by a mix of formal and informal practices and the urban form that emerges is often a dense urban fabric, with a mix of residential, commercial and industrial functions, where living conditions often appear compromised** (L. Zhang et al., 2003)**. This thesis is concerned with understanding these practices and the urban form that is generated in urban villages in China and India.**

## Informal urbanism

Urban villages are regarded as a form of informal urbanization, in which land is formally owned through customary land tenure, but where other aspects like land use, construction and trading are informally organized. Urban villages exist throughout Asia – although they have rarely been recognized as an overarching spatial pattern for all South, East and South-East Asian cities (see Leaf, 2007). Urban villages have been documented in a wide range of contexts, including but not limited to Beijing (Zheng et al., 2009), Guangzhou (Liu et al., 2012), Shenzhen (Zacharias & Tang, 2010), Kunming (He et al., 2010), Delhi (Tyagi, 1982), Ahmedabad (AUDA, 2015), Bangalore (Nair, 2005), Egypt (Bayat & Denis, 2000; Soliman, 2010), Vietnam (Leaf, 2002), Indonesia (Goldblum & Wong, 2000; Silas, 2010) and Malaysia (Brookfield et al., 1991). These village urbanization processes are not exceptional forms of urban informality, but arguably one of the most common forms in large parts of Asia. Urban villages range from several thousands to tens of thousands inhabitants each (Zheng et al., 2009). Some cities like Shenzhen and Delhi have more than 50% of their housing stock arranged within informally grown settlements, the majority of which is built in and around villages on their former agricultural land (Ahmad & Choi, 2011; Zacharias & Tang, 2010).

While urban villages are often understood through the lens of informal urbanity (Chakravarty, 2016; Y. P. Wang et al., 2009; L. Zhang et al., 2003), theory on informal urbanism rarely concedes the profound role urban villages. General assumptions about the ways in which urban informality work, are often not valid or only partially true when applied to urban villages. The confusion about the phenomena of urban villages is partly due to a proliferation of various words in different languages – *Kampung* in Indonesian, *Chengzhongcun* in Chinese, *Abadi* in Hindi, *Gamtal* in Gujarati, etc. – that all point to variations of similar village urbanization processes. Urban village are a particular form of informal urbanism – related but different from other forms of informality. The concepts, methodologies and techniques that have evolved around the study of urban informality in general are critical to understanding the urban village. Not only through insights into their own dynamics, but also because they have shaped the general public's perception of urban informality as well as specific policies that affect urban villages to this day. Critical to urban village as it is defined in this study is its rural-to-urban transformation through envelopment by a larger city, which delineates it from the use of the phrase 'urban village' in several other context. Chung (2010) demonstrated that the smart-growth development in Anglo-Saxon countries under the banner of urban village

has little in common with the urbanization of a rural village. The enveloped urban villages in this study are also different from the 'urban' villages in the countryside that are 'urbanized' socially and economically through the knowledge and money send back by migrants who travel from the village to the city in the countryside (Tilly in Saunders, 2011, p. 47). Urban villages are also different from squatter settlements which have often been conceived as urban villages because of the rural roots of the residents (Peattie, 1992).

**Co-production**

Urban informality is nothing new – it is as old as the earliest cities. The systemic study of urban informality can arguably be traced back to Victorian England (Kudva, 2009), or to mid-century American aided self-help programs (Harris, 1998), but as an academic topic it took root in the early 1970's through the work of Hart (1973), Perlman (1976) and Turner (1972). Their key message was that urban informality should be recognized for its productive qualities. Hart was an economist who argued that the underemployed urban poor in Ghana, were not actually unemployed at all, but rather worked in an informal economy that generated wealth of its own, albeit outside formally approved government channels. In the *Myth of Marginality* (1976), Perlman demonstrated that the urban poor in Brazil were perhaps spatially confined to the cities fringes, they were not marginal to society. Turner worked as an architect in Peru and as such he was able to reassess commonly held perceptions that a 'good' informally produced urban environment is not necessarily one of high physical standards, but one that is geared towards the needs and income level of the inhabitants. In his book *Freedom to Build* Turner (1968) advocated a shift in the government's role in cities – "the central proposition of *Freedom to Build* was that, for a viable housing process to exist, local and personal control is essential" (J. F. Turner, 1972, p. xvi). Turner disapproved of direct government intervention into the built environment and he stressed the importance of self-help and autonomy of the urban poor which during the 70's led to a global policy shift from slum clearance and state-built housing to the implementation of government aided housing schemes (M. Davis, 2006; P. Tiwari et al., 2016; Wekesa et al., 2011).

If this early work demonstrated the productive qualities of urban informality, subsequent scholarship has shown how these qualities are co-produced. Informal urbanism as co-production pays close attention to the different increments, different agents and different methods that each contribute parts to the whole. Co-production emphasizes the interrelations between formal and informal. This relation is most often conceived as a continuum, in which formal is associated with the state, and where informal is associated with individuals and communities (Etzold

et al., 2009). Harris (2018, p. 275) notes that such continuum features "discontinuities, or thresholds, [that] define distinct modes of informality". Altrock (2012), borrowing from Young (1999), has conceived informality as either *complementing* or *supplementing* formal processes. Supplementary arrangements occur when informal institutions are "set up when the state is too weak to implement its formal rules but there is a need for social order anyways" (2012, p. 176), whereas complementary arrangements occur when a setting is not covered by formal codes and informal practices become formalized over time. For example, the productive quality of services such as sewage networks emerge as government-built trunk lines are supplemented by individually-built house connections (Allen et al., 2006; Joshi & Moore, 2004).

In revisiting her research, Perlman (2005) contends that the distinction between formal and informal has become blurred and illegality can no longer be used as a distinctive feature. The distinction between formal and informal processes should not be confused with other related distinctions such as legal/illegal or government/self-help and urban informality should rather be seen as "an organizing logic, (..) a process of structuration that constitutes the rules of the game" (AlSayyad & Roy, 2004, p. 5). The productive qualities of urban informality are not just the domain of the urban poor, but extend into middle-class communities (Herrle & Fokdal, 2011; Sundaresan, 2017). The formal planning apparatus is often more arbitrary and unpredictable than informal practices which follow a more stable logic (Koster & Nuijten, 2016). Lower income areas can emulate middle-class areas in aesthetics (Kellett, 2005) and legal practices (Varley, 2002), while upgrading projects or resettlement sites intended for the urban poor often end up to benefit the middle class (M. Davis, 2006). In other words, informality is not a status that any settlement or agent can be assigned to, but a mode of production (Roy, 2009).

In the opening pages of the book *Urban informality* (2004), editors Roy and Alsayyad argue that "the illegal subdivision of agricultural land seems to have become the largest source of informal urban development" and that "this process implies some important breaks with earlier forms of informality" (2004, p. 2). If the conversion of agricultural land is indeed the dominant mode of urban informality, one of the central questions to understand this process would surely be to investigate what happened with the erstwhile villages and what their role in the urbanization process is? However, research that systematically addresses this question remains scarce and fragmentary – and it is exactly this research gap that this thesis aims to address. Urban villages are co-produced through the interplay of formal and informal practices and they differ significantly from most informal

settlement in the Latin American context, that underpins the understanding of urban informality in general. Urban villages break with earlier forms of informality in three primary ways. First is that informality was understood as taking place on primarily on squatted land through illegal encroachment or 'land invasions' (Alsayyad, 1993), which is reflected in DeSoto's concern with legal titles. Urban villages however are an official part of the government structure, but the municipality has limited formal jurisdiction in the village. The second break was that urban informality was conceived as being constructed primarily through self-help. Urban villages are built by a variety of actors, including local villagers, rural migrants, developers, and municipal interventions, that contribute different spatial elements to the village. Thirdly, while urban informality was understood as a synonym for slums and the urban poor (Gilbert, 2007), urban villages have a mix of residents, including an increasing share of middle-class households .

## Upgrading

While the primary focus of this research is not on the social and economic improvement of the livelihood of villagers and migrants, it is of critical importance to establish the key role that informal settlement plays in this process. Informal urbanity is often conflated with slums, but these are two very different concepts. A slum refers to sub-standard living conditions, while informal urbanization refers to a process that may or may not produce slums (Dovey, 2012). By equating the two, such as in well-known UN-Habitat reports like *The Challenge of Slums* (UN-Habitat, 2003), there is the risk of incentivizing governments to remove informality without addressing the livelihoods of the residents. Just as the concept of urban informality is moldable, Gilbert (2007, p. 699) points out that "standards differ across the world so what is considered to be a slum by poor people in one country may be regarded as perfectly acceptable accommodation by much poorer people in another". Substandard living conditions can take shape in formally built housing, such as public housing built with low standards and lack of maintenance (M. Davis, 2006). On the other hand, many of the most desired parts of European city centers grew informally over centuries of incremental additions.

In 2006, Davis estimated that the total slum population in China is 193.8 million and 158.4 million in India; respectively 37.8 % and 55.5% of the urban population (2006, p. 24). That is over a third of the total population of 900,000 people living in slums globally (UN-Habitat, 2015, p. 8). The poor living conditions that define a slum are in some way a prerequisite for the low housing prices that enables migrants with very little

income to settle there. Upgrading programs that do not recognize this reality are at risk of dislocating the residents and gentrifying the neighborhood (Amis, 2001). Despite the slum-like appearance of informal settlement, they often generate higher square metre prices than formal development (Friedman et al., 1988), and the lower individual unit cost is the result of a vast reduction in unit size, making it affordable to migrants (Wu, 2016). Informal settlement is not static, but generators of social change. Turner himself noticed the incremental change of people's lives and described how people change from 'bridgeheaders', to 'consolidators' and finally to 'status seekers' (1972). Unlike earlier assumptions where the urban poor were thought to be locked into a 'culture of poverty' (Lewis, 1955), informal settlement is now thought of as processes of transformation, turning rural arrivals into urbanites. Saunders (2011, p. 63) argues that "the larger logic of the city is inescapable, new people create new economies, and those economies develop best when those people, no matter how poor, are able to stage their arrival in the organic, self-generated, bottom-up fashion". Informal settlement is often entangled with informal economies that generate much of the socio-economic improvement to its residents. In China, it is estimated that 58% of people work in the informal sector, while in India this figure is 93% (Rada, 2010).The socio-economic improvement extends to accessing political rights and gaining forms of citizenship (Caldeira, 2016). Perlman's study of inhabitants of favelas in Rio de Janeiro showed that the people were well integrated within society, aspiring to many of the same dreams as their counterparts in formal neighbourhoods, but are nonetheless subject to stigmatization (1976).

How much of the global slum population lives in urban villages is not known. Urban villages are framed as transitional neighborhoods (Yuting Liu et al., 2010), that provide a new means of livelihood for the original villagers, and a place for migrants to live and integrate themselves in the city. Bach (2010) argues that the urban village environment allows migrants to 'come as peasants and leave as citizens'. While Peattie (1992) cautions the stereotyping of rural migrants as peasants in Latin American context, in Asia people both derive and are deprived from rights based on their administrative status as villagers. Wang (2009) argues that urban villages play a crucial role in integrating low-income people into contemporary urban life, as they serve "a special and important transitional stage in the urbanization process and provide the space and time for rural people (both local and migrants) to adapt to the new way of life in the rapidly urbanizing regions" (2009, p. 968). Urban villages provide space to a high percentage of rural migrants as well as other low-income urbanites such as students and artists (Wu, 2016, p. 858), in extreme cases outnumbering the original local villagers 30 to 1 (L. Zhang et al., 2003, p. 922).

While affordability and financial limitations allow migrants to settle, the success of the subsequent upgrading process has often been attributed to the social fabric that emerges in informal settlement (Martin & Mathema, 2006). Informal settlement allows the formation of social capital, which is generated within communities as people invest in social networks and mutual recognition (N. Lin, 2017). These communal bonds can originate from kinship ties, but also through bonds that develop between neighbors on the basis of proximity (Arefi, 2011). While urban informality might be characterized by self-help, it is argued that it is most effective as an upgrading practice within a strong community that enables collective action. Perlman (2005) describes the social capital as one of the few great assets for getting out of poverty – they can also help in dealing with government, in resisting eviction or demanding improvement through collective bargaining (Bayat, 1997; Coelho & Raman, 2010). These neighborhoods often show high levels of trust, which enables more effective cooperation (Carpenter et al., 2004). The formation of these bonds is also documented in urban villages (Liu et al., 2012), but what makes urban villages distinct from other forms of informal housing, is a distinction between the social bonds among the traditional land-owners and among the new migrant that move in. Since social and financial status are strongly differentiated, their goals do not always align, and collective action is more likely to occur within a social group. Organization among local villagers is strengthened by family and clan ties (Huang & Tao, 2013), and some village collectives are so organized they have evolved into shareholding companies to manage their urban environment (Chung, 2013).

This process of incremental upgrading and improvement by the people themselves has been described as the central feature of informal settling and it has been recognized that informal growth processes are much better able to support the socio-economic upgrading of the urban poor than formal processes. These informal growth processes are described by concepts such as self-organization (Martin & Mathema, 2006; Schaur, 1991), self-help (J. F. Turner, 1972; L. Zhang et al., 2003), self-made (Tsenkova, 2009) and autoconstruction (Caldeira, 2016). As the urban poor only have limited savings and they improve over time by adding small increments to their dwelling or business (Amoako & Boamah, 2017; Dovey, 2014). As the urban poor do this, they encroach the land and consume open space often without legal tile (Bhan, 2019). Informal settlements are conceptualized as taking place on marginal land and interstitial space (Dovey & King, 2011; Napier, 2007), encroaching upon land that is in some way underutilized. The narrative of co-production is linked to incrementality by stressing that "government does what households cannot effectively do – assemble land and provide trunk infrastructure and services" (Wakely

& Riley, 2011, p. 2). The language of incrementality thus emphasizes the production of architecture – one helps themselves through the production of architecture. However, by conflating the concepts of self-built, incremental and encroachment it is presupposed that informal settlement is primarily conducted by individual families and that they have little capacity or incentive to produce open space.

While the incremental nature of the architecture enables improvement over time, much of the capacity of informal settlement to allow upgrading has been attributed to its open space structure, rather than its architecture. Saunders argues that spatial arrangements such as "the layout of streets and buildings, the transportation links to the economic and cultural core of the city, the direct access to the street from buildings, the proximity to schools, health centres and social services, (..) and the ability to open a shop" (2011, p. 32) are critical in generating this upgrading capacity. Specifically addressing urban villages, Kochan (2015) argues that the spatial particulars within urban villages allow migrants to integrate into the larger socio-cultural system. The fine-grained laneway network and flexible building typologies in urban villages, allow multiple economic and social functions to co-exist in close proximity, allowing a synergy of processes that the migrants benefit from (Davis & Brown, 2011). These spatial components of informal settlements are often overlooked in formal upgrading efforts, and many government rehousing schemes have failed as a result (Amado et al., 2016; Wekesa et al., 2011). "If there is one lesson for planners in the massive literature on slums and squatter community life, it is the finding that housing in these areas is not for home life alone. A house is a production place, market place, entertainment centre, financial institution and also a retreat" (Laquaian, 1983 in Kellett & Tipple, 2000). Despite a considerable academic consent on the importance of the social fabric and spatial relations, Watson (2009) argues that urban planning in the global South still follows ways of doing things from the early 20th century: "Urban form is shaped by a concern with aesthetics (order, harmony, formality and symmetry); efficiency (functional specialisation of areas and movement, and the free flow of traffic); and modernisation (slum removal, vertical or tower buildings, connectivity, plentiful open green space)" (2009, p. 2261). According to the Centre On Housing Rights and Evictions (COHRE), at least two million people are evicted forcefully every year, excluding other forms of market-induced displacement (UN-Habitat, 2007, p. 12). Despite academic criticism, large-scale social housing projects continue to replace informally settled areas and provide housing for millions of people (Van Ballegooijen & Rocco, 2013).

## Urban design

Urban informality is a process, but also an outcome, even if only of temporary nature – a product that has performative aspects that constitute real and significant impact on the residents. Informality is most often addressed in general terms and characteristics, and lacks a comprehensive understanding of how such informal processes operate at the lower level of scale of the individual house or settlement (Dovey, 2012) – beyond the general descriptions of incremental housing, recycled materials, makeshift construction and so on there is little detailed research on the morphology, materiality or semiotics of informality" (Dovey, 2011, p. 351). Informal urban design is often described as a background to which other disciplines such as anthropology or economy frame their studies and make no attempt to provide explanations of urban form (Walker, 2001), or address the limitations of public space design (Duarte, 2009). This issue extends back to as early as 1988, when Rapoport (1988) lamented that most studies into informal settlements go into the social, economic and political aspects of the settlement process, while neglecting the spatial component of the built environment. While the socio-economic processes that lead to the emergence of informal settlement are studied, this has occurred with a "virtual absence of empirical data" on the spatial characteristics of these places (Kellett, 2011, p. 7). Smith (2010, p. 236) contends that "beyond a few rather broad generalizations there seem to be few explanations for variations in the forms of modern squatters settlements." Morphological data on urban villages is even rarer (for exceptions see Huang & Tao, 2013; Zacharias et al., 2013). Smith argues that "while the urban renewal of villages-in-the-city has been increasingly challenged on social grounds, the need for the city to plan, design, and order the *space* of these villages has gone largely unquestioned" (N. Smith, 2014, p. 31). This lack of spatial understanding extends into the implementation of upgrading practices as Mukhija (2001, p. 215) points out that "most of the upgrading literature does not include any figure drawings or drawings with reference scales".

Urbanity is generated when people live in close proximity and are forced to establish social conventions that negotiate the interactions between strangers. The spatial configurations of cities, its urban design, is thus a 'tool' for high-density living. From a purely morphological standpoint, Urbanization is transformation from rural densities and tenure structures, towards more fine-grained access and tenure structures that enables high concentrations of people to life, work and interact in close proximity. Urban design is often misunderstood as a kind of superficial surface treatment, that merely aims to beautify or add character to a place and is therefore often considered of marginal relevance to the larger

structural forces of economics and politics. Urban design is much broader and concerned with the spatial organization of urban life which includes the public realm, such as the arrangement of the infrastructure, but also the private realm in plot boundaries and urban codes that regulate the activities within private plots. In this sense, every urban place has an urban design, including informally settled land.

Urbanization is a process that includes both the production of architecture, as well as the production of public space, which exists in a delicate relation. The public space and architecture are co-produced by different agents, who negotiate with each other, the local governments under which they fall, and the residents to which they cater. Too little public space reduces access to pedestrians, vehicles and service delivery, while too much public space increases prices and reduces affordability. Too much architectural infill reduces access to light and air, while too little architectural infill lacks the critical mass for employment opportunities and public transport. These qualities of accessibility, affordability, etc. emerge from the morphology and are *common* goods because they are accessible to all. To study the urban design of informal settlements, means to refocus attention on ordinary spaces and the everyday city, the interstitial spaces between vast mega-projects (Chakravarty & Negi, 2016). Howard Davis (2006, p. 8) observes that "the vast majority of buildings in the world, the ordinary building fabric of cities and towns, including houses and workshops and minor civic buildings (..) have until recently not been considered fit subject for study and are barely covered in the best-known books about architectural history". Such a reorientation on the physical manifestations of urban informality and informal processes of production, would put urban design back "on the agenda of development interventions that seem to have forgotten the architectural and design values of their process and outcomes, resulting in a de-spatialisation of development planning" (Frediani & Boano, 2012, p. 3).

Research on informally generated urban form is often dismissed as an "aestheticization of poverty" (Roy, 2004, p. 296) in which an emphasis on the physical environment is equated to aesthetic upgrading practices that aims to make cities "look regimented and orderly in a geometrical sense" (Roy, 2005, p. 150). While the 'image of the city' certainly matters, it is just one aspect of urban design (Lynch, 1962). For example, some scholars (Dovey & King, 2011; Rios, 2014) have demonstrated the very real impact of aesthetic considerations made by residents in informal settlement to achieve legitimacy. Physical form and spatial change are in itself forms of human behaviour (Fletcher, 1995) and not just the containers in which behaviour takes place or a background to human activity (Fox & Alldred, 2015; Taylor & Ivinson, 2013). A structural approach to urban informality views the

spatial form of urban informality as a superficial manifestation a of deeper structural political and economic issues – "the provision and distribution of infrastructure is not a technical issue but rather a political process" (Roy, 2005, p. 152). This belief is rooted in the idea that spatial configurations are merely representations of actual forces – and that appearances are irrelevant. Overemphasizing a narrative of political resistance dismisses "a more prosaic assessment of the material constraints facing the urban poor and the resources they use to address those constraints " (Varley, 2013, p. 16). Recognizing the importance of spatiality to is recognize human agency to shape infrastructure, as well as the infrastructure's agency to influence people's behaviour in space.

To reiterate – if the conversion of agricultural land is indeed the dominant mode of urban informality, it is crucial for our understanding of cities to investigate what happens with the erstwhile villages and what their role in the urbanization process is. If urban villages are to remain permanent features of the cities in which they are embedded and to keep performing their role as spaces of integration and upgrading, we need a better understanding of how this productive assemblage comes into being and how its productive qualities are negotiated between its co-producers. These productive qualities will differ by scale, primarily public space, architectural infill and the building interface. At each scale, this study aims to describe the urban form (the urban morphology), to articulate the productive qualities

**1.1** The dense urban fabric of an urban village - what are the urban codes that mediate this process?

that are generated (urban commons) and to elicit how their production is mediated between different agents and different forms of governance (urban codes). At the intersection of this exploration emerge a range of key questions: what kind of public space is produced and is this primarily a planned or an emergent outcome? what are the ways in which the village densifies and diversifies? how does the building interface transform under different conditions? what are the ways in the public space is used and how is this effected by the built environment? how do urban villages relate to the formal regulatory framework? and finally what might be the future of urban villages?

**Significance**

These are open-ended questions without a singular answer, and the research is concerned with the articulation of differences between the various ways in which the village urbanizes. The focus on villages in India and China will shed light on understanding the similarities and differences between the urban morphologies of villages in those two countries. This research will also help to assess the scale of the urban village phenomena, by articulating how urban village morphologies are different from adjoining development and how their spatial transitions take shape. Finally, the research enables a better understanding of the role of local practices versus municipal and state practices in influencing public space and densification. It is important to address the lack of knowledge about how public spaces are produced and how architectural infill is produced because they are related to how well the urban design performs for particular human needs.

What is a stake here is a lack of knowledge has effect on three interrelated urban needs – image & upgrading strategies , access & public space, and legality & affordability. First, the informal character of urban villages does not easily fit into the global city narrative that many municipal governments aspire to, and policy has therefore been geared towards clearing, hiding or limiting the urban villages (Hin & Xin, 2011; Li et al., 2014; Y. Zhang et al., 2016). More than the actual degree of organization in the urban design, it is the *perception* of chaos that makes government and outsiders validate removal or ignorance. Incremental upgrading strategies are often dismissed by governments based on the perception that urban villages are beyond the capabilities of such approaches. The common narrative among municipal governments is that villages are enveloped, or even 'engulfed' by the formal city (Lueder, 2018; Mehra, 2005) and have little agency to determine their future. By documenting the unseen ways in which urban villages organize themselves, this study aims to change this perception.

Second, any neighbourhood has a need for sufficient public space – not only to provide access but also to allow for other uses of public space. A well-integrated neighbourhood will allow for more businesses opportunities, as more people will move through the neighbourhood (Lizarralde, 2014), and more of the city is within its reachable 'pool of use' (Jacobs, 1961). Urban design has a role in "generating and facilitating street life, various cultural activities, small business development [and] land use diversity" (Ye & Van Nes, 2013, p. 19). These societal functions work best if the public space is neither over or under supplied (Webster, 2007), and when the public space is arranged in small enough blocks to allow a permeable urban network. Too little public space and high built density can create overshadowing problems, which affect public life (Y Lin, 2011, p. 70). Public space in Asian cities is under strain – population growth and increasing car ownership has led to popular demands for more infrastructure (Pucher et al., 2005; Pucher et al., 2007). Most emphasis in research and funding is for large-scale infrastructure such as highways or metro-rail projects, while little attention is given to the fine-grained networks of streets and lanes that constitute the bulk of public space. Finding adequate land in dense neighbourhoods is a key restraint for implementing public projects (Bhan, 2019). Small plots and irregular street networks make formal infrastructure improvement more costly (Mukhija, 2001), up to two or three times the costs elsewhere (Ferguson & Navarrete, 2003). While urban services are often pirated and distributed informally to residents, Perlman (1976) showed that many residents of informal infrastructure pay a premium for these informal services.

Third, informally produced public space and architectural infill often exists in problematic relation with the government mandated built form, which effects their legal recognition, housing costs and ultimately the access of residents to affordable housing. DeSoto (1990) argued in his book *The Other Path* that the main obstacle for the urban poor to get out of poverty are cumbersome government regulation and their reluctance to grant formal land titles. In a study of the relation between regulation and the urban poor, Devas (2001, p. 404) argues that many "cities have inherited a collection of repressive bylaws , and planning and building standards, which are unsuited to the needs and ability to pay of the poor". Studies in municipal regulation show that overly tight regulation forces development costs up, making affordable housing effectively illegal (Annez et al., 2012; Ferguson & Navarrete, 2003; P. Tiwari et al., 2016). A lack of urban design knowledge can create inappropriate standards, which are impossible to follow and pushes residents in illegality (Martin & Mathema, 2009; Payne, 2001). This balance between spatial standards and affordability has been identified as one of the key struggles for government planned affordable housing

projects. Mayo & Gross (1987, p. 328) argue that the subsidies required for government housing projects "are simply too high to permit large-scale replication of projects" and that subsidies reflect of "overly ambitious planning standards which require that large subsidies be maintained to make projects affordable by intended beneficiaries". Furthermore, excessive open space standards and low-density architectural infill make service delivery expensive, land acquisition cost high and lowers possibilities for informal businesses (Lizarralde, 2014), while appropriate plot sizes are a key determinant for the success of popular upgrading strategies like tenure legalization (Mukhija, 2001).

A better understanding of adequate public space provision, regulation and perception is key to the future of the urban village. Leaf (2007, p. 178) argues that "although the urban housing provided through the phenomenon of the [urban village] may be problematic in certain regards, with respect to the conceptually larger challenge of providing sufficient housing for China's burgeoning urban populations, it must be looked upon less as a problem than as part of the solution". Stefan Al (2014, p. 3) argues that "urban villages have insufficiently been approached from an urban design perspective. It is this urban design argument that could potentially help persuade city governments to integrate villages into, rather than to expel them from, their cities". What is ultimately at stake here is that a failure to understand these spatial dynamics can lead to degradation of the urban commons and potential demolition of its urban environment. If these villages would cease to function in their role it would have enormous impacts for the millions of people that are currently residing in urban villages. Moreover, with ever expanding cities in China and India, many more urban villages will come into being over the next decades and knowledge created in this research will be beneficial to understand these future urbanization processes as well.

## China and India

China and India are the two most populous countries, with a combined third of the global population, both in the process of rapid urbanization. While a larger body of research has emerged in China, urban villages are critical to the urbanization of cities in both China and India. Two separate traditions of related scholarly work on urban villages have so far existed almost completely independent of each other. While both strands of scholarship have used and contributed to urban informality theory – direct comparison have so far not been made.

Many authors write as if urban villages are a unique Chinese phenomena (He et al., 2010, p. 672; Lai et al., 2016, p. 2; Li et al., 2014, p. 301; Yanliu Lin et al., 2011, p. 427; Y. P. Wang et al., 2009, p. 957). This position is problematic for it assumes there is such a thing as a *the* Chinese or *the* Indian village, with a certain set of unchanging characteristics that preclude any comparison. Some researchers, such as Leaf (2007) have called to break with the Chinese 'thesis of exceptionalism' and to compare urban villages between countries. This thesis of exceptionalism also applies in reverse – China is often consciously left out of research on urban informality as its particular expression does not fit the broad generalizations applied to the 'global South'. Comparative studies are still rare and have generally focused on municipal governance and socio-economic aspects of upgrading (Altrock & Schoon, 2011; Ren, 2018). In writing on comparative urbanism, Nijman (2007) argues to break with a "persistent continental typology" and rather study how global process affect places in very different ways – often city specific. To move away from the idea of 'Indian', 'Chinese' or 'Asian' urbanism is to ask "to what extend and in what manner must cities be understood in reference to their states?" (McFarlane, 2010, p. 731). Even if states emerge as the key determinant for explaining similarities between urban villages, this explanatory framework can never address variation within states.

While at first glance China's trajectory as a communist state and India's path towards democracy could not be more different, the two countries share certain elements, especially in relation to the position of the village. Both countries have large populations that until recently were predominantly rural. At the start of the 20th century, only 10% of people in China and India lived in cities (R. Bhagat & Mohanty, 2009; Friedmann, 2005) and it is currently estimated that there are 572,000 villages in China (Yansui Liu et al., 2010) and just over 600,000 villages in India (Verma, 2017). In the period after the Second World War, both countries were perceived by their respective political leaders as 'nations of villages', and state policy was geared to lowering rural-to-urban migration. Influenced by Gandhi's vision of India, post-independence public policy in India was in favour of village development and sceptical of the potential of the city (P. Tiwari et al., 2016). In a speech, Nehru (1963) told the nation that "the fundamental problem of India is not Delhi or Calcutta or Bombay but the villages of India … We want to urbanize the village, not take away the people from the villages to the towns". Similar sentiments for a future rooted in rural development underpinned much of Mao's decision making in China (Friedmann, 2005). Both these visions of a 'nation of villages' were, paradoxically perhaps, underpinned by an emphasis on a centrally planned control economy and a modern socialist rhetoric, in which the state would provide housing and industrialization (M. Davis, 2006). Both countries

however failed to deliver such housing on an adequate scale (Ren, 2018) and opened up to more liberal economic agenda's – starting in China in 1978, and 1991 in India. Not only was the role for the market increased, in both countries this involved a decentralization of power over urban development to local government bodies (P. Tiwari et al., 2016; Zhu, 2004). Zhang et al. (2003, p. 929) argue that "the real authority of urban control [in China] is not with central policies but with implementation at the local level". In China, this decentralization is greater and municipal bodies fund themselves, while in India much power remains at state level and cities are dependent on government grants for larger projects (Ren, 2018).

One of the key features of contemporary Chinese life and one of the reasons why Chinese urban villages are often described as unique is the *hukou* system. The *hukou* is a residential permit system that limits people's access to public services to the village or city where they are registered. The rights that allow local villagers to develop their own housing are linked to their status as rural *hukou* holders (He et al., 2010), while any rural migrant that comes to the city, is denied formal access to urban services. Informally arranged schools, community centres and medical facilities in the urban villages are often the only options available for migrant communities (L. Zhang et al., 2003). While the role of China's *hukou* as an obstacle to the integration of rural migrants is widely discussed, other scholars have argued that Indian citizens face similar struggles for recognition as urban citizens (Desai & Sanyal, 2012). When rural migrants in India move to the city they do not have automatic access to their rights as citizens, but have to acquire these through lengthy political processes (Kumar, 2016). Bhagat (2011, p. 53) argues that in India "the exclusion and discrimination against migrants takes place through political and administrative processes, market mechanisms and socio-economic processes causing a gulf between migrants and the locals along ethnic, religious and linguistic lines". Zimmer (2012) details how the urban poor that settle on former farm land in Delhi have to go through a long process before they are registered, legalized, authorized and provided with urban services. Contrarily, villagers resist conversion of their legal status from rural to urban as they lose rights and face new obligations as urban citizens (Kumar, 2015). As Alsayyad and Roy argue: "citizenship [in India] is linked to either patronage or to associational membership and in both cases it is fundamentally about protection. (..) These are private systems of governance that operate as medieval fiefdoms, imposing truths and norms that are often contrary to national law" (2006, p. 3). Hence, rural migrants in both India and China are faced with restricted access to municipal services on account of increased commodification and regulation (Altrock, 2012) and are not regarded as 'proper citizens' (Watson, 2003), that have an equal right to city.

# chapter 2 Becoming urban

**Urbanization is a highly complex and multifaceted process. This chapter presents a framework to understand and relate the spatial practices that transform a rural village into an increasingly urban one. Research into urbanism is often distinguished between research that has normative intentions, where the research is used to make design decisions – and cognitive intentions, where the aim is to effectively describe urban form (Gauthier & Gilliland, 2006). This contrast is perhaps best captured by one of the most influential urbanists, Kevin Lynch (1984) – who contrasts the question 'what is a good city?' with the question 'how does it work?' The emphasis of this research is on understanding urban morphology and its related spatial practices rather than the knowledge required to make an urban design, although these are interrelated practices (see Marshall & Çaliskan, 2011). There is no single clear-cut classification of the constituent parts from which the productive qualities of cities emerge – merely a messy field of interrelations. A key contribution that frames these interrelations is the book *Structure of the ordinary*, by John Habraken (1998). In the introduction, Habraken (1998, p. 10) distinguishes his approach from Lynch's normative approach, as the aim is to "explore the nature of urban form" and suspend judgement on its outcome. Habraken emphasizes that the key structuring relationship between humans and the built environment lies in the idea of control – the ability to transform parts of that environment. However, the built environment is many-folded, and control can be expressed and exercised in different ways as people *built, use* and *regulate* the same space. Habraken conceptualizes this three-fold *structure of the ordinary* as the physical, cultural and territorial order of the built environment. Withdrawing from the rigidity implicit in order, and by using the concepts of morphology, commons and codes that connotate a related differentiation, Habraken's structure is interpreted to suit the specifics of studying urban villages. Urban morphology is the spatial configuration and transformation of the urban fabric. These configurations provide emergent socio-spatial resources used by the residents and are conceptualized as the *urban commons*. The interrelated set of spatial practices that comes into being to maintain that resource are conceptualized as *urban codes*.**

# Urban morphology

Urban morphologies are neither formal nor informal. If urban informality is understood as primarily a process (Roy, 2005; J. F. Turner, 1972), it is in the nature of its production rather than its outcome that an urban morphology can be considered informal (DeLanda, 1997, p. 30). In a typical formal city building process, the urban design is produced first, after which the infrastructure is built, plots are sold, and the architecture built. Dovey (2014) has demonstrated that this sequence of events is much more mixed, sometimes reversed in informally settled areas. The public open space emerges from many small decisions that are made by the residents, without any masterplan, that often results in non-orthogonal layouts with meandering access structures. However, Dovey and King (2011) also argue that although these decisions are multiple and potentially contradictory, informal settlement cannot be regarded as entirely unplanned or undesigned. The assessment of informally produced urban form as organic or un-planned is almost always based on visual appearances and the actual underlying spatial structure is rarely studied (Arefi, 2011). The absence of orthogonal layouts is insufficient evidence to establish the degree of planning (M. E. Smith, 2007, p. 5). To Dovey, urban informality is the incremental production of urban form that takes place outside state control. This approach is similar to Briassoulis (1997), who argues that informal settlements differ primarily in 'the manner by which the final product is produced'. She defines informal planning as "the planning activities that are not institutionalized but, nevertheless lead to planned outcomes that serve particular interest" (1997, p. 106). She argues that the informality of an urban village happens in a process of 'parallel planning', whereby pre-institutional informal planning mechanisms continues to operate in the village, as formal plans are not enforced for either financial or political reasons. Roy (2009) goes so far as to flip the tables and argues that is actually this shifting state of regulation of degree of enforcement, that deserves to be called informal.

### Morphological ontology

The discipline of urban morphology operates from the premise that urban morphologies are not the outcome of a single top-down formal procedure, but that urban form is a dynamic entity that is "immersed in a dialectic relations with its producers and inhabitants" (Moudon, 1994, p. 289). Much of the systematic study of morphology that developed in Europe such as Muratori's study of Venice (1959) and Conzen's study of Alnwick (1960), was driven by a renewed interest in traditional, largely informally produced morphologies, that were increasingly neglected and under threat of demolition (Moudon, 1994). It is one of the primary contentions of urban

morphology that these dialectic socio-spatial relations can be read, by looking at the arrangements of space (Hillier & Hanson, 1984), and through observing in what way change occurs (J. Habraken, 1998). In Scheer's (2016, p. 9) recent essay on the epistemology of urban morphology she argues that "patterns may be exclusive to a particular place, but identifying, comparing, and naming those that occur over time and in different places is one of the key aims of urban morphology". Scheer (2016, p. 7) further notes that "urban morphology (..) does not have the ambition of achieving a complete description of the complicated dynamics of the city. Rather, it is concerned with describing, defining and theorizing a single segment of urban knowledge (form and formal change) *and* suggesting how that knowledge is brought into specific relationship with other dynamics and conditions in a particular place".

While informal morphologies lack an apparent visual order, they nevertheless have a systematic order. Any morphology consists of architectural infill, plots and public space which relate to each other in a hierarchical and systemic manner (Kropf, 2014). This *systematic* order, Marshall (2009) argues, applies to all cities across the world, unlike emergent *characteristics* that are place specific. Systematic urban order can be explained as three interrelated premises. One – every plot is connected to an access network of public spaces. Two – every building is associated with a single plot which provides it with private open space. Three – access between public space and the architectural infill is granted through a sequence of increasingly private spaces, known as the building interface. In Habraken's (1998) language – *configurations* at a higher level provide a stable space for *configurations* at a lower level – public space provides a stable space for plots, plots a stable space for buildings, and buildings a stable space for separate functions. The research questions presented in the introductory chapter are organized to match this systematic order that relates public space, with the architectural infill and the buildings interface.

Characteristic urban features can include a wide range of spatial elements. Yet, three of the most defining and recurring characteristic features are density, mix and access. The sociologist Louis Wirth (1938) famously identified density and heterogeneity as two defining elements of urbanism. Jane Jacobs (1961) in her book *The Life and Death of great American cities,* similarly identified density and functional heterogeneity as key urban elements, while also pointing towards the importance of small urban blocks that allow more intensive access of those densities and functions. Building on these insights, Dovey and Pafka (2019) argued that density, mix and access are the prime three morphological aspects that afford and restrain human use of the city. Ye and Van Nes (2013) derive

a similar set of key characteristics through the work of the morphologist Conzen (1960): land use mix, density and building types and street network configuration. Functional mix, density and public space access can differ in the extent to which they are planned or self-organized. The modernist city planning ideology infamously segregated functions and planned for high-rise low-density build environment. Yet, functional mix is most often self-organized, even in a relatively planned formal context, since the various shops, offices, industries and so on are subject to market competition. Density also self-organizes, as high-rise buildings tend to cluster along the places with the highest land value. Access tends to be the least self-organized and most often subject to planning, but even here alleys and other interconnections often emerge informally to make the formal road network better accessible.

Traditional notions of qualitative and quantitative data do not easily capture the characteristic spatial relations and a range of additional concepts have been developed within the domain of urban morphology to describe these spatial configurations (Marshall, 2004). One key two-fold distinction is between *geometric* and *topological* properties of space. Geometric properties describe absolute values such as captured in dimensions of length or width, while topological properties describe relational values describing the ways in which spaces are connected to each other. Another two-fold distinction is between *extensive* and *intensive* properties. Extensive properties describe values that change when an element is divided, such as absolute dimensions, while intensive properties describe values that remain unchanged when divided, such as densities. DeLanda (2006) has argued that both intensive and extensive properties affect the capacity of an urban form to interact with its users. According to DeLanda, intensive differences are critical for understanding the movement of flows and the driving of processes, such as densification .

**Urban change**

Buildings, plots and public space transform at different rates of change. DeLanda (1997) argues that the materiality of settlements is shaped by human agency, but once built, the materiality structures and restricts people's behaviour. Built form has a inertia that resist change and enables and constraints flows. Fletcher (1995, p. 19) argues that the effort and costs invested in building settlements generates a "relative inertia of the material [which] acts as a constraint on people's actions and intentions". This tension between agency and structure was explored by sociologist Giddens (1984, p. 11), who argued that "we create society at the same time as we are created by it". While changes in density and functional mix are much more frequent, this effect is strongest at the level of the public space, as the

combined investment in infrastructure and the properties that align public space discourage change to the configuration. The property- and infra-structures constrain the agency of the individual owner or community to change much beyond their own plots. In her study of San Francisco, Moudon (1986) demonstrated that while all the streets remained as they were laid out, considerable change occurs in the plot structure as plots subdivide and amalgamate to allow for different building typologies. Large-scale changes to public space often require heavy-handed top-down government involvement, such as in the infamous Parisian boulevards that were made possible by large-scale acquisition and restructuring of plots (see Panerai et al., 2004).

Kropf (2001) argued that change in the built environment is a commonly acknowledged process, but often reduced to a dichotomy between new settlement versus transformation of existing built form. This characterization also applies to informal settlement, which has most often been viewed through the lens of encroachment (Alsayyad, 1993; Bhan, 2019), focusing on new settlement, while its subsequent transformation has been neglected as an area of research. Terms such as 'settlement', 'formation', 'development', 'evolution' and 'transformation' are often used as synonyms, without much concern as to how they differ. Existing research on urban informality has aimed to differentiate these processes. Martin and Mathema (2006) stress the background and economic status of the residents, who through their resources are able to assert different forms of tenure – from small-scale *accretion,* to *invasion* of specific pieces of marginal land to widespread illegal *subdivision* of land. Dovey and King (2011) emphasize the relation to formal claims on land – *settling* occurs on unclaimed land, *inserting* on land left-over by formal development and *attaching* onto formally built structures. Hao et al. (2013) focus on the economic scarcity of land – *expansion* occurs when land is easily available, after which left-over space is filled in through *densification,* which finally leads to *intensification* as low-rise buildings are replaced. Finally, Marshall (2009) bases his differentiation on morphological elements – *footprint formation* as buildings are added, *plot subdivision* as land is subdivided and *route propagation* as existing public space is extended.

These spatial processes articulate the ways in which buildings, plots and public spaces can aggregate. In a formal process, public space is produced first, followed by plots and then buildings, but in the informal production of space this is more mixed. Hillier and Hanson (1984, p. 19) argue that settlements can aggregate in two fundamental ways – "by aggregating them independently, so that continuous permeability is maintained" or "by subdividing or accumulating cells [in such a way] that

internal permeability is maintained". In the first way the various streets, lanes and squares of a city are aggregated into a single continuous public space. While new buildings can be built independently of other buildings, new public space is always connected to every other public space – fused into a single whole. The second is the way buildings or groups of buildings within a single plot grow. While formally produced buildings can be considered 'finished' after construction, the informal production of buildings is almost always incremental as extra floors, rooms, cantilevers are added over time without a clear sense of when the building is 'finished'.

The relation between the aggregation of buildings and of public spaces is mediated by the plot structure. Habraken (1998, p. 209) argues that densification often requires changes in territorial structure as plots get subdivided and extra public open space is added to provide more access. Conzen (1960) described how plots get filled in incrementally over time and how different plot sizes have different capacities to amalgamate or subdivide. An urban block is defined as any aggregate of plots surrounded by public space (Panerai et al., 2004) while the pertinent strip is the aggregate of plots that share the same part of the public space for access (Caniggia & Maffei, 2001). Urban blocks contain all the privately owned spaces in a city – the exact inverse of the public space – and are as such a useful unit of analysis.

**Type**

Development is measurable – the growth of an individual object can be traced through its incremental additions. Kropf (2001) argues there that is another distinct way in which morphologies change, namely evolutionary. Development is the transformation of single elements, while evolution is the transformation of groups of elements, as parts are replaced and adept to new circumstances. The change that occurs to a group of objects as it evolves is harder to capture – it involves a field of features in which differences converge till they are analogous, while similarities diverge to become disparate. In ancient Greece it was believed that there are a fixed number of immutable ideal types, from which any object must be ultimately derived (Mayr, 2006). In this view, type and model were synonymous. In biology, typological thinking is therefore considered as opposite to evolutionary thinking. However, in studying the built environment, whether in archeology (Sørensen, 1997) or urban morphology (Scheer, 2010) type has been understood differently. Noble (2000) argues that the concept of type was originally introduced in the architectural discourse by Quatremere as a means to locate built form as the outcome of human agency, rather than being derived from a divine source. Quatremere was clear to distinguish between the type as a concept different from the model or the prototype: "all is precise and given when it comes to the model, while all is

more or less vague when it comes to the 'type" (Quartremere in Younés, 1999, p. 255). Whereas biological copying of DNA relies on errors for its evolution, the copying that occurs in the production of buildings relies on different interpretations of the agents in charge of its reproduction. In this understanding, built types change through an evolutionary process , in which types are reproduced, variety introduced and selection applied (Kropf, 2001). To borrow from archaeology – typologies are constructed to "understand similarity or dissimilarity, not to measure where similarity stops and dissimilarity begins" (Sørensen, 1997, p. 182).

To Habraken (1988), type is a design tool that enables people to respond to new conditions. A type combines geometric and topological properties that reflect a social agreement among its users. To Davis (2006, p. 43), types are "commonly understood configurations of building arrangement or construction that characterize the buildings of the culture". Similar to build form, these common ideas also exhibit a replicative inertia, as established habits persist (Kropf, 2001). Within architecture, types have often been conceived as crude functional types (Pevsner, 1976), but as buildings normally outlast the functions that were intended for them, it is important to distinguish spatial types from societal and functional context. A spatial type can include close interrelations with functional use, but these can better be understood as one of its shaping forces (Scheer, 2010). The contemporary usage of 'type' in the built environment refers to a trans-spatial concept that is used to communicate ideas about the configuration of spatial elements. To draw out the distinction between type and a typical example of that type, Hillier and Hanson (1984) use the distinction between genotype and phenotype. A phenotype is an actual spatial manifestation, that can be observed and mapped. A genotype on the other hand is an informational and trans-spatial concept, an 'abstract model of space', that imbued with social information is (1984, p. 39).

There are two key works that use the concept of type to investigate the evolution of built form. In the book *Interpreting basic building* (2001), Caniggia and Maffei put typology at the centre of built environment study by arguing that each building is derived from an earlier precedent and that by careful interpretation of the typology earlier stages of its evolution can be reconstructed. They are clear in their work that they see type as an abstract schema that represents the actual buildings and not an archetype, or a simplified stereo-type (2001). In his book *House form and culture* (1969), Rapoport argues that informal urban environments are the outcome of numerous individual decisions over a long period of time, but which collectively add up to recognizable wholes which can be understood as types. Over time, these coalesce into a common understanding of a

'cognitive schema' that than acts as a mental image on which rules might be based (1988, p. 52).

Types have most often been conceived at the building level, where a high rate of change among a large population allows an evolution of types. Caniggia and Maffei argue that types can also be conceived at the scale of the neighborhood. "A tissue is to an aggregate what building type is to building – tissue is the concept of the coexistence of several building existing in the minds of builders before the act of building" (2001, p. 118). Kropf (2014) has argued that Conzen's 'plan unit' can be understood as an analogous concept of tissue. However, a plan unit is a group of associated buildings, plots and streets "which form a cohesive whole either because they were all built at the same time or within the same constraints, or because they underwent a common process of transformation" (Moudon, 1997, p. 7). To Caniggia and Maffei, tissues are genotypes, from which particular aggregates of spatial elements are 'individuated', while Conzen's plan-unit is a phenotype. In her book *Evolution of urban form* (2010), Sheer argues that neighbourhoods are often planned with a particular building typology in mind so that phenotype of the neighbourhood and the genotype of the building are intimately related – and potentially confused. She argues that "because types emerge and evolve rather than being wholly invented, improving the built environment implies an understanding of how the process of typological transformation occurs, especially through changing conditions such as market demand, technology, cultural values, infrastructure creation, and regulation" (Scheer, 2010, p. 6).

Here it is useful to introduce another concept by Caniggia and Maffei (2001), which is the distinction between serial and organic that aims to understand the relation between type and aggregation. Serial consists of aggregation of repeating, interchangeable elements, while organic aggregation consists of elements that are particular in their position and shape. These ways of aggregation can occur on different scales – for example, a serial building typology can repeat in an organically aggregated layout of public open spaces. Habraken's (1998) work posits two ways certain buildings, plots or urban blocks repeat. Serial repetition can be linked to a single agent being in charge of the development. This might be called 'standardization from above'. This may be contrasted with a 'standardization from below' – a shared set of values among people can lead to largely similar 'organic' repetition, but more chance of small variations . The uniformity of building typologies in informal settlements is often understood as a consequence of resource constraints, so that all users end up producing very similar buildings (Walker, 2001). Archeological evidence has demonstrated that a constant set of conditions will lead to gradual standardization, as an optimal configuration takes shape (M. E. Smith, 2007).

To understand why morphologies and types change, it is important to recognize these spatial configurations have productive qualities. Morphologies are changed to better fit the production. Rural land is subdivided to make it fit for human inhabitation. Villages are densified to allow more users. Plots are subdivided and amalgamated to better fit functional changes. The biologist D'Arcy Thompson (1917) studied "form as a diagram of forces", where an morphology is always the outcome of a morphogenetic process through time whereby spatial, social, economic, cultural and climatic forces change the form. These forces are often in conflict – the fitness to one kind of socio-economic force can run counter to the fitness to another. This is the conflict of the urban commons.

## Urban commons

### Tragedy of the commons

An urban morphology provides a common pool of resources – the public space affords a range of activities, while the plots affords buildings in a range of densities, which in turn allows a range of functions. These urban commons are not just 'assets' that merely derive their value from land and real-estate markets, but they are valuable through the functions they provide to the inhabitants. These functions are urban commons because they are accessible to anyone yet owned by no one. The urbanization of villages can be conceptualized as process of managing and adapting those commonly owned resources. In Hardin's (1968) *tragedy of the commons*, individual consumption leads to overexploitation and eventual degradation of the commons and Hardin argues that "each man is locked into a system that compels him to increase his herd without limit-in a world that is limited. (..) Freedom in the commons brings ruin to all" (1968, p. 1244). Whereas Hardin referred to rural artefacts such as pasture land, Sheila Foster (2009) has extended the commons dilemma to urban informality, where regulatory slippage leads to overexploitation of the urban commons. She argues that "much like the herdsman in Hardin's tragedy, in the case of informal settlements, individual users (e.g. pirate subdividers) have no incentive not to continue to (over) populate and consume the land while externalizing the cost of that use to others" (2009, p. 270). Informal settlement has historically been characterized as the illegitimate encroachment of land, but as the introductory chapter explained, this is an outdated conception. Squatting and land invasions are just two informal settlement strategies out of a broad range of informal processes.

To avert the tragedy of the commons, it is often assumed that effective protection requires either a strong central government or a system of private property rights (Ostrom, 1990). In an urban context, these two approaches are often deployed in unison, subdividing the land into public and private plots that are managed by different owners under state regulation. Lee & Webster (2006, p. 27) argue that the increasing enclosure of the commons is actually "a predictable evolutionary step associated with the rising value of urban public spaces and related civic goods". However, a divided commons lacks flexibility to deal with concentrated moments of overuse and a connected commons copes better with changing patterns of use (Ostrom, 1990). Residents of cities in the global South often have inequal access to the urban commons, especially when they have been enclosed. Bayat (1997) famously argued that the 'quiet encroachment of the ordinary' enables both the "redistribution of social goods" to the urban poor and for them to attain "autonomy from the regulations, institutions and discipline imposed by the state" (1997, p. 59). Payne (2001) and Martin and Mathema (2009) argued that state regulations are often set too high, and rather than protecting the urban commons, end up merely push residents into illegality. In informal settlements, the commons play an important role in allowing temporary spill-over of domestic activities as daily and seasonal patterns of production cycles change demand for open space (Bhattacharya, 2014; Kellett & Tipple, 2000). To outright ban encroachment of the urban commons is to risk restricting the livelihoods of the urban poor. Nevertheless, Fekade (2000) has noted that incremental densification over time can also degenerate such neighbourhoods to slum conditions – to the point where the affordances generated to urban poor are no longer available. What is ultimately at stake in understanding encroachment of public space, is the potential degeneration of the public realm and the utility to its users.

**Self-governing villages**

Through her criticism of both government and market based management of the commons, Elinor Ostrom's book *Governing the Commons* (1990) revealed the capabilities and limitations of self-governing communities for regulating common pool resources. To Ostrom, a common pool resource has two important characteristics – the use of the resource depletes the availability for other to use it, and users cannot easily be excluded from using it. Ostrom (1990, p. 30) defines appropriation as the process of "withdrawing resource units from a resource system" and that to prevent the depletion of the resource, "appropriators and their officials [need to] have rapid access to low-cost local arenas to resolve conflicts" (1990, p. 100). She argues that whether such a common pool resource can be replenished changes the dynamic of its self-governance. In 'appropriation problems'

there is a fixed resource quantity that is being allocated to its users, while in 'provision problems', allocation of resources is compounded by "assigning responsibility for building, restoring, or maintaining the resource system over time" (Ostrom, 1990, p. 47). The commons in urban villages are clearly a provision problem and villages have developed sophisticated informal mechanisms to build, restore, and maintain them. Traditional land ownership practices and building regulation practices in villages have tended towards common ownership and self-governance. Villages in both China and India are formal institutions in the sense that they have an official government mandate, but villages manage their affairs largely informally, often in parallel or in defiance of that state. Hence, even more so than other informal urban environments, it makes sense to conceptualize urban villages through the lens of the commons. Although rural villages have been discussed in relation to management of the natural commons (see Ligon & Narain, 1999), urban villages and their urban commons have not been framed in this way. Whereas rural villages are mostly concerned with the management of shared resources such as water or collective land, as the village urbanizes these rural commons become less important and a different set of urban commons is increasingly at risk. The mechanisms that managed rural commons need to adapt to manage urban commons. This adaptation depends on how the original rural commons were managed, as will be discussed below, but also on municipal practices that have developed in the last few decades and on the specific local responses of each village. The latter two are case specific and will be discussed accordingly – municipal practices at the start of each case study chapter, and local responses within each of the twelve villages.

While villages often have forms of communal ownership, a tragedy of the commons can occur without any kind of legally defined communal ownership. Any kind of publicly accessible space is a shared resource from which users are not easily excluded. The existence of urban commons is not merely about the presence or absence of communal ownership, but includes recognition of common-use rights (Porter, 2011). The urban commons can be distinguished into an ecological commons (such as clean air) and a civic commons such as public infrastructure and public open space (Gidwani & Baviskar, 2011). According to Webster (2007), two types of urban commons tragedies can occur to public space. One unfolds as people overconsume space by building too densely and with too little open space, while the second occurs through the use of these public spaces. Critically, unlike rural commons that are only consumed, urban commons are also produced. Furthermore, through interaction of people engaged in the consumption and production of urban commons, an emergent set of additional urban commons are generated. The social fabric, described in the introductory chapter as essential to facilitating the integrating of migrants, can be

understood as an urban commons that emerges from the settlement's use. While densification increases pressure on the urban commons, DeLanda (1997) argues that the high-density networks in cities "act as efficient mechanisms for enforcing social obligations" (1997, p. 192). In other words, the conditions that lead to over-exploitation at the same time allows the formation of social norms to control their consumption. There is a lineage of ideas from Jane Jacobs (1961) to Sennett (2017) that locate shared urban values, ideas of civic virtue and citizenship within the use of public space (Amin, 2008). These are not common pool resources in the classic definition as their use does not diminish the supply for others, and they might be understood as the sense of community that underpins the ability of that community to manage its commons and effectively address overexploitation.

Public space usage is diverse and its societal role always shifting. Amin (2008, p. 15) suggests that in recent years "the connection between urban public space and *[its users]* has become fragile owing to shifts in the uses of public space and the growth of other political spaces and institutions." Ideas on public space that have been developed through study of European and American cities should be treated with caution when applied to another context. Whereas Western public space tends to be single-use, in Asia their use is multiple (Drummond, 2000). This is particularly evident in the ways public space is used by street vendors, waste pickers or the spillover of informal businesses and home-based workers (see Chen & Beard; Kim, 2015; Lizarralde, 2014; Rosin, 1998). While public space in the West is often the stage for public protest, this kind of collective bargaining is much rarer in Asia and disadvantaged groups primarily seek improvement through everyday behaviors (Bayat, 1997). Bayat argues that the urban poor are weary of formal procedures and state discipline that govern their time, obligations and commitments and seek autonomy and redistribution of social goods through evading state control on their behavior in public space. It has been suggested that the persistence of a rural culture is an important factor in explaining why villagers and other rural migrants use public space differently from urban dwellers (Kellett, 2005; Mangin, 1970). Rural migrants are attracted to the urban villages, because it is a more familiar space that allows them to continue their rural practices and be part of a social fabric that is more akin to their native village.

Another cautionary aspect to the application of public space concepts lies in the clear distinction between public and private space rooted in a predominately Western legalistic, view of public space (Drummond, 2000). While all public space in the West is accessible by virtue of citizenship, public space in Asia is often perceived as a specific commodity that is owned by a government body which controls and grants

access to private citizens (Gidwani & Baviskar, 2011). Drummond (2000) argues that in parts of Asia, the government is often one of many competing entities to deliver urban services – 'public' spaces are the property of municipal bodies, that may or may not allow public access on that land. These designated public spaces are increasingly perceived as spaces for leisure and consumption (Drummond, 2000).

Paradoxically, while government-owned public land has lost much of its public role, actual publicly accessible space often passes through or emerges in-between privately-owned space. In many traditional villages before the intervention of planning, the 'public' path evolved out of the setback of buildings rather than being pre-determined in the layout of the physical space (Kang, 2009). The 'public' path is merely a right of way across private land that is granted by the owner. While it is common knowledge that the legal *state* of informal settlement is often disputed, the boundaries of those properties are often fuzzy without clear demarcation (Kamalipour, 2016). This practice was even very common under ancient Roman rule, where a public right of way was mandated without expropriating the land (K. Kropf, 2018). The commons of the *public path* often contains other shared functions too, such as open drainage, the functioning of which requires cooperation and collective action (Parkinson et al., 2007). In this research the term public open space will be used to refer to this capacity to allow public access, as opposed to public ownership.

### Commons in India

Both India and China have forms of common land ownership and shared spatial practices on that land. As the commons in urban villages can be characterized as a 'provision problem' (Ostrom, 1990), the remainder of this section is devoted to several critical distinctions in ownership, usage and upkeep of urban commons between India and China, that will prove relevant to understanding the morphological transformation of urban villages and their public spaces.

Rural village life in India historically involved varying degrees of collective ownership and management of land. Banerjee and Iyer (2005) distinguish three main land tenure systems. First, *in zamindari* villages all land is held is owned by a landlord or land-owning class who rents land to tenants. The position of the *zamindar* is often hereditary and 'village ownership' can be transferred between the ruling classes. Second, in *mahalwari* villages, land was owned collectively and managed by a village body, which often took the form of a *gram panchayat*, a traditional village council. For each family, the share of land,  of tax to be paid, and of the representation in the village body varied. Villages where these shares were fixed and handed down along ancestral lines are known as *pattidari*, while in *bhaiachara* villages, land, taxation and representation changed depending

on caste, family size and standing in the community (Chandhoke, 1990). Villages where a single family gained a dominant share in village affairs increasingly resemble a *zamindari* village (Banerjee & Iyer, 2005). Finally, there are *raiyatwari* villages, in which land is owned by individual families with minimal shared features.

This entire system of managing rural affairs ceased in 1952 when it was abolished by the newly elected independent government. The *zamindar* system was entirely abolished, while *gram panchayats* were stripped from much of their power. Over time however, it became apparent that the government lacked capability to effective manage land at the local level and *gram panchayats* were re-institutionalized in 1992 as democratically elected bodies (Sapra, 2013). The *gram panchayats* was traditionally constituted by five members and are among other things, responsible for maintaining local amenities such as village roads and potable water supply, and for carrying out any social programs that are financed by state governments (Besley et al., 2007). Until a village is formally incorporated into the city, the *panchayat* continues to be responsible for these services, while their status as village excludes them from municipal taxing and building regulations (Kumar, 2016). Intermediating between the *gram panchayat* and individual families was a system of caste-based conventions also known as *jajmani*. Each caste had its own rights and duties and was allocated residence in a particular part of the village. Lower castes are usually confined near the edge of the settlement, occupying smaller plots along narrower lanes (Singh et al., 1975; R. Tiwari, 1989). While both the *zamindari* system and the caste system are officially abolished, Lewis (1958, p. 81) points out that "while the land owners are generally of higher caste in Indian villages, it is their position as land owners, rather than caste membership per se, which gives them power and status". Hence, these ownership patterns continue to influence the urban morphology to this day.

Appadurai (1987) argues that the street lies at the heart of public life in contemporary India – and is a place where notions of place and identity emerge through contested practices. This street culture encapsulates codes of conduct that evolved about the use of space and the interaction with strangers, especially at those places where regional trunk routes meets local places within villages and small towns (Appadurai, 1987). Indian streets are characterized by a multiplicity of uses and Edensor (1998) stresses its role as a place of commercial exchange. However, away from the bustling streets, lies a network of commonly owned open space and lanes arranged in a topological relationship of graduated privacy, such as can be found in the traditional urban fabric of such cities like Ahmedabad and Delhi (Nanda, 1994; Yamane et al., 2008). The *chowk* is one of the

most important public open spaces in this arrangement, negotiating the meeting between more private with more public routes. In a rural context, a *chowk* is often complemented by a *chaupal*, a shared semi-open structure which plays an important role in managing village affairs (Mishra, 2004). The *gram panchayat* convenes at the main *chaupal*, while different castes might have their own secondary *chaupals* in the village (Chandhoke, 1990). Public open space is graduated from public-to-private, but public space also reaches into the private sphere of the house, mediated by class, gender and caste (Abraham, 2010). This mediation between public and private manifest in the existence of transitional spaces at edge of the house, such as the *otla*, which affords the inhabitants flexibility in negotiating different visitors (Kaza, 2010).

**Commons in China**

Before 1949, rural life in China was organized by clan organisations, who manage village affairs through kinship relations (Fei et al., 1992). A clan or lineage is a patrilineal group sharing a common ancestor, who provides legitimacy to the decedents and is kept in memory through an ancestral hall. Traditionally, the clan took care of cultural festivals, religious ceremonies, and maintenance of commonly owned assets. The 1949 revolution collectivized all land and made the village the basic unit of collective production (Zhu & Guo, 2014). Land ownership was re-collectivized and put under a strict hierarchy of communes, brigades and production teams. Starting in the early 80's this system was abolished and replaced by a governance structure of *xiang/zhen, xingzhengcun* and *zirancun,* commonly translated as townships, administrative villages and natural villages (Zhu & Guo, 2014). Spurred by high rural population densities and high family savings, decollectivization led to rapid growth of township and village enterprises which by the late 1990's accounted for a third of China's industrial output (Friedmann, 2005). Decollectivization also changed the configuration of power in China's villages. While the communist party still retains influence in most villages, the introduction of elections for a village committee has broadened participation in village governance (Oi & Rozelle, 2000). The village committee is a body of 4 to 7 villagers who are in charge of a wide range of responsibilities such as supply of water and electricity, social welfare, public order and financial affairs (Yuting Liu et al., 2010).

Collectivization also involved a dual-land system that survives to this day in whichall rural land is collectively owned by villagers while all urban land is owned by the state (Tian, 2008). Any village further consists of three primary types of land. The built-up area of the village is referred to as *zhaijidi*, while the farmland can be divided into collective land (*chengbaodi*) and cropland for private use (*ziliudi*) (Xu et al., 2011; L. Zhang et al., 2003).

The local villagers have the legal right to build their own housing and community facilities within the *zhaijidi*, without state permission (Tian, 2008). Village land is not included in any urban zoning scheme, is exempted from any urban tax (Hao et al., 2013, p. 6) and leaves the rural landowners responsible for their own planning and service provision. While the *Land Use Rights System* has allowed the lease, transfer and sale of urban land since 1988, this right to exchange does not apply to rural land (Tian, 2008). While villagers have de-facto ownership over the house that they built they are not legally allowed to sell it.

Public spaces in China are often regarded as state-controlled and under strict control, but Friedmann (2006) argues that traditionally a lack of centralized urban administration led to a degree of autonomy that enabled public spaces to be used by members of all social classes. "Commoners freely conducted all sorts of recreational and commercial activities on the street and in other shared spaces such as public squares, temple fronts, ends of bridges, and teahouses" (D. Wang, 2003, p. 23). Rankin (1993) too, argues that 'public' in China is not synonymous with the state and that historically Chinese society had a distinct public sphere that existed outside independent from official government policy. Local elites would sponsor or establish institutions for welfare, education, religious purposes, social betterment or defence and would build or repair of local infrastructure like roads, bridges, dikes, and wharves.

The residential laneways in Beijing – or *hutongs* – not only function as passages for movement, but also provide a space for residents to communicate with their neighbours (Y. Wang, 2016). Therefore, to some extent, the residents of courtyard houses regard the hutong as a neighbourhood public space. In the context of Shanghai's laneways, Bracken (2017) argues that a graduated sequence of increasingly less public space as one moved from the main street to the house, had a large effect on the activities that took place there. While some emphasize the lack of public spaces in urban villages in China, Kochan (2015) argues that this stems from a conception of public space as designated parks and public places, rather than the public space of the markets, street corners and laneways. Rather than considering this a merit, the multifunctionally of these public open spaces is often perceived as chaotic and dysfunctional to the proper use of streets of efficient movement (Kochan, 2015).

## Urban codes

Habraken's (1998, p. 228) section on cultural order starts with the idea that "common understanding about form ranges from clearly explicit bylaws and building codes to deeply implicit customs and habits. Between these two extremes there exists all manner of ongoing rule making, agreement, and consensus". This focus on the process of building as a form of culture, is the central idea behind Davis' book *the Culture of Building* (2006). The traditional vernacular building culture of a village is in many respects similar to that of an informal settlement (H. Davis, 2006; Rapoport, 1988). Villages lack a formal system of managing the urban commons, but instead they operate as a building culture which Davis defines as "the coordinated system of knowledge, rules, and procedures that is shared by people who participate in the building activity and that determines the form buildings and cities take" (2006, p. 3). According to Davis, these urban codes can take three forms – social constraints and understandings that are not codified, common-law based on custom and explicit codes. North (1990) makes a similar distinction between self-enforcing constraints such as customs, traditions and norms of behaviour – and formal constraints such as constitutions, laws and property rights that require an authority that enforces these. In both Davis' and North's accounts, rules can differ to the extent that they are codified and who enforces them. These two dimensions of informality – codification and enforcement – resurface in Helmke & Levitsky's (2004, p. 727) definition of an informal institution, which they define as the "socially shared rules, usually unwritten, that are created, communicated and enforced outside of officially sanctioned channels". Their purposefully strict definition of informal only includes that which is both unwritten and self-enforced within a community. The aim here is not to define informality but to acknowledge and explore the parameters that generate a field of difference. Urban codes are all the rules – both codified, unwritten, self-enforced and top-down – that impact the urban commons .

### Formal codes

Formal buildings codes can apply to all aspects of the urban morphology, including codes on functional mix, maximum permissible densities and specifications on built form. Many such codes originate from the specific desire to tackle the overcrowding and unhealthy conditions in many of the slums that came to characterize the rapidly growing industrial urban centres of the early 20th century (Talen, 2009; Valverde, 2011). Such formal codification coincided with an increasingly quasi-scientific approach to planning that carefully defined 'human needs'. Carmona (2017) distinguishes three types of formal design governance in increasing strictness of their enforcement – guidance, incentives and control. In this view, informal

codes are those that are discretionary or optional, lacking enforcement but still codified within the legal framework of the state . Baer (2011) draws a distinction between government issued *regulation* – and *standards* that emerge within building industries. This formal apparatus has been challenged in two very distinct ways – firstly as a procedural problem through the cumbersome restriction on urban development (De Soto, 1990) and the inherent limitations of government policing (Ostrom, 1990) and secondly as a political project intended to uphold urban inequality (Roy, 2005, 2009).

In a study of informal settlement in Lima, De Soto (1990) demonstrated the urban poor face enormous restrictions in registering their land, applying for building approvals and licensing their business. He advocated an overhaul of these cumbersome regulations, thus removing the countless opportunities for bribes, and enabling the urban poor to participate fully in economic life through their integration into the formal planning apparatus.  De Soto is a contentious voice, whose ideas probably received more criticism than any other in urban informality (Gilbert, 2002). The legal land titling that De Soto advocated often made the urban poor vulnerable to property developers who could now acquire their land, while liberalization of other regulation that would protect the urban poor were often removed as well. De Soto emphasized the procedural limitations of formal regulation as an effective tool to ensure the welfare of its citizens. In a similar emphasis on such procedural limitations, Foster (2009) argued that governments lack the capability to enforce formal codes, which leads to regulatory slippage that sets a tragedy of the commons  in motion. Ostrom (1990) reminds us of the inherent limitations of government policing. Policing these standards are associated with hefty transaction costs – financial resources that the government often does not have. Lack of co mplete and correct information about the commons means that in reality, governments will often set standards either too high, or too low.

In the paper *Seeing Like a City,* Mariana Valverde (2011, p. 287) questions the objectivity and assumptions within the modern planning apparatus – “early zoning ordinances were generally introduced only to protect districts that had already been either built or designed by private enterprise, rather than to impose standards across whole, existing municipal jurisdictions”. She continues that these codes are better understood as “descriptive rather than prescriptive, and as a technique to defend the status quo of local ‘organic’ communities rather than as a coercive state measure”. To allow change within this descriptive project, she argues planning authorities increasingly relied on an exception-granting mechanism While this mechanism could be understood as a rather prosaic feature,

through the work of philosopher Agamben (2003) this perpetual 'state of exception' became understood as a fundamental element of contemporary planning mechanism. In a state of exception, the government suspends its own rules in the name of the public good, thereby gaining a renewed ability to (re)distribute resources quite contrary to the public good. According to Roy(2005), this 'state of exception' has become a strategic tool within the planning apparatus of cities in the global South, allowing a place in the city for the urban poor as well as the rich, both of whom might be transgressing the formal codes. Even in cities in the West, it is not uncommon to encounter situations where up to half of the city is considered "nonconforming" (Valverde, 2011, p. 291). It is estimated that 85% of all buildings globally are produced in extra-legal manner (Berner, 2001, p. 1), clearly demonstrating that informality is not exceptional, but rather the normal state of affairs. While Desoto sees resolve in deregulation, Roy locates the problem in deregulation.

**Informal codes**

The most comprehensive account of the way in which informal codes work, comes from Besim Hakim chiefly through his book *Mediterranean Urbanism* (2014). According to Hakim, the medieval towns and cities in this region share a considerable continuity of build form, through the application of an informal set of codes. a community, these codes coalesce in a set of customary spatial practices known as the *urf*. Change to the *urf* often emerges from individual adaptations that are then imitated, spreading throughout the community till it becomes a new accepted norm. Hakim (1994) explains that the *urf* is socially constructed and that adhering or deviating from the *urf* can reflect negatively on someone's social status in the community. The main guiding principle of the *urf* is that owners are allowed to build on their own property as they please, so long as it does not negatively affect the general public or their direct neighbours. These potential negative effects on the urban commons, such as maintaining right-of-way or particular view corridors, underwent incremental codification through the centuries. Most of the codes were formulated in a proscriptive manner – defining what is not allowed or using performative measures to restrain built form. Hakim contrasts this principle with prescriptive codes that define exactly what has to happen, without much flexibility. As these proscriptive codes were performative and involved assessment by neighbours, they were largely self-enforced and would only need to be devolved to an independent arbiter if disagreement occurred.

These kinds of codes are not unique to the Mediterranean context. Emily Talen (2009) has used the concept of generative codes, which are largely analogous to proscriptive codes, to demonstrate similar informal

governance existed in many pre-modern societies. In his book *House form and culture* (1969), Amos Rapoport emphasizes the cultural codes that underpin the organization of vernacular architecture and settlement planning. While Rapoport acknowledged the role of climate, economics and building material, he argued that vernacular built form is most fundamentally shaped by cultural decisions around the negotiation of public-private domains and division of functions within the house. To Rapoport (1988), informal settlements are the contemporary versions of vernacular architecture, which in extension implies that informal settlements are largely shaped through cultural decisions. Using this lens of vernacular architecture, Kellett (2005) has explored some of the contemporary codes found in informal settlements. He argues that beyond pragmatic codes that come from the need for shelter, there are also codes that reflect aspirations and sense of belonging of the inhabitants. Kellett argues that residential architecture has an important role in signifying someone's social status within the community, such as when spatial arrangements from neighbors, nearby upper-class communities, or rural antecedents are copied (Kellett, 2005, 2013). Another way such informal codes operate lies in the way in which small plots are allowed to cantilever over the laneway as long as they do not impede its functioning (Adianto et al., 2014). Residents can cantilever up to 90 centimetres beyond their property boundary, under the condition that enough clearance must be left to allow traders' carts to pass underneath. Such negotiation recalls Hakim's proscriptive rules and demonstrates its relevance to contemporary forms of informal urbanism. Yet, in contemporary informal urbanism, those vernacular proscriptive rules are often confronted with an oppressive state that aims to impose its own rules. One study on urban villages in Shenzhen describes how the built form evolved in a close relationship with formal regulation, always trying to reinterpret and manipulate the formal codes to the benefit of maximum floorspace (Y. P. Wang et al., 2009).

A s pointed out in the introduction of this research, the spatial outcome of urban informality is co-produced through various forms of formal and informal decision making. The work by Hakim and Rapoport demonstrates that the urban environment and its related urban commons is not the outcome of a single agent but is rather coproduced by multiple agents. Any form of coproduction requires coordination among the different contributors (Ostrom, 1996). While top-down coordination requires agents to formulate and follow instructions, coordination among equals requires a kind of 'common sense' – a non-specialist kind of general knowledge that is geared towards practical decision making through commonly agreed standards. Residents of informal settlement hold spatial knowledge which they use to construct, navigate and extend these places (Dovey & Ristic,

2015). This knowledge is not taught, but rather acquired through everyday behavior as people move through, and interpret meaning from the built environment (Hillier & Hanson, 1984; Lynch, 1960; Rapoport, 1982). This is what Davis (2006) refers to as *shared* architectural knowledge, although it might more aptly be referred to a *common* knowledge. Common knowledge is a state in which people know something, but they also know that everyone else knows it – an "infinite string of embedded levels of mutual knowledge" (2014, p. 5). This makes it different from a state of shared knowledge, where people know something, but are not aware that others know that too. Common knowledge is crucial in coordinating behavior (Thomas et al., 2014).

**Formal-informal relations**

Traditional analysis of urban informality equates the distinction between formal and informal to that between legal and illegal, but as discussed in the introductory chapter, this relation is no longer thought of as analogous. While Desoto and Roy present contrasting theories for the emergence of informality, both foreground the role of the state. Informality in their view is either a calculated move by the state or reactionary responses to the state. According to Harris (2018), an important distinction is the difference between informality in the absence of formal codes, from informality that defies formal codes. Informal practices can occur in cases that are not covered by formal rules (Altrock, 2012), such as in the way villages managed their affairs informally in absence of the state, even before a state existed at all. Altrock (2012), borrowing from Young (1999), has called the setting that is not covered by formal codes arrangement complementary. In a complementary arrangement, informal practices might become formalized over time. *Supplementary* arrangements occur when informal institutions are "set up when the state is too weak to implement its formal rules but there is a need for social order anyways" (2012, p. 176). This supplementary role is close to what DeSoto's (1990, p. 19) distinguishes as extra-legal activity, which he defines as "the informal customary law and of rules borrowed from the official legal system when these are of use to informals" that operates when the law is absent or deficient. Altrock does not discuss Young's (1999) category of adversarial, which is when informal practices actively competes with formal practices. Young (1999, p. 39) argues that in "communities where minority views are not well reflected in public policy, minorities will organize themselves on a voluntary collective basis, not only to provide public services for themselves but also to press government to more adequately serve their interests.

Enforcement of codes assumes a certain territory were those codes have legitimacy. One of the ways to understand the relation between formal

and informal urban codes is through the concept of territory and territorial levels. The concept of territoriality originates from the domain of cognitive studies, where it signifies the natural impulse of humans to mark a bounded territory and include/exclude people from that territory (Hall, 1966; Hillier & Hanson, 1984). According to Altman (1975), the desire for privacy lies at the heart of a regulatory process of which territorial behavior is one of the key mechanisms to influence social interaction. Habraken (1998) conceptualizes the idea of territory in the built environment as any number of spatial configurations, possibly encompassing multiple spaces and scales, controlled by an *agent*, which includes both individual people as well as other kinds of social entities like families or institutions.

Formal and informal codes do not need apply to distinct territorially bounded units such as adjacent neighborhoods or districts, but are can be enacted in more embedded ways through territorial levels linked to the systematic morphological order of public space, plot and building. According to Habraken, control of space is the ability to restrict entry and defend that space against unwanted intrusion and to use physical elements as well as spatial signs as markers to communicate the transition from a more public to a more private space. When users are operating at different territorial levels, formal and informal codes can co-exist without much friction (J. Habraken, 1998) – for example the informal arrangement of furniture within a room happens at a different level than the formal arrangement of the building on a plot. However, in cities in the global South, formal and informal codes are not mutually exclusive and compete for influence at the same level through the agents that deploy them. Informal codes might prevail in one laneway, while the adjacent main road might be governed by formal codes.

A useful way to make sense of these ambiguities is through the work of Lyman & Scott (1967, p. 238) who note that "official rights of access may be regularly violated" and "status discrepancy may modify activity and entrance rights". In informal urbanism, the default way of discussing such transgression is through the lens of encroachment, but according to Lyman & Scott territories can be contested in three distinct ways – invasion, violation and contamination. Invasion is the active interruption or taking over another territory  It claims ownership through its occupancy. If uncontested, invasion of urban land produces new and lasting territories, while if they are contested in an eviction their claims are deterritorialized. Violation is the unwarranted use or entry into a territory, most often of temporary or cyclical nature. Contamination renders a territory impure with respect to its usage. The presence of 'undesired' activities or people can taint the public space and can acquire forms of permanency by leaving marks.

Invasion, violation and contamination all have negative connotations, in which territorial shifts are seen from the perspective of territorial loss.

It frames transgressions from the 'logic of governing', while the 'logic of survival' that is associated with territorial gain is dismissed (Watson, 2009). The impurity that a government official experiences at the sight of 'improper' (Watson, 2009) signs of inhabitations, for the person enacting the transgression might be a form of personalization and adornment. The difference between invasion, violation and contamination can best be understood in relation to the previous use that was conducted there. Invasion prohibits the previous use, violation modulates the previous use, forcing it to share the territory with the new use and contamination allows the previous use to continue relatively uninterrupted, but affects it as is conducted. These distinctions can be translated back into built environment terms as encroachment, appropriation and personalization. In a study on appropriation in a affordable housing project in Mexico, Tames (2004) demonstrates that the distinction between personalization, appropriation and encroachment is fluid – personalization can lay the basis for appropriation, which can become encroachment.

**Affordance, capacities and capability**

To determine whether a spatial adaptation is personalization, appropriation or encroachment is relational. A space affords different possibilities to different users and different kinds of use – a relational property that Gibson (1977) calls an affordance. While the actual existence of an affordance is objective in the sense that it does not depend on interpretation or value judgements by the user, the affordance needs to be perceived by the user in order to be actualized. In other words – someone needs to become aware that a space affords certain use. There is thus a relationship between the morphological properties of a spatial arrangement and the potentially realized capacities of a morphology (DeLanda, 2006). Both absolute dimensions – such as the width of a laneway or the size of a plot – and configurational properties – such as how a plot along a laneway is linked in with other public spaces – affect the capacity of that laneway or that plot. When capacities are actualized in recurring manner, they may become stable enough so that new properties emerge (DeLanda, 2006). For example, a laneway's capacity to allow a flow of pedestrians needs to be actualized, before the laneway provide the capacity to open an economically viable shop. This flow of people is an example of an urban common that emerges from the interaction between public space and architectural infill, and is a shared resource that the inhabitants and migrants can use to their advantage.

Affordances not only depend on a person's relation with the built environment, but also how they relate to other people. A quiet laneway affords the owner to extend further than a busy lane where such addition is more scrutinized. Since many informal settlements straddle the line between

legality and illegality, visibility is an important dimension in understanding the emergence and transformation of informal settlements (Dovey & King, 2011). Encroachment of land happens out of the gaze of the government, sometimes overnight such as in the *gecekondu* of Istanbul (Neuwirth, 2006), in the 'shadow' of the city, such that the settlement can gather momentum towards legitimacy. A highly visible settlement on the other hand is more sensitive to public perception and political whim, but also has the potential to attract passing traffic into informal businesses or philanthropic support for upgrading schemes. Issues of visibility, legitimacy and representation are important factors in episodic periods of clearance but also to understand changing government perspectives and subsequent changing slum policy.

Not every person however has the same ability to use the shared resources that emerge through urbanization – people's capacities differ. This insight led Amartya Sen (1999) to formulate the concept of capability – a person's ability to transform resources into actual value. To Sen, urban poverty is not the deprivation of resources, but of capabilities. Frediani and Boana (2012) have applied the capability approach to investigate the role of participatory urban design . They argue that participation in urban design has either focused on the process, involving people in deciding how an urban design takes shape – or on the product, involving people in deciding the properties of the final urban design outcome. The capacities or capabilities that a certain spatial configuration creates, and that would enable long-term participation of people with their built environment, are seldom considered. "The reason is that citizen's design freedom is shaped not merely by their choices, abilities and opportunities to engage in the process of design, but also by the degree to which the outcomes being produced are supportive of human flourishing" (Frediani & Boano, 2012, p. 9). This research is descriptive in the sense that is it concerned with articulating the properties and capacities that emerge from the production of public space and architectural infill in urban villages. While descriptive, it explores its normative dimensions through the 'space of possibilities' (DeLanda, 2006), its 'capability space' (Frediani & Boano, 2012) and the 'freedom to build' (J. F. Turner, 1972). The ability of an urban environment to allow change and innovation, while also providing stability and tradition are exactly the qualities that Howard Davis (2006) considers the characteristics of a healthy building culture. To conclude with the final words from Habraken's *Structure of the ordinary (*1998, p. 327*)*, "environment must be cultivated. (..) After all, it is by the quality of the *common* that environments prosper and by which, ultimately, our passage will one day be measured".

# chapter 3 Comparative mapping

**The productive qualities of the urban village that this research seeks to understand is a complex multi-faceted field that connects the domains of urban informality, urban morphology, urban commons and urban codes. This study brings together these largely separate domains of knowledge in a methodological framework which can be summarized as a multi-scalar, comparative mapping approach. While urbanism has always been known comparatively (McFarlane, 2011), this chapter foregrounds the advantages, limitations and potentials of comparison. Twelve urban villages across four cities were selected for comparison, providing scope to compare within cities as well as between cities. These village were visited during fieldwork undertaken from August 2017 to February 2018 and were mapped at four scales of analysis – metropolitan, village, transect and interface scale. Each scale reveals different urban dynamics, informs the higher scales and sets selection criteria for lower scales. These maps are supplemented by secondary data, which vary with each scale, ranging from policy analysis, to analysis of historic maps, interviews, and non-participant observation In total, this research contains 100 maps, covering 12 villages, that are supported by more than 7000 photos of more than 60km of laneways.**

## Mapping informality

The production and study of maps is one of the key ways in which to document and understand spatial relations. The discipline of urban morphology has developed tools to do so based on a broad record of urban maps – which is most comprehensive and reliable in Europe and the United States. This research operates in a context where such a record is unavailable and where urban morphologies are characterized by a relatively informal morphogenesis and informal use, which thus requires a methodological shift (McCartney & Krishnamurthy, 2018). Formally state-produced maps are inadequate in understanding the variations and productive qualities of urban village morphologies. Firstly, current maps of village morphologies are fragmentary in coverage or inaccessible to the public. Secondly, partial transgression of building codes and zoning laws and the state's interest in suppressing or profiting from these is reflected in both their under- and over-representation of such features. Illegal or undesirable elements can be hidden on maps or brought to the foreground as a means to legitimize state intervention. Thirdly, current maps are often outdated and use different mapping categories from city to city, precluding the possibility of meaningful comparison. Finally, independent mapping of urban villages often only represents two-dimensional information, providing little information on the vertical intensification of the village. Thus, rather to rely on existing maps, this study has conducted its mapping independently from direct observation.

One form of spatial research into urban informality that has lately gained attention, is the use of remote-sensing of satellite imagery (Kuffer, Pfeffer, & Sliuzas, 2016; Taubenböck, Kraff, & Wurm, 2018). These studies have carefully crafted methodologies on spatial recognition using mathematic models but are largely disconnected from the literature on urban informality which poses four limitations. Firstly, these studies tend to conflate 'slums' and 'informality', confusing the process with a possible outcome of that process. According to one such study "slums and informal settlements are one in the same and, therefore, can be treated as one" (Mahabir, Croitoru, Crooks, Agouris, & Stefanidis, 2018). Detection of informality often relies on corroboration of slum census data (Mahabir, Crooks, Croitoru, & Agouris, 2016), even though we know that only a small fraction of informal development fits the definition of a 'slum'. Secondly, these studies often seek a 'universal' slum morphology (Kohli, Sliuzas, Kerle, & Stein, 2012), operating on the assumption that urban informality works in essentially the same way everywhere independent of context. Thirdly, the studies are mostly concerned with monitoring informal development and have not developed any explanatory power on the process of informal growth. Finally, scalar

restrictions of satellite imagery, restrict their contribution to the smallest morphological scales of the building interface. Many studies acknowledge that despite advances in remote sensing techniques, accurate maps still rely on manual verification (Chitekwe-Biti, Mudimu, Nyama, & Jera, 2012) and that such verification is a highly political process (Karanja, 2010).

The limitations to existing mapping of urban informality poses methodological challenges, but also opens up opportunities to reconfigure how urban informality is represented and understood. Informal settlements are often literally "off the map" (Robinson, 2002) and Roy (2009) argues that the 'unmapping' of settlements can actually be a conscious state strategy in order to exercise forms of control. In the example of image 3.1, an urban village is misrepresented as a collection of low-rise courtyard houses awaiting formal redevelopment, while in reality urban villages like these have densified and redeveloped informally. Mapping is thus not mere documentation, but carries political meaning. Yet another dimension of mapping is its potential to challenge the pervasive narrative that that favours 'change from above' as a means to explain local spatial phenomena (Dovey, 2011, p. 351). Maps do not merely illustrate macro-scale socio-economic issues, but can expose spatial relations and reveal new insights (Corner, 1999; Dovey & Ristic, 2015). Depending on the purpose, maps can adopt a broad range of a mapping approaches – each of which emphasizes different scales and methods.

**3.1** (mis)representation of urban village as collection of unchanged courtyard houses – photo taken in Beijing urban planning center

## Knowledge and maps

Maps are an embodied form of knowledge that straddles the traditional distinction between qualitative and quantitative data, as it brings both absolute and relational properties within a single representation. Extracting spatial knowledge through maps requires two 'moments of translation' – first abstracting spatial relations into a map and then interpreting the map. Urban fabrics can be 'read' just like other forms of coded information. Such reading is most effective if a particular phenomenon is mapped at the right scale, in the right frame, with the right method and with the right categories – all of which will be addressed in the latter part of this chapter. The Delft approach to mapping, which is geared primarily to inform design decisions, follows a four-step process from data collection, to base map preparation, to analytical and comparative mapping and finally to drawing conclusions in a concise graphic manner (Van den Burg, 2004). Analogous to the Delft approach, Corner (1999) posits a three-fold interrelation of mapping practices of 'field', 'extract' and 'plotting'. The field comprises all the decisions that form the system of organizing the raw data, frame, scale and orientation of the base map. To extract is to de-layer or de-territorialize the data into clusters so that they can be analysed in *iso*lation and *re*lation. Plotting is the "drawing out of new and latent relationships (..) amongst the various extracts within the field" (1999, p. 230). Scheer (2016) identifies different kinds of spatial knowledge that can be derived from this process that are linked to each other in increasing complexity. The first is "the recognition of *patterns*, at different times and across places. (..) Patterns may be exclusive to a particular place, but identifying, comparing, and naming those that occur over time and in different places is one of the key aims of urban morphology" (Scheer, 2016, p. 9). Secondly, using the observations and classification of these formal patterns, theories of change can be formulated that deal with *how* urban form undergoes transformation. Finally these formal changes can be related to non-formal conditions in order to deal with the question of *why* urban form changes.

Kropf (2001) argued that urban morphological studies have a close parallel to the methods of evolutionary biology, where observation, comparison and classification of a population have become the main methods. This analogy is explored further by Trummer (2012), who contrasts typological thinking based on archetypes with population thinking. He primarily challenges the conception of type as a fixed or unchanging entity and questions whether a type is shaped by a set of fundamental traits or by a shared process? Trummer relies on the interpretation by the philosopher of science DeLanda (2006), who argues that populations rely on a storage device that allows information to be carried over from one individual to the next. This is analogous to the morphological definition of type as an abstract

scheme that is held as common knowledge between inhabitants (Hillier & Hanson, 1984; Rapoport, 1969). DeLanda (2006) argues that one cannot study cities or neighbourhoods 'in general', but that generalizations emerge from looking at a range of individual places and articulating how variation is distributed across a population.. DeLanda stresses that this way of thinking avoids the trap of reductionism. Many urbanist that conceived the city as an evolutionary process have tried to reduce a 'prime mover' or 'common ancestor' (Abu-Lughod, 1975). The population approach is appropriate for this research because it is not concerned with the individual development of any particular village, but rather looks at the emerging spatial patterns in a population of villages.

Maps have been made for thousands of years, but the emergence of an analytical mapping practice arguably traces its roots to 18th century architects such as Durand and Quatremere de Quincy (Moudon, 1994). Rather than to trace the individual and specific emergence of each case, spatial configurations were reproduced at the same scale and with the same drawing technique (Scheer, 2010). While such techniques were initially applied to architectural scale, such method has been extended to the scale of public spaces (Sitte, 1945), fortified towns (Divorne, Gendre, Lavergne, & Panerai, 1985) and urban blocks (Moudon, 1986). A key distinction in these studies is between comparing through time or comparing through place. Comparing through time has huge potential to further knowledge on informal urbanism (Caldeira, 2016), but as there are no reliable maps available for urban villages to track spatial change through time, this research therefore focuses on comparison in place.

**Selection, generalization and exception**

Case selection is critical in setting the conceptual 'field' (Corner, 1999). Comparative studies have an inherent tension between selection of cases, their ability to be generalized and their potential to show unique or exceptional cases. This tension is especially relevant in the field of urban informality, where the empirical results have often been too easily generalized across a broad range of context without sufficient questioning or reassessment of their general significance. Through her research on cities in the Islamic world, Abu-Lughod argues that "with perhaps too much ease, informal developments, having roughly the same morphology and dubious legal status, are assumed to have arisen from similar causes, to serve similar sociological functions, to have similar social organization, and, finally, to produce similar consequences" (1975, p. 15). She urges to focus on the common mechanism of process as a means to illuminate similarities and differences.

More recently, Robinson made a very similar argument, when she argued for "tracing the interconnected genesis of repeated, related but distinctive, urban outcomes" (2016, p. 14). However, Robinson (2011) is also concerned with the ways in which comparison breaks with or reinforces colonial practices and has therefore advocated a comparative method that "abandon[s] the hopeless effort to apply a quasi-scientific rigour to case selection based on attempting to control for difference across cities" (Robinson, 2016, p. 13). This practice has been picked up by others, who argue for a juxtaposition of dissimilar cases (Caldeira, 2016). This is contrary to Abu-Lughod's approach that looks for variation within a specific set of parameters. She argues that without these parameters, variation cannot be meaningfully discussed (Abu-Lughod, 1975). This approach fits in closely to the approach of urban morphology, even though the literature on comparison in urban studies is generally ignorant of the tradition of comparison within urban morphology. To add relevance to a single study, it has been popular to discuss cases 'in wider conversation' (Robinson, 2016) – but as Small (2009) cautions, to extract knowledge from a single case in relation to others, such studies require an *a priori* conceptual model of society such as globalization or neo-liberalism. It has been specifically suggested that the cities in Asia would benefit from multi-city comparison and multiple sites within a single city (Ren & Luger, 2015). Due to the multi-scalar nature of urban research, the issue of case selection is closely related to the problem of sampling within a given case – should the sample be random or should it purposive? "In [a] *purposive* sample, the researcher is less concerned about generalizing to the larger population and more concerned about discovering useful patterns of information about particular groups or subsets of the population" (Groat & Wang, 2013). The latter part of this chapter carefully describes these parameters and selection criteria for each site, and the sample within each site.

One of the key recurring issue for correlational research are decisions about categories of measurement (Corner, 1999; Groat & Wang, 2013). For comparison to be meaningful, the categories for spatial components and the scales from which they are obtained need to be consistent (Kropf, 2014). While at the level of the neighbourhood, largely established categories can be used to map open space, height and function, at the metropolitan scale and interface scale, absence of such conventions requires a different approach. A grounded approach bears close attention to the everyday realities of the study area and aims at inducing categories from the data, rather than imposing criteria onto the data (Strauss & Corbin, 1994). Alexander (1964) points out the reality of space is not one of "strictly nested sets", but rather one of "overlapping sets" and any given space will be a member of multiple categories. To arrive at a meaningful

set of categories, comparison was used to derive practical criteria for distinguishing categories. As Strauss and Corbin (1994) explain, a central feature of the grounded approach is constant comparative analysis, hence the approach is often referred to as the "*constant comparative method" (*Glaser, 1965*)*. The grounded approach is built on acknowledging change and rejecting determinism (Corbin & Strauss, 1990) and hence fits within the concept of population thinking. In practice, this means that "coding an incident for a category, [requires comparison] with the previous incidents coded in the same category" (Glaser, 1965, p. 439). Hence, the categories presented under methodologies were not derived *a priori*, but derived from the fieldwork and analysis of the gathered data. The categories themselves can be considered a research outcome, derived from comparison between and within cases.

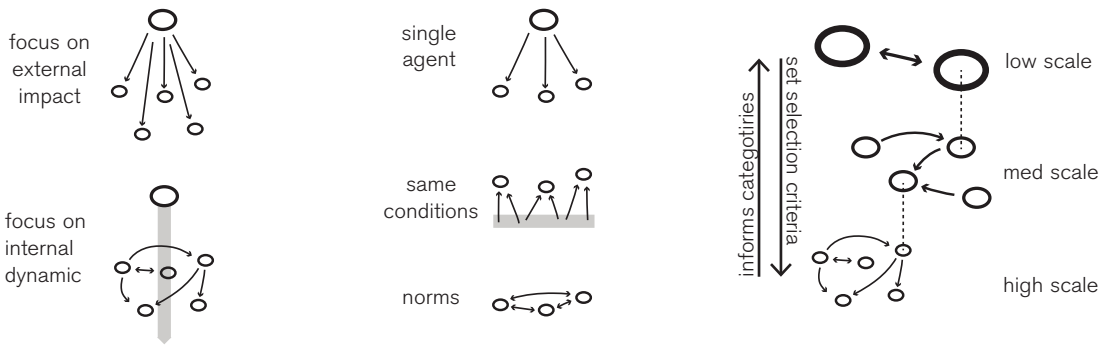
**Interpreting comparison**

Through careful case and category selection, a meaningful range of difference can be generated, but how is variation within the comparison interpreted and explained? The differences are not necessarily causally linked and the task is rather to "clarify the relationship among a complex set of real-world variables" (Groat & Wang, 2013). The framework used for this interpretation can perhaps be best understood by what it is not – the aim is not to interpret difference by mapping it onto a normative framework and not to deduce a 'core essence'. This research is descriptive, rather than normative as it is not concerned with establishing in what way the villages adhere to any notion of a good urban environment (Habraken, 2009; Turner, 1972), but rather focuses simply on understanding how urban villages work in their own spatial terms. It describes not just the process but also of the ways in which the product generates capacities for future use. The description is not aimed at reducing villages in China or India to a kind of essence, a typical "Chinese" or "Indian" village, but rather to articulate the range of spatial variation and the relation among them at various levels of scale.

Within morphological studies, Gauthier and Gilliland (2006) suggest that urban fabric can be interpreted either as an outcome of external forces such as political, cultural, etc., or through an approach that emphasises the internal logic of the urban fabric. The 'internalist' approach does not deny the effect of external systems, but builds on the premise that urban space has its own consistency and resilience, relatively independent of those external forces (Gauthier & Gilliland, 2006). As a theoretical model and ways of explaining this is very different from a Marxist approach that seeks to explain urban phenomena primarily through external forces. Much of the academic discourse on urban informality has favored 'change from above' as

a means to explain local spatial phenomena and this means that "beyond the general descriptions of incremental housing, recycled materials, makeshift construction and so on there is little detailed research on the morphology, materiality or semiotics of informality" (Dovey, 2011, p. 351). This research aims to break with that discourse, by focusing more on this internal logic and micro spatiality of the settlement, rather than seeking how urban form is the outcome of geo-political forces.

Morphological change can be interpreted through focusing on how transformation occurs versus interpretations that emphasise why they change. Scheer (2016, p. 11) argues that "autonomous theories of change are concerned with the dynamics of physical change itself, the assumption being that there are highly varied non-formal conditions that can induce or influence the same pattern of formal change". The subtitle of Habraken's book is *form and control in the built environment,* and he envisions that "in the environmental game, we must watch the game played, observe the live configurations, and *deduce* the rules ." (1998, p. 20). Habraken argues that patterns of transformation reveal the structure of control, which occur in clearly defined levels. These levels will parallel a given environment's hierarchy of control – "control causes change and change reveals control" (2009, p. 132). This rendition of the relationship between morphology and control, is a bottom-up application to Foucault's concern of the ways in which "isomorphic forms (..) reflect institutional regime in the built fabric" (Foucault, 1977, p. 187). DiMaggio and Powell (1983) developed the concept of isomorphism to describe the increasing similarity of organizational structures within institutions. Isomorphism is defined as a "constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions" (Hawley, 1968 in DiMaggio & Powell, 1983). Mugavin argues that a "Foucauldian urban morphology would emphasize systematic description and analysis of relationships between the




**3.2** representation of three methodological concerns: external-internal; isomorphism; multi-scalar

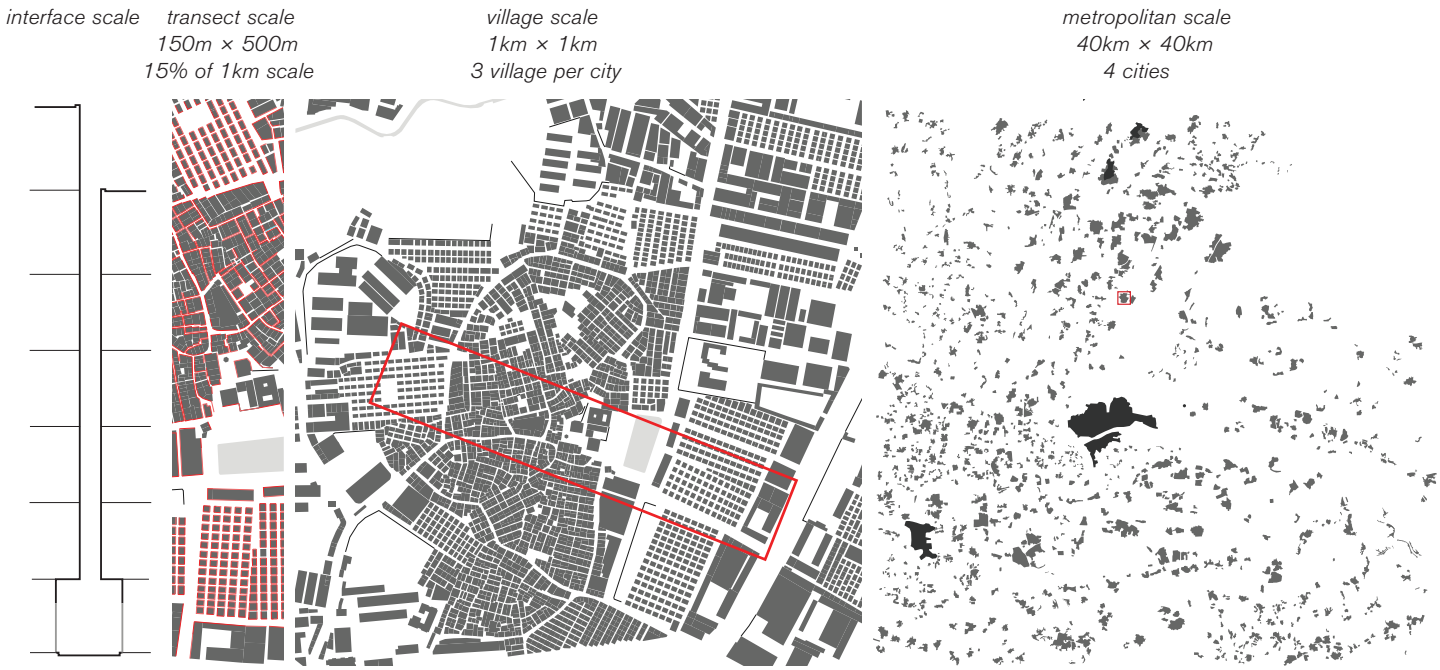
social and the physical aspects of spaces/places, over time, right down to the scale of the individual site, but inclusive of the broader societal pattern" and would look for "isomorphic patterns between built fabric, institutional regimes, owners and occupants" (1999, p. 96). This means that if we observe similar urban forms we can surmise that they must have been either shaped by similar forces (agents choosing the same outcome), by pressure of social norms (agents subjected to rules) or they have been created by the same agent.

### Selection of scales

This research uses a multi-scalar approach that relies on classification of buildings and their related open spaces which is grounded within typo-morphology (see Kropf, 2009; Moudon, 1994; Scheer, 2016). Because many of the spatial elements in urban villages emerge from the interaction of smaller parts, a multi-scalar approach is required to understand how urban informality operates and induces morphological variation. Urban informality happens at a variety of interrelated scales – understanding one requires knowledge of the others. Bobic (2004, p. 53) argues that "only by observing interrelationships between different entities and scale levels, can the knowledge about the character of city structure be learned ." Arefi (2011) argued that a multi-scalar approach to informal settlement is required to reveal different ordering principles at different scales.

Not all scales will receive the same amount of attention and this research relies on a mixed-scanning method that uses several scales of data collection and analysis in order to scan for both patterns that would be revealed at a high resolution as well as patterns that would be noted only by comparing large groups of data across different conditions (Etzioni, 1967). Each spatial scale operates at different rates of change, revealing different processes at play. The lower scales inform the higher scales and these in turn set the selection criteria for the analysis at lower scales. Hence, metropolitan scale mapping sets the criteria for the selection of villages, while the village mapping in turn sets the criteria for selecting the transect. Reasoned the other way, the interface scale informs the categories to be mapped at the transect scale, while the transect scale informs an understanding about the village as a whole. Each scale sequentially discusses case selection, methodology and mapping categories. As the remainder of the chapter progresses down the scales, the initial focus on selection criteria at the higher scales will gradually dissipate as focus on the mapping categories takes over at the lower scales.

Figure 3.3 shows the four scales selected for this research. The highest level of scale is the metropolitan scale, for which a frame was




**3.3** interrelations between four scales of analysis

chosen at 40km by 40km, covering 1600km$^2$. This is related to the degree of village urbanization – villages that are further than 20km away from the city centre show only limited signs of urbanization, making them unsuitable for the scope of this research. The 1km scale is related to the size of the village. Most old cores are between 2 ha and 10 ha, while expansions roughly double or triple the original size of the old core. The 100ha frame allows enough space to study the expansion process as well as the edge of the village with the formal city. The length of the transect at 750m was chosen to cover the distinct urban environments of the old core, to new expansions and the formal edge. The width of 150m was chosen to provide a large enough sample of public spaces – the transect covers 11% of the 1km scale, and on average 15% of the public spaces.

## Metropolitan scale

### Selection

As explained in the introductory chapter, there are valid reasons for comparing urban villages across China and India. There is however also much variation within these countries so on what basis can a meaningful case selection be made? There are an estimated 1.2 million villages in these two countries (Liu, Liu, Chen, & Long, 2010; Verma, 2017), each with their own history, and so this research in no way claims to cover all the various ways in which villages can urbanize. Although the results of this research

might be meaningful to all kinds of village urbanization patterns, the scope of this research is restricted to *nucleated* urban villages that take shape in areas of *high pre-urban densities* and are in *proximity to a much larger urban centre* within China or India.

In his influential paper *The emergence of desakota regions in Asia,* McGee (1991) describes how Asia's urbanization is different from the Western context. *Desakota* literally means 'village-city', by which McGee (1991, p. 8) indicates an area of "intense mixture of agricultural and non-agricultural activities that often stretch along corridors between large city cores". This intensive mix takes place in a context of high rural population densities – so high that they often surpass suburban densities of many Western cities (Qadeer, 2000). Such high rural population density also distinguishes informal urbanization in Asia from peri-urban informal growth in the Latin American context, where the role of rural communities is of much less significance to the urbanization process (Caldeira, 2016). Qadeer (2004) builds upon the concept of *desakota* and argues that while the metaphor of 'exploding cities' is commonly used for the rapid expansion of cities in the global South, a more appropriate term would be 'imploding cities' as the growth in these cities happens through the expansions of villages.

In addition to population density, urbanization is tremendously affected by the erstwhile spatial organization of the villages, which are commonly distinguished between nucleated and dispersed villages (Chandhoke, 1990; Knapp, 1986). Rapoport (1969) argued that a village' social life is intimately tied to this distinction. Nucleated villages are characterized by a concentrated pattern of settlement where farmlands and housing are spatially separated, and where the village committee has a strong mediating role in managing village affairs.

Finally, the urbanization process is affected by the power relation between the village and the enveloping city (Altrock, 2012). While a smaller, less rapidly growing city has to respect the village's territorial integrity and negotiate with villagers on a relatively equal footing, this study looks at cities that are characterized by an asymmetrical relation between the village and the municipal authority which has vastly more resources and power. Villagers in proximity to a fast-growing city have less time to react, anticipate and transform their rural institutions – often leading to reactionary village practices geared towards the municipal practices. Urbanization is so fast that transformation from rural community to urban neighbourhood can happen in a single generation.

This research is thus limited to large cities in India and China, that have experienced fast urban growth in a context of high rural density organized in nucleated villages. Figure 3.4 shows all 16 cities in China and

**3.4** case selection of cities mapped in relation to potential cities of 8 million or more

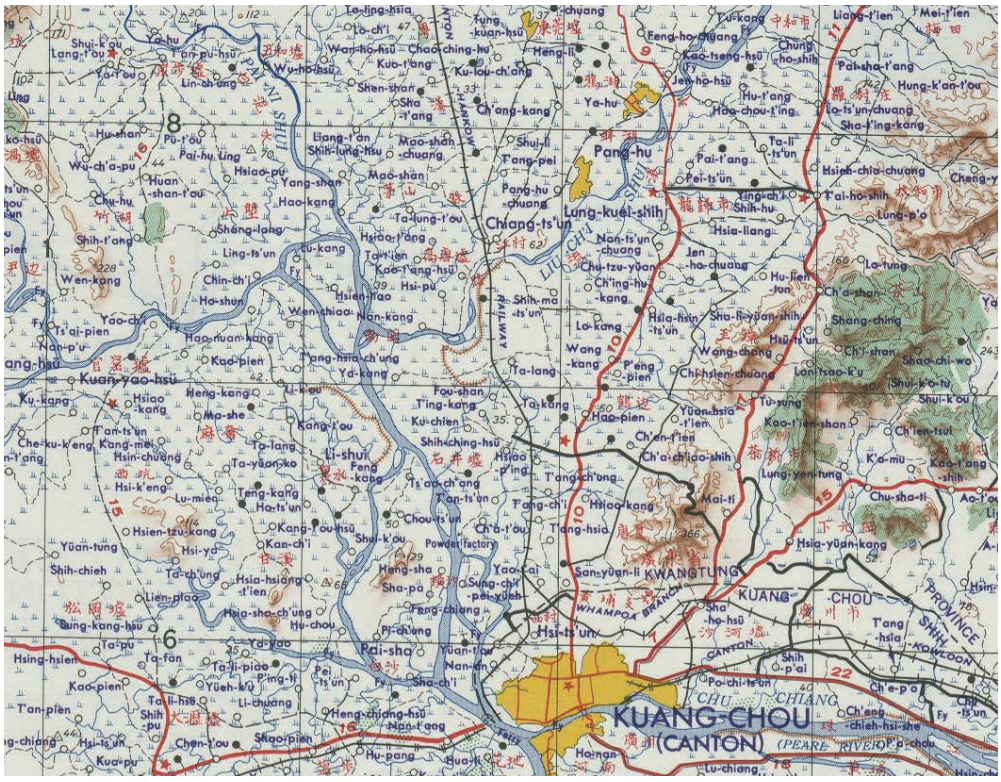
India unquestionably qualify as large cities with populations over 7 million people – a third of the global total (Demographia World Urban Areas, 2016). From these were excluded cities without high pre-urban densities – like Mumbai which as a colonial port was founded on a peninsula –, cities where most villages follow a linear or dispersed settlement pattern – like coastal Shanghai and Kolkata – and cities without much available literature on urban village practices – like Tianjin or Chengdu. The three regions that received most attention in literature on urban villages are the urban region around Beijing, the Pearl River Delta region and the urban region of Delhi, and this research will focus on these areas as well. In addition, Bangalore was selected, to provide two cases in both China and India.

## Method

The city scale mapping provides a framework for comparison between cities as well as a tool to identify specific cases in each city to be studied at a lower scale. As villages urbanize, the boundary between the erstwhile village and other forms of informal urbanism can become very blurry to the point where the village might not appear as a recognizable entity. Rather than relying on contemporary and potentially biased maps, this research uses historic maps to provide a basis for identifying villages. While a range of historic maps are available for the four selected cities, they are often framed around the maximum extent of the city at any given time – not showing much of the agricultural hinterland that is required for village identification. In addition, changing definitions about what constitutes a village between different cartographers, each influenced by their own cultural bias, makes comparison between cities very difficult. Hence, this research uses a set of maps by a single cartographer, produced in roughly the same historical

period and covering the entire contemporary metropolitan extent. In the early stages of the Cold War, the US army started using aerial photography to produce maps that were both detailed and spatially accurate – see Cloud (2002) for a detailed discussion. These US army maps have been made available by the University of Texas, from which "China, Series L500" 1954) and "India and Pakistan Series U502" 1955) have been used to identify the location of villages in all four cities.

While the US army maps provide a consistent means of identifying the rough location of the original village core, it provides no means to identify the contemporary boundaries of these villages. For reasons that will become more apparent in the discussion of each city, formal and legal boundaries as found in government documents provide a limited and skewed representation of the extend of urban villages. Hence, Google Earth satellite imagery was superimposed on the historical maps to trace the contemporary extent of each village. For reasons outlined earlier, this tracing has been done manually without remote sensing technology. An approach that is better geared to the identification of urban villages, is the technique used by Dovey & Kamalipour (2017) who assess urban design and architecture separately based on the degree to which they demonstrate self-organization.


KUANG-CHOU
(CANTON)
KWANGTUNG
KUANG-CHOU
Pang-hu
Lung-kuei-shih
Chiang-ts'un
Pai-sha
Hsi-ts'un
Kuan-yao-hsü
Shih-lung-hsü
Ch'ang-kang
Shui-li
Ta-li-ts'un
Hsia-liang
Shang-ching
Hsia-ti-yüan-shih
Hsia-yüan-kang
Mai-ti
Ch'ien-tsui
Chu-sha-ti
Lung-yen-tung
Ch'i-shan
Shao-chi-wo
Ch'e-p'o
Ch'ang-chieh-hsi-she
Hsia-ho-hsü
Ch'ang-hsia
Hsiao-kang
Hsiao-p'ing
Ch'a-t'ou
Powder Factory
Pei-ts'un
Nan-ts'un
Ch'ing-hu-kang
Chu-tzu-yüan
Hsia-hsin-ts'un
Wang-kang
Wang-chang
Ch'i-hsien-chuang
Ch'a-chiao-shih
Yüan-hsia-t'ien
Ch'an-t'ien
Hsiao-pien
Ta-lang
Ta-kang
Lo-kang
Shih-ma-ts'un
Hsia-hsin
Hsia-liang
Hu-tien-tun
Lung-p'o
Ch'a-shan
Lo-tung
Shih-hu
Pai-t'ang
Ts'ai-ho-shih
Hsien-chia-chuang
Ch'ang-ch'i
Pang-hu-chuang
Shui-li
T'ang-pei
Mao-shan-chuang
Liang-t'an
Shih-lung-hsü
Pai-hu-ling
Hsiao-pu
Yang-shan
Hao-kang
Ta-lung-t'ou
Hsiao-t'ang
Hsi-pu
Kao-t'ang-hsü
Ts'ai-pien
Hao-nuan-kang
Kao-pien
Ta-tang-hsia-ch'ung
Yü-kang
Nan-kang
Wen-hsiao
Ho-shan
Chin-ch'i
Ling-ts'un
Shang-lang
Chu-hu
Hsiao-pu
Huan-shan-t'ou
Hu-shan
Pu-t'ou
Wu-ch'a-pu
Shih-t'ang
Wen-kang
Yao-ch'i
Ku-kang
Heng-kang
Ma-she
T'an-ts'un
Kang-mei
Che-ku-k'eng
Hsin-chuang
Hsi-k'eng
Lu-mien
Ta-lang
Ta-yüan-ko
Teng-kang
Ha-ts'un
Li-shui
Feng-kang
Li-k'eu
Kang-t'ou
Ku-chien
Shih-ching-hsü
Ts'ao-ch'ang
T'an-ts'un
T'ang-ch'ung
T'ang-ch'i
Hsiao-kang
T'ang-hsia
Chou-ts'un
Shui-k'ou
Kan-ch'i
Kang-t'ou-hsü
Hsien-tzu-kang
Hsi-ya
Yüan-tung
Shih-chieh
Ta-ch'ung
Hsia-hsiang-t'ien
Lien-piao
Sung-kang-hsü
Hsia-sha-ch'ung
Ha-chou
Ta-pu
Ta-yao
Ta-fan
Hsing-hsien
Ta-li-piao
P'ing-li
Yüeh-k'u
Li-chuang
Kao-pien
T'an-pien
Ta-li-hsü
Shih-pu
Heng-chiang-hsü
Nan-t'ang
Shao-pien
Chen-t'ou
Hsi-ts'un
Kua-pu
Hu-pang
Hua-li
Ho-nan
Lu-chiang
Sha-ch'i
Pei-ts'un
Yüan-t'ou
Nan-ts'un
Pi-chiang
Feng-chiang
Hsia-sha-ch'ung
Sung-chia-pei-yüeh
Yao-cai
San-yüan-li
Hsiang-sha
Sha-po
Hsia-hsiang-t'ien
Shih-k'ou
Sha-ho-hsü
Sha-t'ang
Ch'ang-kang
Ye-hu
Heng-li
Ku-lou-ch'ang
Chao-ching-hu
Kuo-t'ang
Wan-ho-hsü
Wu-ho-hsü
Shen-shan
Sha-t'ang
Ta-ch'i
Lo-ling-hsia
Yung-kuan-hsü
Feng-ho-chuang
Kao-tseng-hsü
Jen-ho-hsü
Hu-t'ang
Hao-chou-t'ing
Lo-ts'un-chuang
Sha-t'ing-kang
Pai-sha-t'ang
Hung-k'an-t'ou
Mei-t'ien
Liang-t'ien
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### Categories

Using these techniques, the metropolitan scale mapping adopts a four-fold categorization of non-urbanized, village-urbanized, formally urbanized, informally urbanized. The distinction between these categories was informed by morphological knowledge that was generated at the lower levels of scale as well as a literature review for each city that focuses on the municipal practices towards village development. Other informal includes all development that is not in the direct vicinity of any village old core, and shows no evidence of master planning. Formal are those parts that show evidence of being planned according to a masterplan and where construction happens in large increments. A final categorization of demolished villages was added by comparing the contemporary satellite imagery with historical maps and Google Earth records which revealed whether any villages had been demolished.

## Village scale

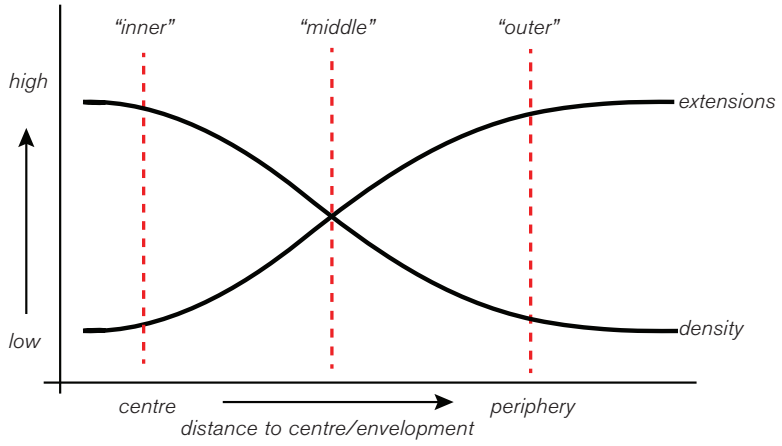
### Selection

The metropolitan scale mapping that will be presented in the subsequent chapters, will reveal that each selected city has several hundred villages within the study area. These urban villages have been commonly described in terms of center-periphery (Li, 2001; Tyagi, 1982). Tyagi (1982), writing in the context of Delhi, analyses the urbanization of villages in three *stages*; rural, peri-urban and urban. He argues that the spatial progression through these stages, is geared to a change in social mix and employment structure. A similar categorization has been developed by Li (2001) who divides urban villages in the Chinese context into three *types* based on centrality and retention of farmland: centrally located village without any farmland; suburban villages with some farmland left; and peri-urban villages that still have large amounts of farmland. The Chinese term *chengzhongcun* literally means 'villages encircled by city' and thus seems to refer specifically to centrally located villages. Wang (2009, p. 960) used the term *chengbiancun* to describe "semi-urbanized villages located at interface zones of the main built up areas", similar to Li's second category. Yet, Wang also introduces another village type termed *chengwaicun*, which are "semi-urbanized villages in suburban areas and industrialized towns" and which appears independent of the retainment of farmland and rather describes a functional characteristic. Based on research in Shenzhen, Hao et al. (2012) have shown that villages also go through a stage-like progression of functions, initially becoming more functional diverse up to a point where less-profitable non-residential are increasingly pushed out. Hao et al. (2013)

also demonstrated that densification intensifies as the village gets more embedded within the city – in other words, the closer to the city center, the denser the village. Villages grow horizontally by adding expansions to their old core, which tend to occur in villages located towards the periphery of the city where there is the vacant land required for these extensions (van Oostrum, 2018).

Conceptualizing the urbanization of villages as a set of stages conflates a range of locational, morphological and functional categories. The terms types, phases and stages tend to be used interchangeably in this context, even though they refer to very distinct transformation processes. Following the analysis in the previous chapter, type is a trans-spatial concept that refers to a particular set of spatial relations specific to a village. Phases indicate a process that can be reversed like in the three 'phases of water', while stages indicate a progression of different conditions, like in the 'stages of tree's lifecycle', a process that can be halted but is fixed in its sequence. To use an example for the previous section, nucleated and dispersed villages are different *types*, because they refer to a specific set of spatial relations. Dispersed villages are not an earlier stage or a different phase of a nucleated village.

The selection of villages was based on the premise that villages simultaneously move through a sequence of stages, as well as shifting between several phases. The envelopment, densification and extensions of villages are permanent spatial features that cannot be reversed, yet to what degree they follow a fixed progression is debatable. The three interrelated parameters of centrality, densification and extensions that are visualized in figure 3.6, are not conceived to generate rigid boundaries between




**3.6** village selection for each city based on framework of three interrelated criteria: distance to centre, density and expansions

different kinds of villages, nor should they be interpreted as a deterministic relation between distance, density and expansion. Rather it is a framework that forms a spectrum from which three villages in each city have been selected to have the largest range of difference represented: one on the urban periphery that has just started urbanizing – with low density and some extensions; one that has expanded significantly and is marked by mixed land-use; and one close to the city center with high density but with only very limited expansions. These villages will be referred to as 'inner', 'middle' and 'outer' in the subsequent chapters.

**Method**

Each of the selected villages was mapped by the researcher over the course of 5 to 15 site visits, depending on the complexity of the village. A satellite image from Google Earth or Baidu was used as a base map and annotated during site visits – hence all the data collected in this research is new, not linked to any existing data sets. The following information was mapped at this scale: building footprints, public space network, building heights, building functions and any administrative boundaries. Every municipal government has at least some elementary regulations for the urban villages in their respective jurisdictions, for example rules on maximum height or restrictions on certain industrial functions. In the Indian cases the formal rules were obtained online from the municipal website. Urban codes are not made public in China, so here the research relied on interviews and secondary sources such as news articles and posters with public announcements. These codes also include the mechanisms in place to enforce the municipal codes., which includes policing, but also building approval procedures.
In each village, interviews were conducted with local residents to get an understanding about the legal and social boundaries within the village and between the formal city. Internal boundaries might include caste boundaries, clan boundaries, administrative divisions, and phases of growth. A translator was used to conduct these interviews. All participants remain anonymous and agreed with verbal consent.

**Categories**

The public space was mapped to produce a figure-ground map in the tradition of Nolli and Rowe & Koetter (1983). Public space was defined as a performative quality, in which the ability of the researcher to enter was used as a proxy of the space's publicness. While it is common to assert the distinction of building, plot and street in morphological studies (Kropf, 2014; Marshall, 2004), because of high net plot coverage or absence of (legally acknowledged) plots, it was not possible to systematically map plots with confidence. Because of limitations in the quality of satellite imagery and cantilevering structures in the dense urban form, the mapping of public

space had to be verified on the ground. While the absence of clear plot boundaries makes it difficult to distinguish where one building begins and another ends, the concept of isomorphism can be used to surmise that different built increments are controlled by a different combination of agents – and can thus be distinguished as separate buildings. Compound walls were also mapped to distinguish publicly accessible open space from private open space, and to indicate where adjacent publicly accessible space are not continuous. A correct mapping of this is important because it relates to the capacity of the urban fabric to allow flows of people.

These arrangement of public spaces, plots and buildings generates capacities for further densification and functional mix. The concept of urban permeability is used to describe the degree to which the configuration of an urban morphology is accessible for through movement – primarily for pedestrians (Marshall, 2004; Pafka & Dovey, 2017). The configuration of public spaces is one of the main structuring principles for the movement of people, which in turn is one of the key drivers of functional mix (B. Hillier, 1996). Clustering of functions is reinforced by the economic benefit that is derived from the economic synergies that emerge from proximity (Fujita & Thisse, 1996). The primary functions mapped are residential, production and consumption functions – a distinction derived from established ways of functional mix mapping (see Dovey & Pafka, 2017; Van den Hoek, 2008; Van Nes, Berghauser Pont, & Mashhoodi, 2012). In addition, community facilities have been separated out because of their special significance in the village. Likewise, the production of services and goods has been separated out because of the distinct ways they appear in the urban morphology. Hence, building function was mapped in the following five categories: production and storage of goods (including workshops, factories, etc.), production of services (including hotel, offices, etc.), consumption of goods (including retail, wholesale, diners, etc.), community buildings (including religious, public and schools) and residential. These clusters of categories were derived from the fieldwork through analysis of a more extensive list of functions that was initially mapped. Because all the functional mapping was done by the researcher without access to existing surveys, there were restrictions in the data collection. The upper levels of buildings in the village sometimes include formal and informal office space, and small workshops, but these could not be confidently observed and were therefore not mapped or included in the analysis.

Building height was mapped in floors in six categories – 1 floor, 2-3 floors, 4-5 floors, 6-7 floors, 8-9 floors and above 9 floors. These categories were chosen as each is associated with particular spatial characteristics. The traditional fabric of the village was mostly constituted by single story

buildings. Two- and three-story buildings can be built on top of an existing building and generally do not create major overshadowing effects on the public space below. Four- to five-story buildings are likely to require reconstruction of any original structure that stood there, but they maintain a close relationship to the street. Six- to seven-story buildings starts to lose that connection to the streets and are increasingly at risk of overshadowing public space. Eight- to nine-story buildings are the maximum height observed anywhere in the village, while buildings of more than nine stories are primarily reserved for buildings outside the village.

## Transect scale

### Selection

The village scale is too extensive to map activities and other micro-scale elements systematically in sufficient detail. Therefore, a transect was chosen as a sample of the village. The use of transects as way to explain diversity within a population go back to early studies in biology by Alexander von Humboldt and Patrick Geddes (Bosselmann, 2011). While the transect has been used as a prescriptive tool within contemporary planning practice (see Duany & Talen, 2002), this research uses the transect as a linear sampling technique that covers a sequence of urban environments and their transitions. Sampling in urban morphology is difficult because space is interconnected – a transect allows coverage of a larger range of different morphologies, without losing their interconnectedness. In each village, a stretch of 750 by 150 metres was selected that stretches from the oldest part of the village, through any village extensions to include the formal edge of the village. In some villages where many options for such a transect existed, a preference was given to a transect that included significant village buildings such as community- and market-halls, or significant clusters of functional mix – again in the interest of covering a range of morphologies.

### Method

Public space does not only function as a space for movement, but a range of other activities, appropriations and encroachments happen within public space as well (Bobic, 2004). All of these were documented by non-participant observations in the tradition of Gehl (2006). The research recognizes that activities in public space are subject to daily, weekly and seasonal rhythms, but as the transect sample is still large, this research focuses on a single part of the day between 3 and 5pm. Issues of access and safety to the villages prevented early morning and late-night surveys. The late afternoon survey tries to capture the social life in the village,

without the commuter peaks that are expected at other times. The fieldwork was planned to avoid extreme weather conditions with atypical patterns of use. Hence, the information from the survey is not meant to depict all the intricacies of daily live in the village, but rather to establish a measure for village comparison and move beyond simplified notions of 'busy' or 'crowded'. Issues such as age, ethnicity or gender of occupants, or the illegality of the activities were not taken into account. Laneways that were gated off or had a highly private character, were excluded from the mapping, but reference is made to them in the text wherever it was significant.

**Categories**

Hall (1966) distinguishes appropriations along a spectrum of permanency from fixed to semi-fixed to unfixed. The fixed parts are permanently built elements, the unfixed parts effectively the people using the open space, while the semi-fixed parts are all the non-human parts the people use and move about in public space, such as any vehicles, seating, etc.. Dovey (2009) describes these semi-fixed elements as 'loose parts' arguing they have a key specific role in the public/private negotiation along laneways. This ability to appropriate adjacent space by spilling-out across the pavement is an important asset to property owners in Asian cities (Drummond, 2000). These semi-fixed appropriations are also temporary markers of identity, that are important in personalization (J. Habraken, 1998). Rapoport (1982) points out that these semi-fixed objects are of particular importance in studying meaning in the built environment, communicating to people what kind of behavior is expected from them.

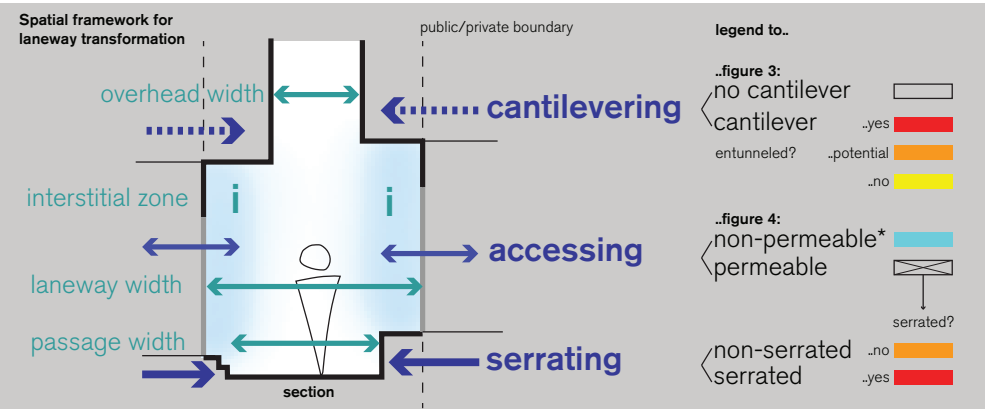
The use of public space has been coded in two basic categories – non-fixed and semi-fixed (Hall, 1966). Non-fixed activity has been divided in stationary activities and people moving through. Stationary activity has been divided in two basic categories; people socializing and people engaged in other forms of exchange such as hawkers, taxi's and rickshaws and guards. These stationary activities were mapped during several walkthroughs with a minimum of two walks for each transect. Walk-throughs were preferred over long-term observations in the interest of lowering unwarranted attention. The flows of people were documented by taking an average of two counts of 5 minutes each . If one count differed substantially from the other, a third count was made and the strongest outlier removed from the count. The flow information was translated to the map by using an average walking speed, added to the stationary activities, to create an 'snapshot' of the average use of the public space in the transect between 3 and 5pm. Semi-fixed use is less transitory and was mapped by a single walk-through into four categories – domestic appropriations , commercial appropriations, cars and 2-wheelers. Domestic appropriations are geared to daily residential use, such as drying

of laundry, washing and storage. Other domestic appropriations are more related to social life and urban quality in the laneway, such as potted plants and outdoor furniture. Commercial appropriations are geared to displaying goods for sale and enticing people to buy things. Cars have been separated from 2-wheelers, not only because of a significant difference in size but also because of different degrees of flexibility.

## Interface scale

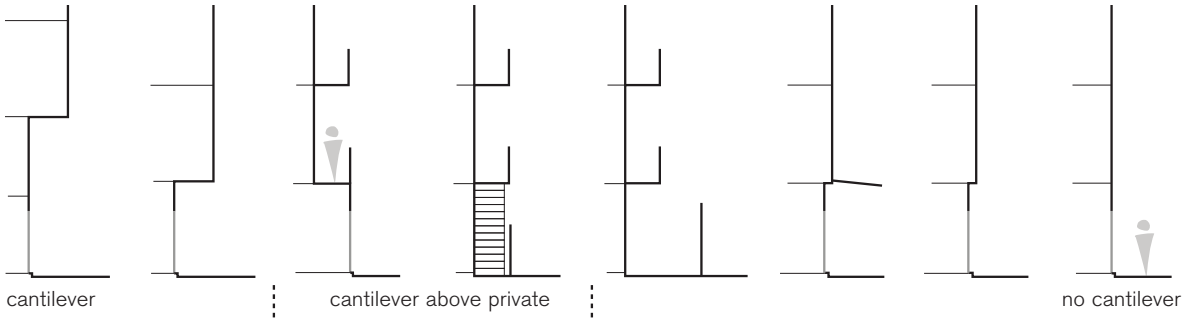
### Method

The smallest level of scale is that of the building interface – or the transition zone between public and private space, where the urban design and architectural infill meet. The primary outcome of the public/private mediation of the building interface is street access, but interfaces are important in many other ways too – they reflect the owner's identity, it is the site of commercial display and exchange, and relates to how safety around the building is perceived (Dovey & Wood, 2015; Tames, 2004). These attributes differentiate the socio-economic space of interface from a façade that merely represents the outer layer of a building (Thwaites, Simpson, & Simkins, 2020). Gehl (2006) has highlighted the interface's critical role in supporting social use of the street – a capacity which he classifies as *active* versus *passive* interfaces. Because interfaces are such a critical aspect of urbanity, regulating them has therefore been a longstanding concern of urban dwellers. In formal urbanism, the interface zone is legally fixed and subject to codified rules that regulate its features, while in informal urbanism, legal boundaries are fuzzy or entirely absent. The interface zone is contested, yet critical to the neighbourhood's liveability through its 'looseness', or its

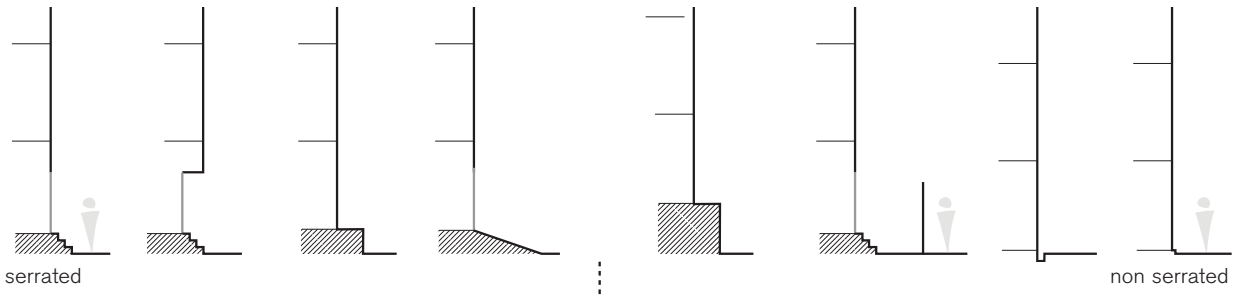



**3.7** Conceptual framework for mapping laneways and their encroachment.

capacity for flexibility and allow multiplicities (Dovey & Polakit, 2010; Franck & Stevens, 2006). Encroachment across the public/private boundary is done in support of livelihoods, but excessive transgression compromises the neighbourhood's liveability. People tend to only appropriate those areas directly around their entrance (Tames, 2004). Hakim (2014) demonstrated that in traditional Islamic urban fabrics, territorial shifts of the building interface are regulated through the *fina*, a zone in which the owner is permitted to use space as an extension of the house, as long as the laneway's collective functionality remains intact. Similarly, medieval London had a commonly understood custom that prohibited new construction to block light to pre-existing windows (H. Davis, 2006, p. 207). Hakim (2008) describes several such potential areas of conflicts that involve decisions about interfaces, such as concerns about the structural integrity of new additions, views and lighting, overlooking and privacy, drainage and hygiene. These concerns are both mediated by formal and informal urban codes. As discussed at the village scale, these formal codes were obtained from the relevant government body were possible, and otherwise supplemented by interviews and other documents.




**3.8** the distinction between cantilevered and non-cantileverd interfaces




**3.9** the distinction between serrated and non-serrated edges

Each of the cases in this research has between 2.5 to 10km of laneway – resulting in 5 to 10km of interfaces per village. All publicly accessible space in the transect was documented through a photographic survey and the public/private interface was subsequently coded through an iterative process. This process has two outcomes – firstly, an understanding of the kind of interfaces that exist and how they are distributed in the village and secondly, the urban codes that mediate where and how these interfaces are established. In absence of clear legal plot boundaries, this research relies on a socio-spatial distinction between public and private, rather than a legal distinction. The photographic survey also allowed for a mapping of public space and building footprints within the transect at a higher resolution than through tracing of satellite imagery. Every interface in the transect was mapped, except in those instances where photography was deemed too intrusive. All photography was modified to ensure individual people are unrecognizable.

**Categories**

Interface mapping has been dominated by an effort to understand active edges (Gehl et al., 2006) and their transformation over time (Kickert, 2016). Gehl argues that an active façade slows down pedestrian movement and encourages more intense use of the street. Active edges are interfaces that contribute to street life through their capacities for permeability, transparency and interstitiality (Thwaites et al., 2020). Permeability embodies the capacity to transition between public and private realms, structured through territorial levels that allow agents control over the transition (J. Habraken, 1998). Transparency embodies the capacity for visual exchange between the public and private realms, which promotes social interaction between these two realms and allows passive surveillance (Jacobs, 1961; Newman, 1972). Interstitiality embodies a capacity to negotiate between public and private realms enabled through the 'articulation' of interfaces (Mehta, 2009), or the ways in which ledges, stairs, porches, alcoves, etc. create transitional spaces. Such articulation creates unintentional affordances for personalization (Mehta, 2009), 'secondary seating' (as opposed to primary seating provided by the government or private businesses) (Gehl & Svarre, 2013) and can have a measurable positive effect on community life (Brown et al., 2009). Gehl et al. (2006) argues that these three lateral interface capacities are enhanced if they are repeated in a dense rhythm that add to a street's diversity. Dovey and Wood (2015) even argue that non-active impermeable interfaces are part of that diversity and point to their positive role such as through providing space for hawking and graffiti.

Interface mapping has largely been limited to formal morphologies and their transferability to informal morphologies remains questionable.

Kamalipour (2016) mapped permeability and interstitial zones in informal settlements, while disregarding the distinction between permeability and transparency. While permeability and transparency are closely related and can exist independently in formal morphologies (Dovey & Wood, 2015), in informal settlement, permeability and transparency largely overlap. It is only through large glass façades that the distinction between permeability and transparency has become pronounced in formal urbanism. Interface articulations in formal urbanism are most often within the private property boundaries, while in informal urbanism articulations are often contested projections into public space. This interface study pays close attention to the ways in which public space in urban villages is encroached and the capacities that they affect. While active interfaces are accredited to contribute to the urban commons of street life, public space provides distinct urban commons at different levels – access and exchange at ground level and lighting at upper level. The laneway framework introduced here conceptualizes interfaces as performative urban infrastructures that affect the laneway through three primary processes: cantilevering, serrating and accessing (see figure 3.7).

Cantilevering is an upper level projection into public space. While cantilevers are occasionally considered for their contribution to the covered-space underneath them (J. Habraken, 1998, p. 242), no framework has been proposed for the mapping of cantilevers. Cantilevering is an almost innate feature of high-density informal urbanism because it allows floorspace to increase without additional land acquisition. Indiscriminate cantilevering for the pursuit of maximum floorspace is problematic as cantilevering can induce low-light conditions both to public space and adjacent buildings and compromise the social role of the public space . This gradual process of deprivation through cantilevering is referred to as *entunneling* and cantilevers were mapped and subsequently coded into three categories to the extent that they entunnel the laneway and induce low-light conditions – not entunneld (▭), entunneld (▭), and potentially entunneld (▭) if the opposing interface cantilevers. Figure 3.8 show the cantilever types that have been used in the mapping, by organizing a range of examples in the appropriate category.

Ground level projections reduce the public space left available for vehicles and pedestrians to a narrower *passage width*. Ground floor projections however also generate a level difference that affords secondary seating and enables an interstitial zone that can contribute to street life. Rather than to use the generic 'encroachment' or 'articulations' within private property boundaries, the term 'serration' is introduced to capture the twofold relation of both affording and restricting urban commons that

results from any steps, ledges, porches, etc. that project into public space. A non-serrated interface ( ) is aligned with the public/private boundary and flush along its entire ground floor height, while a serrated interface ( ) exhibits articulations into public space. While entrances are not physical encroachments, accessing an interface projects a necessary 'right of way' which is a claim on space nevertheless. Any interfaces without access, including compound walls, were mapped as non-permeable interfaces ( ). Figure 3.9 show a range of interface conditions and whether they were included as serrated edges.

# chapter 4 Beijing

In the mid 90's a series of articles raised awareness about the existence of vast communities of migrants on the edge of Beijing who lived and worked in village-built accommodation (Beja & Bonnin, 1995; Leaf, 1995; Leaf et al., 1997). Even when urban villages in other parts of China were still relatively small, Beijing's villages had agglomerated into districts housing hundreds of thousand people each. While the early phase of urban village development is generally characterized as a mutually beneficial relationship between migrants and district government, from the end of the 1990's onwards that relation became increasingly antagonistic (Jeong, 2011). Demolition and displacement of the residents was being reported, especially at the urban village of Zhejiangcun, which is one of the cases in this research. Urban villages have since been blamed for hindering urbanisation and regional development through incompatible land uses, deteriorated urban environments and deficiencies in infrastructure – as well as posing a threat to public security and intensifying social disorder (Xu et al., 2018).

By 2008, Beijing's migrant population had grown to over seven million people, of which half accommodated in urban villages (Zhao, 2012). These migrants tend to be seen as low-skilled industrial labour surplus, but in reality they make up an heterogenous group of which the majority works in commerce and service industry, while only 5 to 10% work in industry (C. Wong et al., 2018; Wu, 2016). Beijing' urban villages also provide housing to an educated class of students and recent graduates, often referred to as the 'ant tribe' – hard-working, yet anonymous inhabitants (Lian, 2009). In fact, some villages have more than half of the inhabitants with college degrees, mostly working in the IT industry (Gu et al., 2015). What is at stake here is thus not only the future of local villagers, but also of rural migrants and of affordable housing in Beijing in general.

## Municipal practices

Beijing's municipal practices towards urban villages take place within the context of the collectivization of land and the interlinked *hukou* system as elaborated upon in chapter two. Migrants without formal rights come to the city searching for work and urban villages provide a place for them to settle. While most of the villages around Beijing have hundreds of years of history, their contemporary identity has been shaped by these incoming migrants. Clusters of urban villages are most often referred to by the name of the most dominant migrant groups in that area, such as *Zhejiangcun* and *Xinjiangcun* which respectively refers to people from *Zhejiang* and *Xinjiang* province and carry no official meaning. In the context of Beijing, special emphasis has been given to the *laoxiang* relations, which indicates the bond between migrants from a similar native place (Ma & Xiang, 1998). Shared practices of language, cuisine and culture create distinct bonds between fellow *laoxiang* that supports a process of chain migration in which migrants find housing, work and credit through these *laoxiang* relations.

While in the early 1990's most housing in urban villages was developed by individual families, the increasing clustering of migrants created a market for housing developments financed by a wealthy migrants, developers and village councils. Since village land cannot be formally sold under Chinese law, the investment, construction and maintenance of these developments are managed by a range of informal lease agreements that are collectively known as *xiaochanfang* – or 'incomplete ownership housing' (Zhao, 2012). The informal character of these developments is reflected in the village' rental agreements, which are predominantly verbal rather than written (Wu, 2016). These *xiaochanfang* developments can cover up to 40% of all residential land development in villages (R. Liu et al., 2012). Zhao (2012; 2016) has provided an account of the various ways in which this development takes place. Most commonly, individual businessmen lease land from the village (ranging from 0.5 ha to 5 ha) and turn them into rental housing for migrants. These are also known as *dayuan* meaning 'big courtyards' (Jeong, 2011), although they are in fact back-to-back houses (Leaf, 1995). These *dayuan* sometimes transform into owner-occupied houses if the houses are sold to the inhabitants, turning them into local villagers, eligible for compensation in case of relocation. Some *xiaochanfang* target middle- and higher-income groups with well-built villa's or apartment buildings on collectively owned land (Zhao & Zhang, 2016). Many of the gated communities that have been written about in the context of Beijing (see Wu & Webber, 2004) are in fact on village land. While gated communities represent a share of the urban village housing, on average most rental units are small and lack amenities – only a quarter of urban

village households in Beijing have access to their own kitchen and bathroom (Wu, 2016).

The combined floor area of all *xiaochanfang* developments reached 6.6 billion $m^2$ in 2010 (Bi, 2010), accounting for 20% of all houses sold on the real estate market in Beijing in 2012 (Zhao & Zhang, 2016). While Zhao (2012) points out that the lack of constructions permits renders these developments illegal , urban villages are a in fact a 'regulation blank area' (Xu et al., 2018), where it is impossible to obtain any construction permit. This logic of 'illegality without regulations' technically renders all village-built housing in the entire country illegal and disregards that local villagers have historically always been allowed to build for their own family need. Construction in villages was outside municipal control, but since 2008 the municipality has been granted formal authority to implement building codes (Zhao & Zhang, 2016). Nevertheless, Beijing has not formulated building controls or a formal building approval process that villagers have access to and they are forced to resort to informal development. Such informal development grants villagers the majority of any land-value appreciation, in some cases up to 70% (R. Liu et al., 2012). Liu et al. (R. Liu et al., 2012) argues that even though housing prices of informally developed housing is about 60% cheaper than formally developed housing, because of the lower construction costs, villagers can quickly earn back their investment. According to Liu, a single additional floor with rental accommodation can be eared back in 2 to 3 years. Thus, even with impending demolition, it can be profitable to invest in temporary housing.

Liu et al. (2012) argue that in the alternative, formal way of development which involves complete village removal, the villagers would only receive between 5–10% of the land value as compensation, while the remainder is split between the government and developers. Financial compensation consists of land compensation, relocation compensation and property compensation, the value of which are determined by the municipality (Tian, 2008). Public announcement posters found in this research show that the combined value of these in one case came to 4500/$m^2$, only a fraction of the 30.000/$m^2$ average housing price in Beijing (Zhao & Zhang, 2016). These offers are often paired with other 'incentives' such as one example found in this study where villagers were incentivized to agree to removal early on, if they wished to receive a flat 40.000 to 60.000 yuan payment and qualify to be among the first to choose a resettlement location. In another example, all villagers were informed that only buildings finished before a certain cut-off date were eligible for compensation (Mangurian & Ray, 2010). All these negotiations are complicated by the village collective ownership of land, which means that any compensation is

channelled through the village committee who is in charge of distributing the money to the villagers (R. Liu et al., 2012). This has led to rumours about party members and cadre leaders benefitting disproportionally, which the municipality has been keen to oppose. As was written on a public announcement poster encountered during fieldwork: "Do not listen to rumours. Do not believe in rumours. Do not spread rumours. To guarantee the maximization of your legal interests."

Up until the mid-90's these developments were largely tolerated, since district governments were able to gain revenue from fees on the migrants and their businesses (Jeong, 2011). Jeong (2011) argues that since the mid 1990's Beijing's villages have shifted from a 'low-end' alliance with migrants to a 'high-end' alliance between the local government and real-estate developers, resulting in the gradual demolition of the villages and displacement of its residents. A new rhetoric has emerged that contends that "rapid urban expansion is always accompanied by the relocation of villages and the resettlement of villagers in which villagers move out of rural dwellings and go to new residences built by the governments." (Xu et al., 2018, p. 33)

In Beijing, it is the municipal practice to acquire all village land and disperse the inhabitants to the periphery of the city (Leaf, 2007). Lin et al. (2014) point out that despite municipal claims that there is a shortage of land, large amounts of requisitioned village land often lay waste for years before new development commences. The Beijing municipality has expressed a clear desire to become a 'city without slums' (T. Wong, 2015) and to that end launched a redevelopment plan in 2010 that was aimed at removing 1.2 million people across 50 villages in the city (R. Liu & Wong, 2018). The 2035 development plan called for a capping of population at 23 million, a removal of 'non-capital functions' and the removal of 'low-end people' (Yuwen, 2018). Beijing's antagonistic history with its villages can be traced back to when the government ordered all ancestral halls to be taken down during the cultural revolution (J. Wang, 2011). It is rare in Beijing to still find a village hall and its related community facilities. Events like the 1990 Asian games and the 2008 Olympics have led to waves of evictions as the city sought to beautify its image (Davis, 2006). The apparent need for demolition is so prevalent in policy, that a strain of scholarship has emerged to evaluate the progress of demolition and to address villages that are lagging behind in such an effort (such as Xu et al., 2018).

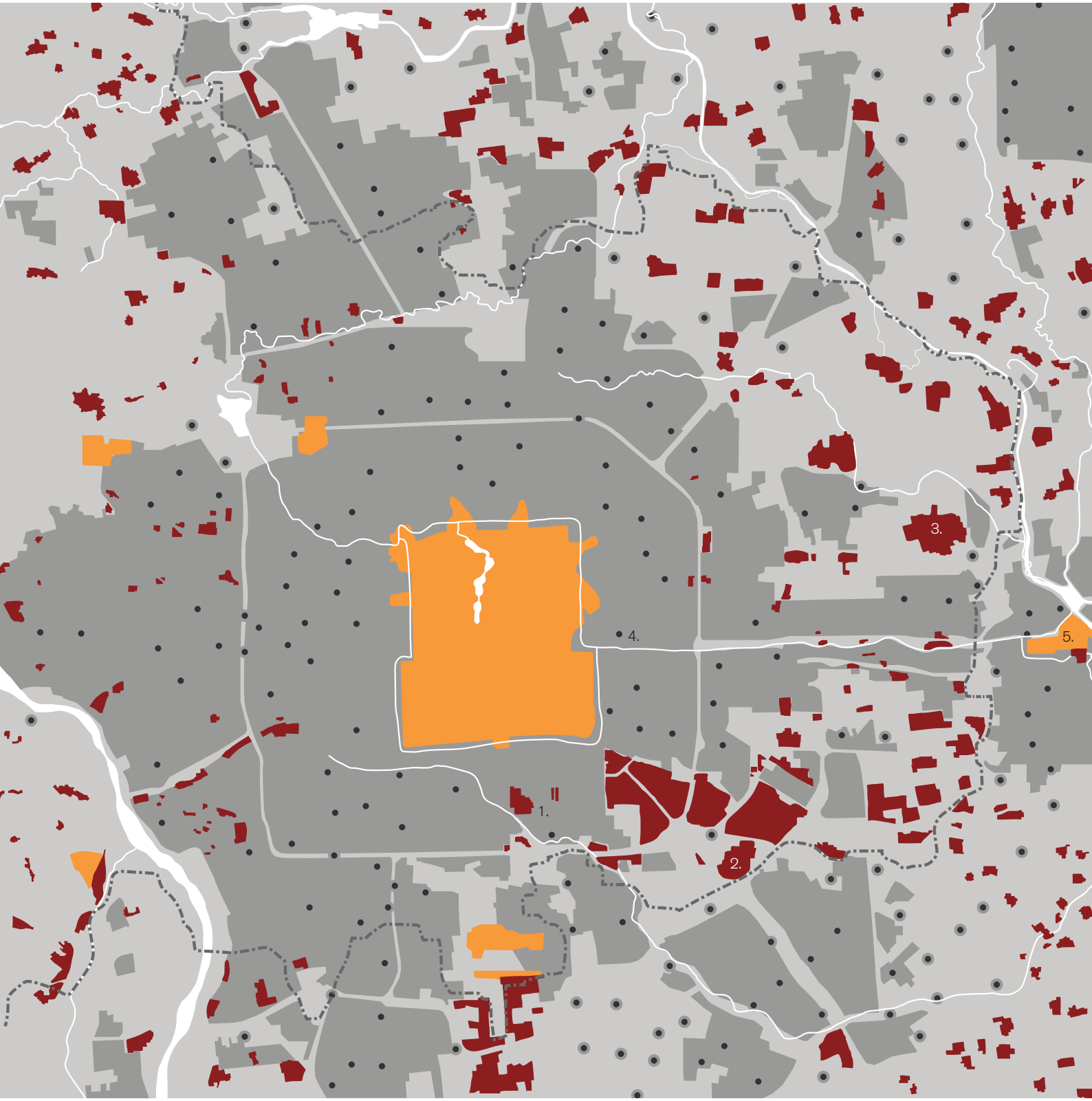
One of the key rationales for urban village removal is an environmental agenda. As the nation's capital, Beijing has closely followed the guidelines developed in the National New Urbanisation Plan which called for a 'human-centered' and 'environmentally friendly' urbanization strategy

(Cheshmehzangi, 2016). Beijing has faced extreme levels of air pollution in recent years and urban villages have been identified as a significant source of pollution. While studies about coal-to-gas transformation appear as early as the mid-2000's (Mao et al., 2005), the Beijing municipality has recently started to implement above-ground gas lines to villages to deal with pollution (Beijing Gas Group, 2017). This program is on a voluntary basis, as village collectives need to partly finance the construction costs, as well as a yearly 3000yuan heating bill for each family (C. Wong et al., 2018). A study funded by the Beijing Municipal Urban Planning Committee, argues for the 'restoration' of wetland zones to turn Beijing in a 'liveable' city (Jia et al., 2011). Even in places where wetlands never existed, 'eco-cleansing' (C. Wong et al., 2018) has already lead to several cases where villages are demolished and refitted as ecological zones (Gu et al., 2015). The 2035 development plan for Beijing inner areas has designated more than 80% of the remaining villages within its 1400 $km^2$ jurisdiction to be transformed into ecological zones.

Wherever village land falls within a residential rather than an ecological zoned area, the villages have been replaced with high-rise development, achieving similar built densities, but only providing housing for a fraction of the people (Mangurian & Ray, 2010). New guidelines by the ministry of land resources advocates a net floor-area-ratio of 2.0 which is followed by most formal development (Zacharias et al., 2015). A study of several of those developments showed that the population was reduced by 70 to 90% (R. Liu & Wong, 2018). In some cases villages are replaced by affordable housing, but as Wang (2016) has pointed out, these apartments rarely cater to the displaced and are only accessible to people with a local *hukou*, so that most apartments end up owned by investors (Y. Wang, 2016). An example of this is found in Tuantongyuan – which at the time of its construction was one of the largest affordable housing projects in Asia – replaced a cluster of urban villages to create a dormitory town of 100.000 with few local job opportunities (Po, 2011). While the land use policy issued by the central government focusses on preservation of rural land, municipal land use policy seeks to extend land for urban development, as this is the only significant way for the municipality to gain revenue (Zhao & Zhang, 2016). A change in the tax-code in 1994 redistributed most local tax revenue to the central government, removing any incentive upgrade villages in-situ (Xie et al., 2002).

**Spatial outcomes**

Beijing and its surrounding hinterland have been inhabited for thousands of years. The characteristic morphology of Beijing' old city, such as its courtyard houses, did not substantially differ much from the morphology of the villages




**4.1** Urban villages in Beijing

1. Zhejiangcun/Shicun 39°50'55.21"N 116°24'3.32"E
2. Hengjiezicun 39°49'21.57"N 116°29'57.94"E
3. Magezhuangcun 39°56'59.60"N 116°35'42.92"E
4. new CBD
5. Tongzhou

urbanization till 1950
formal
urban village
demolished village

that supported the city agriculturally. In fact, Guo (2012) argues that Beijing' master planning practices can be traced back to ancient practices of rural land distribution, which used a grid-field system on a cardinal direction (*jingtian zhi)* for taxation of land. These socio-spatial practices are entangled with the application of *Fengshui* principles (Knapp, 1992). While these principles are complex and multi-faceted, an important guiding principle at the village scale deals with the orientation of the built-up area towards the south for maximum solar access during winter. Compared with other villages in China, the courtyard houses are Beijing are relatively big, generating an extensive built-up area at relatively low density (Knapp, 1992). On average, each village has between 2.5 to 3.5 $km^2$ of hinterland, so that traditionally it had walkable access to agricultural land up to 1.5km from the village nucleus. Estimates on Beijing' urban villages within this urban area vary widely. Early research pointed to roughly a dozen urban village clusters (Ma & Xiang, 1998) – but drew no clear distinction between urban villages and other migrant communities. More recent estimates range from 343 (Yang, 2005), to 500 (Mangurian & Ray, 2010), to 677 (Cavallo et al., 2014, p. 433) and up to 867 (Zheng et al., 2009). These estimates differ not only because of the increasing size of the city, but also because of different interpretations about Beijing's urban area as well as what constitutes the difference between a rural and urban village. Furthermore, it is unclear how demolitions have affected these estimates.

Based on morphological criteria and historical maps, map 4.1 shows the distribution of villages through the territory of Beijing metropolitan region. The 1600$km^2$ study area contains around 270 clearly identifiable separate village settlements, although many more villages used to exist here. By comparing historic maps with recent satellite imagery, it is possible to estimate how many communities were demolished over the last 40 years. The study area originally had approximately 430 villages, of which more than 40% has been demolished up to date. In the area within the 4$^{th}$ ring road – 20% of the study area – almost all the original 38 village communities that existed there historically have been demolished or are in the process of demolition. One of the last villages to remain here is Shicun, part of Zhejiangcun, which will be described in detail as one the cases. In between the 4$^{th}$ and 5$^{th}$ ring road, 40 villages have been demolished, while 18 remain. Finally, another 107 villages outside the 5$^{th}$ ring road have been removed. The latest round of evictions happened in late 2017 after a fire resulting in fatalities broke out in an urban village (Chan, 2018; Phillips, 2017). Online responses – most of which have been taken down since then – reported evictions in 135 urban villages (Yunang, 2017) affecting more than 100.000 people. According to a 2018 study, the majority of villages within the study area has made plans for, are in the process of, or have completed demolition (Xu et al., 2018).

Map 4.1 demonstrates that urban villages in Beijing are primarily a peripheral phenomenon – their presence increases with distance from the city centre. According to Zhu et al. (2014) villages increase their functional mix as they get closer to the centre of the city. Urban villages specialize in particular industries such as artist colonies (X. Liu et al., 2013), student housing (Zhao, 2012) or garment industry (Jeong, 2011). The map shows that the urban villages are loosely clustered in distinct areas, having been removed completely from other parts. An overlay of extent of the metro network shows that the clustering of villages is inversely related to formal urbanization and associated infrastructures. As a simple metric, metro construction seems to precede urban village removal in most cases. The selection of case study villages was based on the urban to rural transect. As Beijing has seen largely concentric growth, epitomized by its system of circular ring roads, one village was selected within each of the outer ring roads. Shicun lies within the 4th ring road, Hengjiezicun lies within the 5th ring road and Magezhuangcun lies within the 6th ring road.

## Zhejiangcun

Shicun is the final remnant of one of the largest and best documented cluster of urban villages, collectively known as Zhejiangcun. It was here that researchers first described the village-led urbanization process that would spark many subsequent studies across China (Beja & Bonnin, 1995; Leaf, 1995; Leaf et al., 1997). In Ma and Xiang's influential paper *Native place, migration and the emergence of peasant enclaves* (1998), they describe how in the 1990's native-place attachment led to the clustering of migrants from Zhejiang province in several villages just south of Beijing's old city. The land of five administrative villages, became interspersed by small garment factories and wholesale retailers. By 1995, more than 100.000 people were living here, of which more than 80% were migrants. It constituted one of the largest centres for garment production and distribution in China, that even warranted specific mention in Davis' polemic book *Planet of Slums* (2006, p. 112), in which he called it a 'sprawling slum'. The municipality recognized Zhejiangcun' potential and designated the Dahongmen district it which it lies, as an official garment centre in their own policy documents (Jeong, 2011). Profiting from the established economic links, formally built garment stores gradually replaced the informal garment distribution – allowing the government revenue on sale of land and tax income. As of 2018, Shicun remains as the last village in such close proximity to the old city – but for how long?

**Urban design**

Shicun is one of the five administrative villages that originally constituted the Zhejiangcun area. It lies along *Dahongmen* road which connects the southern city gate of Beijing' old city to a crossing across the *Liangshui* river, which runs directly south of Zhejiangcun. Even before urbanization Shicun was a mixed community, constituted by five *zircancun* – Macun, Dengcun, Haihuisi, Houcun and Gaohuang. Interviews with the villagers revealed that each of these communities originally had their own ancestral hall, but none remain today. After years of incremental change, involving both amalgamation and removal, the traditional urban fabric is hardly recognizable. Morphologically, the main feature that survives are the small plots ranging between 100m$^2$ and 200m$^2$ on a cardinal alignment. Most laneways are 3 to 4-metre-wide and oriented in a north-south or east-west alignment – see map 4.3. In addition to the in-situ reconstruction within the traditional fabric, there are also many *dayuan* complexes. These complexes were built by developers and state-owned industries on land leased from the village. The parcels between 2000m$^2$ and 8000m$^2$ in size have each been fitted with a urban design that subdivides the land into small rental units. The population of each *dayuan* has earlier been estimated at 400 to 2000 migrants (Leaf et al., 1997). Apart from their southern orientation, these units have little in common with the traditional fabric. The *dayuan* has narrow 1 to 2-metre-wide laneways, spaced between 7 to 8 metre apart allowing back-to-back units of between 10m$^2$ and 20m$^2$ such as can be seen on image 4.4c&e.

Satellite imagery indicates that in 2002, the residential area of Shicun still consisted of around 50 ha, featuring just over 20 *dayuan* complexes. While the state had sporadically demolished buildings in the village,most notably in 1995 (Beja & Bonnin, 1995; Leaf et al., 1997), 2007 marked the start of a period of rapid demolition. Demolitions focused primarily on *dayuan* complexes and other land-extensive industrial development. As can be seen in map 4.2, in 2018 only 25 ha of residential land remained, with only 5 *dayuan* complexes left. The tracing of these demolitions in relation to administrative boundaries reveals that the municipality acquired smaller parcels of less intensively used land at the edge of the each *zirancun* community, rather than buying up a single *zirancun* at a time. The demolition was not followed up with construction of new buildings and instead these parcels remained vacant – in some cases for more than 10 years – adopting temporary uses such as parking. Once section of the village that was cleared in 2008 was left vacant and was subsequently reoccupied by an informal market, which in 2013 was upgraded to a full-fledged market building. The piecemeal acquisition of land did not produce many consolidated plots that the municipality could sell to formal developers. The only major redevelopment that did take place was the

**4.2 figure ground**

building footprint

under demolition

proposed road network

**4.3 public space**

public space

1. market

2. school

3. Dahongmen road

M. Macun

D. Dengcun

Ha. Haihuisi

Ho. Houcun

G. Gaohuang

100m

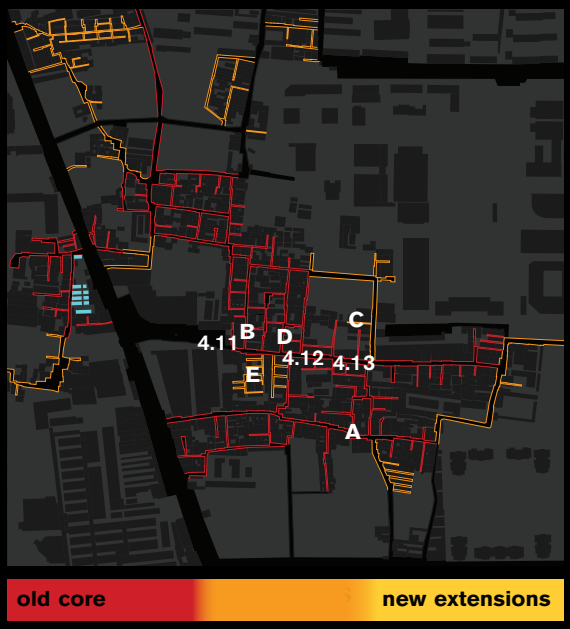
construction of a tower complex in the south-east corner of the village that rehoused most of the native villagers.

The piecemeal removal of the village has fragmented the public space network and lowered its accessibility to the surrounding city. While movement is easy within the village with small urban blocks of just 100 to 400 metre perimeter, the surrounding formal development has created considerable barriers to movement. Over time, the entire village has been embedded within a single 1200 by 1200 metre super block, constituted by 50-metre-wide roads. Connections between the village and this formal road network are poor. The southern edge of the super block, which was only built in 2014, widens an existing village lane, favouring motorized through-traffic over local pedestrian accessibility. The formal road network that is superimposed on the village takes little notice of the existing laneway network, anticipating the eventual removal of the village. Comparison with the official Beijing masterplan reveals that land acquisition and demolition primarily targets those parcels where a formal road has been planned. Formal development that has occurred on the edge of the village is entirely orientated on this new formal road network and has severely limited access to the village. While the traditional fabric and informal wholesale buildings usually provided through connections, linking in with the adjacent urban fabric, the demolished sites and temporary uses on them generally put up perimeter walls and created large impermeable urban blocks.

**Architecture**

The restricted connectivity has impacted the village's functional mix. Map 4.5 shows that Shicun' functional mix is concentrated along *Dahongmen* road, where easy access to the wider city has attracted wholesale markets, that each contain hundreds or even thousands of booths. From *Dahongmen* road, a series of lanes that provide entrance to the village are lined with small textile workshops intermingled with local services. The production and retail of goods relate in a symbiotic manner that has changed over time. The villagers narrated that initially, both production and sale of garments was managed by migrants. Entrepreneurial migrants opened their own (work)shops, employing their fellow *laoxiang*. Over time, the commercial-end became formalized in government supported retail-centres while much of the production moved to the periphery of the city. The remaining workshops became specialized in customized orders. Especially, with the rise of online retailers, an increasing demand for storage and ad hoc delivery, created a new symbiosis between these retail outlets and the adjacent village.

During this process of functional change, most courtyard houses have been replaced by multi-storey apartments. The reconstructed buildings



**4.4** Typical set of laneways for old core and new village extensions

reach a maximum height of four floors. The exposed brick construction of these reconstructed buildings emulates the brick-built courtyard houses they replace, often recycling the bricks from the former house supplementing traditional construction material with a new reinforced concrete support structure (Zhan, 2018, p. 1533). However, even this close to the city centre some traditional houses remain and the average building height is just two floors (see map 4.6). Likewise, most of the *dayuan* complexes are single storied, featuring no vertical incremental growth since their initial construction. A classic trope of informal urbanization would attribute this to the restraints imposed by the materiality of the dwelling. However, whether the *dayuan* are built from brick with pitched roofs and outdoor laneways, or in concrete with covered laneways(see image 4.4c&e), does not seem to make any difference in their lack of densification

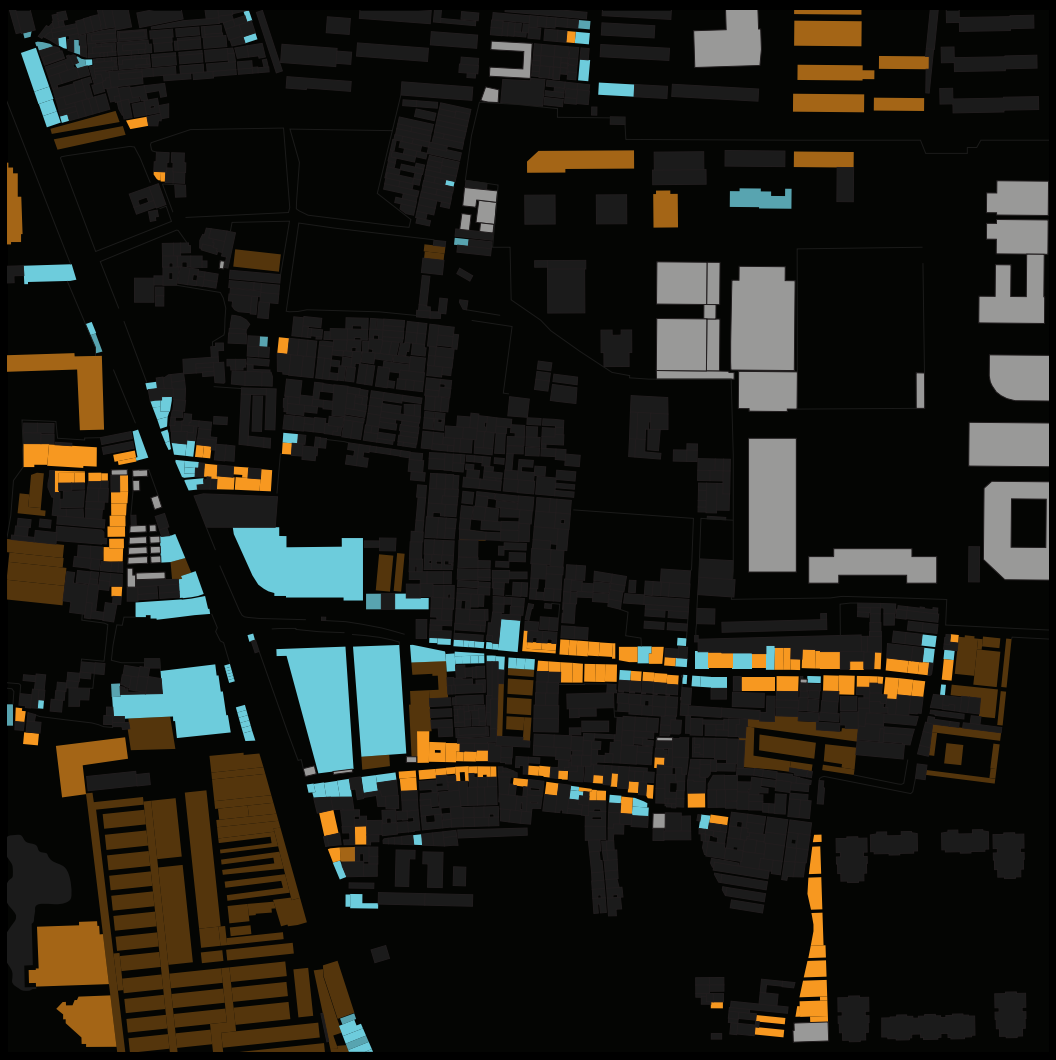
The changing functional relations engendered a densification process that required flexibility. Map 4.10 shows that the main lanes of the villages have a very high percentage of serrated edges – as can be seen in photo 4.12-13. The serrated edge creates flexibility for workshops that use this zone for spill-out and easy delivery. Along residential buildings , the edge is often occupied by semi-permanent amenities for the residents, incorporating functions such as toilets that were not originally part of the building. These plastic and metal sheet extensions often taken shape under cantilevered balconies that provide a more permanent fixture – as can be seen in image 4.12a. While cantilevering exist (see image 4.12b), map 4.9 shows that this practice is very rare. The wholesale markets also employ flexible zone at their edge, but on an entirely different scale. The large setbacks are primarily geared to parking, delivery of goods and incidental promotional events. This zone also provides space for hawkers – who are largely tolerated on the premise.

**Urbanity**

Interfaces are not only a zone of flexibility, but also of contention. The local government considers appropriations of public space problematic, as can be read from public notices posted in the village, urging the residents to clean up the laneways to reduce the risk of fire. Similar apprehension was conveyed in a 2017 municipal campaign to remove all commercial signs from the village. Image 4.13a-b shows the same lane several years apart – areas cleared of semi-fixed appropriations have been painted in a pattern of red and yellow bands – a colour combination associated with the government. Map 4.7 shows the various forms of appropriation in the village. A clear distinction can be seen between the wholesale markets, where parking dominates – to the village market, where commercial appropriation proliferates – to the area of garment production, where domestic

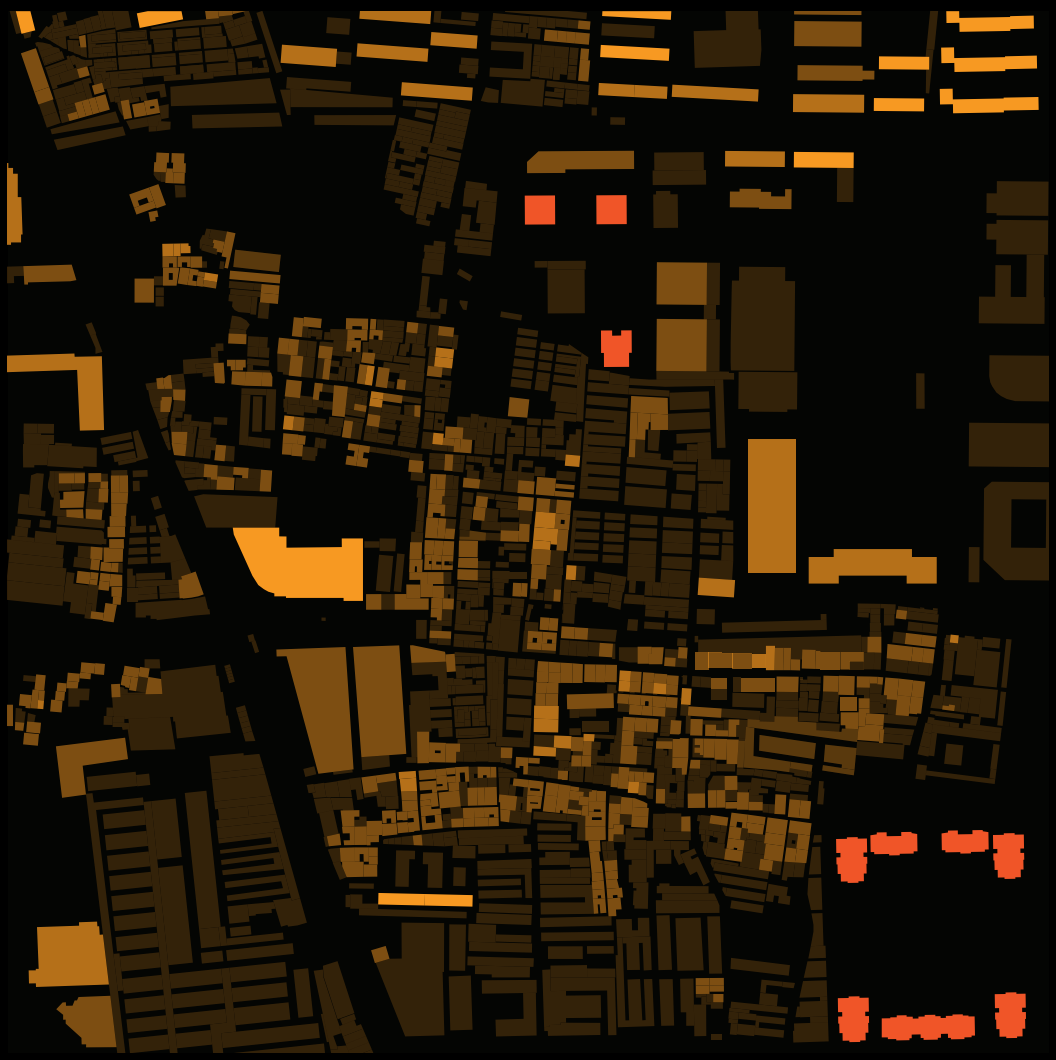
**4.5 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- production
- goods



**4.6 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

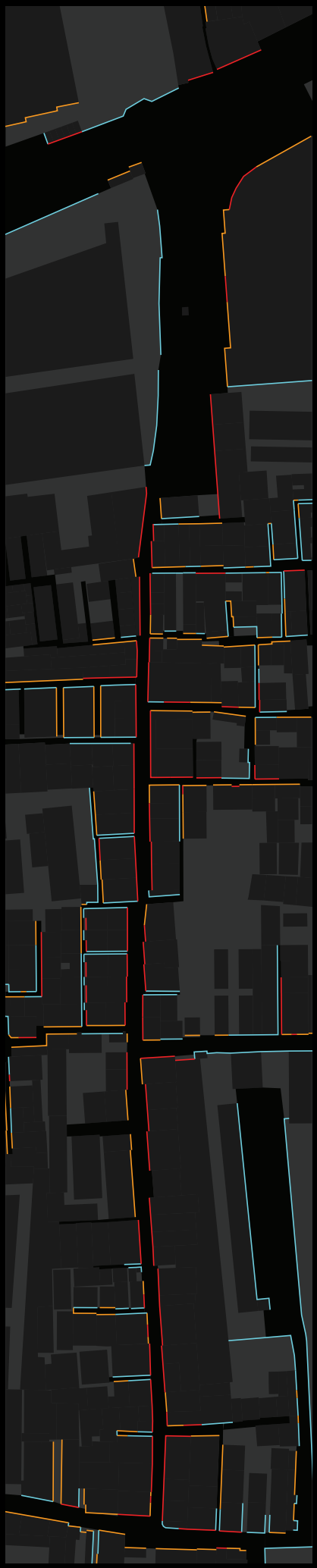
**4.7 appropriation**

- commercial
- domestic
- vehicular

**4.8 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi

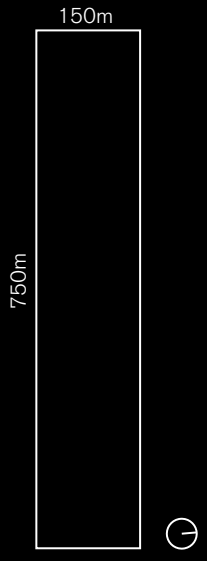


**4.9 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**4.10 interfaces**

- inpermeable
- permeable
- permeable & serrated



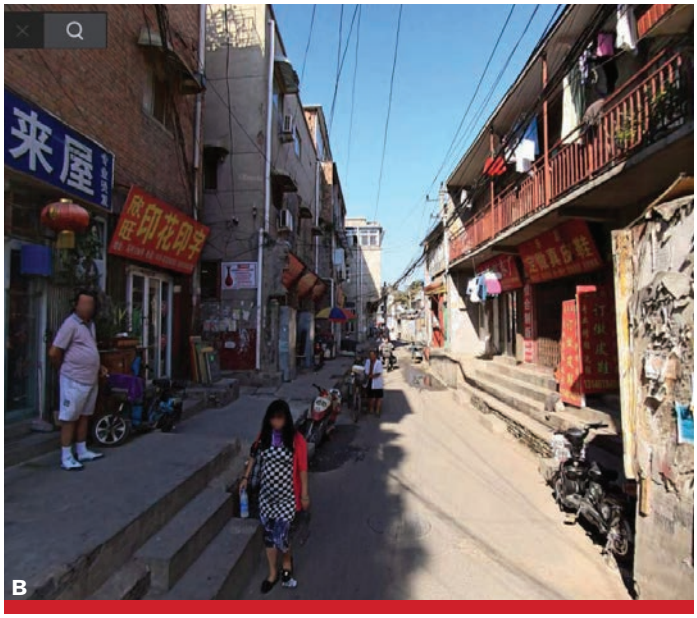
appropriation and parking of 3-wheelers are found. Image 4.4b shows the 3-wheelers that play an important role in the supply of small workshops and are used in the express delivery business. The most intense appropriation happens along the laneways of the *dayuan*, as can be seen in image 4.4c-e. Short-term appropriation and long-term storage are so prolific that it blends temporary structures and permanent buildings in almost indistinguishable manner. The intense appropriation is linked to the morphology of small units, which forces the residents to make use of all available space for such activities as drying of laundry, washing and cooking. It is also linked to the low-rise typology of the *dayuan* units, that have direct ground floor access to the laneway, as opposed to multistorey buildings that characterize much of the reconstructed old core.

The intensity and use of public space as shown in map 4.8 is geared to the village' functional mix. An average, of150 people were observed using the transect between 3 and 5pm, of which over half for stationary activities. The market and the connection to *Dahongmen* road is the busiest part of the village – see image 4.11. Produce is brought in by farmers from Beijing's periphery and is sold in the village-built market building mentioned earlier. Hawkers concentrate where pedestrian flow is the highest, on the edge of and along the more formal parts of the village, rather than inside the village,. A similar edge condition characterizes the distribution of stationary activities, which occurs in small groups spread throughout the transect. Inside the village, the serrated edges provide space for people to socialize (see photo 4.13a), while most people along *Dahongmen* road are waiting to transfer to other modes of transportation.

While periodic removal and demolitions have marked Zhejiangcun for decades, Shicun was left relatively untouched until demolitions started in 2008. The residents' daily life has increasingly been taking place among piles of rubble left from demolition and supplies for new formal construction. This is a process of 'creative destruction' in its rawest form. Jeong (2011) points out that the close relation between villagers, migrant businesses and local government has stalled their complete removal. The villagers refused to surrender their rural *hukou*, so they could continue to profit from the informal lease agreements, limiting the municipal government to piecemeal acquisition. The government nevertheless infiltrated the remaining parts of the village. The district government supplies the village with water, sewage and public toilets, providing a service, yet also make the village increasingly dependent on them. These services have been accompanied with CCTV cameras that monitor all the main entry points into the village. The lowered accessibility to a few entry points discussed earlier facilitates the ease with which they can be surveilled. Both through the passive government

**4.11** view of wholesale market upon exiting the village

**4.12** two ways in which a cantilevered balcony facilitates further appropriation




**4.13** laneway before government cleansing - photo sourced from baidu.maps

presence of these services, and active presence in the formalities of land acquisition, have made the residents aware that the future of the village is precarious. While the villagers have stalled complete removal for over two decades now, it seems like eventual removal is inevitable. This might be one of the underlying reasons for the fluidity between temporary and permanent forms of occupation as the residents have little incentive to upgrade any temporary features in permanent elements of their home in anticipation of demolition. Hence, the impending threat of demolition acts as a catalyst for the stagnation of the village into conditions that justify that demolition.

## Hengjiezicun

**Hengjiezicun lies about 14 km south-east from the forbidden city, nestled immediately north of  where the 5th ring road meets the Tianjin-Beijing expressway. While most of the land beyond the 5th ring road in the suburban Daxian district has been cleared from villages more than a decade ago, Hengjiezicun in Chaoyang district has been spared. Over the last three decades the village quadrupled in size, extending from several clusters of traditional courtyard houses into a patchwork of residential extensions, small industries, and commercial establishments. Local employment opportunities and frequent bus connections to the city centre, make the village a desirable place for migrants to settle. With an estimated 40.000 residents, Hengjiezicun is one of the densest urban villages in Beijing – but to what degree has that deteriorated its urban environment?**

### Urban design

The old village core is structured between two parallel pre-urban routes – a canal and main road that both connected Beijing to its agricultural hinterland. The old core consists of several clusters that are recognizable through their shared morphological features. The main 3 to 5-metre-wide lanes are aligned east to west (see photo 4.17a), while narrower north-south lanes provide connection between these and the plots that align them. The traditional plots vary in size from 12m to 20m wide by 18m to 25m deep, resulting in 200m$^2$ to 500m$^2$ plots. These large plots originally had courtyards which through their southern orientation could take maximum benefit of the winter sun. The main public space of the village is also on an east-west alignment and connects important village buildings such as the school and market (see map 4.15). According to the villagers, the ancestral temple used to stand here as well, but was removed during the cultural revolution.

**4.14 figure ground**

building footprint

waterbody

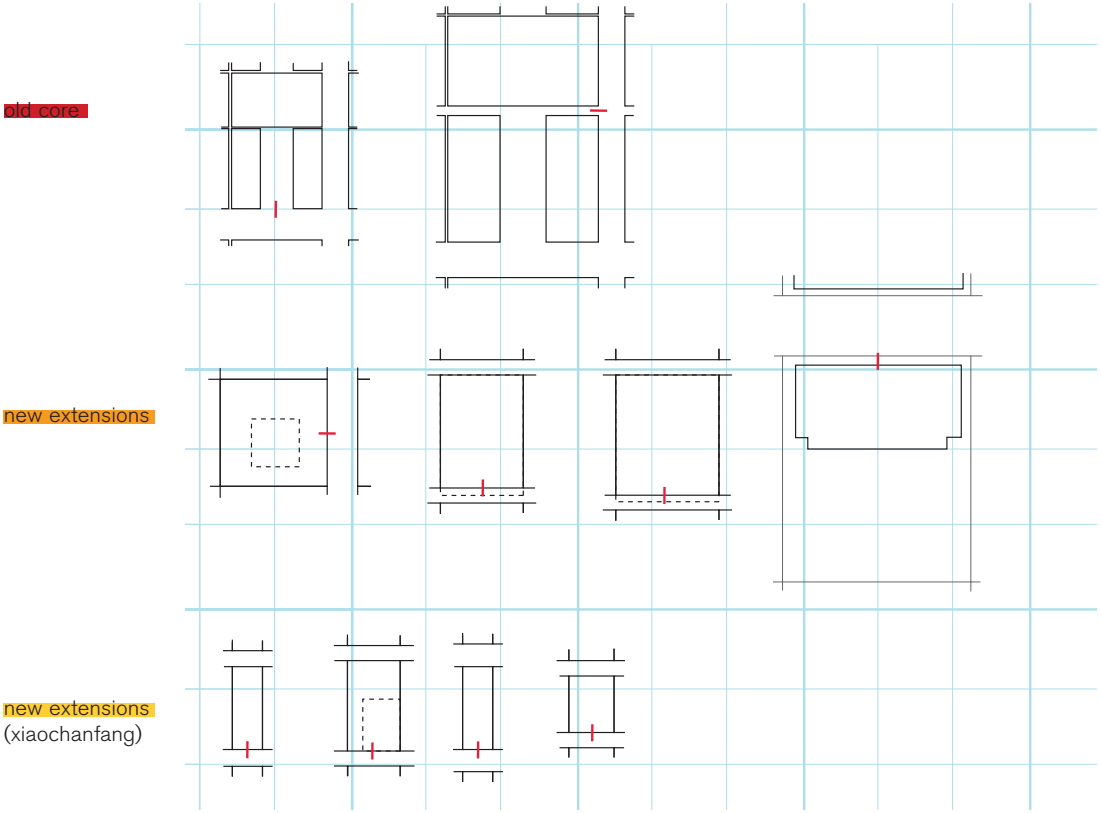
**4.15 public space**

public space

1. market

2. school

100m




**4.16** variations on plot-level in urban design of new village extensions

Satellite imagery indicates that the last farms of the village were converted to urban use in the early 2000's . The traditional village clusters amalgamated with numerous semi-planned village extensions into one continuous urban area. These semi-planned extensions are both village-built and developer-built and distinguish themselves morphologically by their intended user-group. The first series of extensions was intended for local villagers and closely emulated the plot size of the traditional morphology. The dimension of the laneway network ranges between 2 and 4-metre-wide (see image 4.17c) but is generally more fine-grained – often with lanes on opposing sides of the plot. As in the old core, these were filled in with south-facing courtyard houses, built by the families that occupied them. Using some of the proceeds from the sale of agricultural land, the village then proceeded to develop the area due west of the village market area, were both urban design and architectural infill were managed by the village collective. Photo 4.24a shows the 46 identical dwellings that were built along 4-metre-wide dead-end laneways. A third extension was planned to the north-west of the village, where a large semi-gated compound was built with detached villa's, emulating the spatial language of nearby middle-class communities. The plots were bigger at 700m$^2$ and eliminated the introverted courtyards in exchange for setbacks.

**4.17** Typical set of laneways for old core and new village extensions

Much of the village extended by leasing out land to developers – developments also known as *xiaochanfang. The current residents narrated that* in the 1990's several parcels were leased to nearby factories, who developed small residential units for their labourers. The largest covers 2.5ha and its 400 units are organized like a gated community with a single entrance. The 32m$^2$ units are arranged in rows of eight, facing south along 3.5-metre-wide laneways (see photo 4.17d). Other *xiaochanfang* have a similar typology, and this typology was eventually also picked up by village-built extensions. When a formerly green open space that diagonally crossed the village was filled in the 2000's, the northern section was built as a company asset, while the southern section was built as a village asset. Both extensions where intended for migrant workers and they subsequently follow a very similar typology in which the southern orientation is disregarded in lieu of maximizing the developed units by aligning them with the configuration of the available land. Figure 4.16 shows the range of plot dimensions generated in these new extensions and how they compare with the dimensions of traditional plots. While the plots intended for migrant labourers remain roughly consistent across the various extensions, the plots intended for local villagers are experimented with – each subsequent adaptation incorporating new changes.

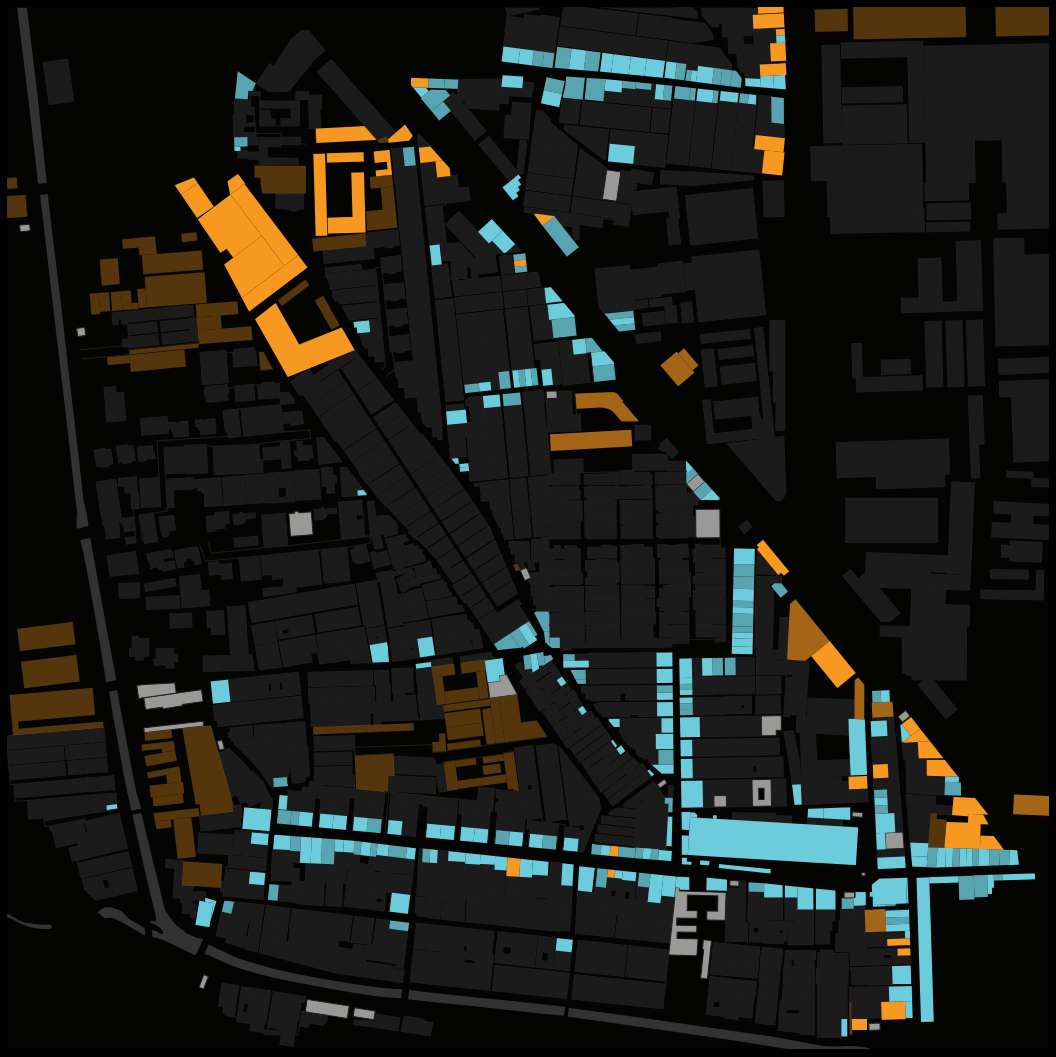
The distinction between village-built and developer-built extensions has the largest impact in the way they connect to the surrounding urban fabric. The village-built extensions are much better integrated with the surrounding urban fabric than the areas that have been leased to developers. This is most evident is the extension that diagonally crosses the village, with the southern section well integrated with the surrounding lanes while the northern section only has two entrances and creates a large barrier to movement. Map 4.15 shows the aggregated effect that these various extensions have had on the permeability of the village. The urban blocks in the old core have an average perimeter of 400 metre, while the village extensions generally have much smaller blocks at 200 metre perimeter. The urban blocks that contain *xiaochanfang* have a fine-grained laneway structure, but these do not contribute to through movement and the outer circumference of 700 metre presents considerable barriers to movement.

**Architecture**

Movement and adjacency play a structuring role in the functional mix of Hengjiezicun. Map 4.18 shows that most commercial activity is along the wider lanes that directly connect to the main road. The village-built market along the main public space of the village acts like a hub and was upgraded in 2009 to a double storey multi-function shopping mall. While the functional mix seamlessly spreads through the old village core and village-built

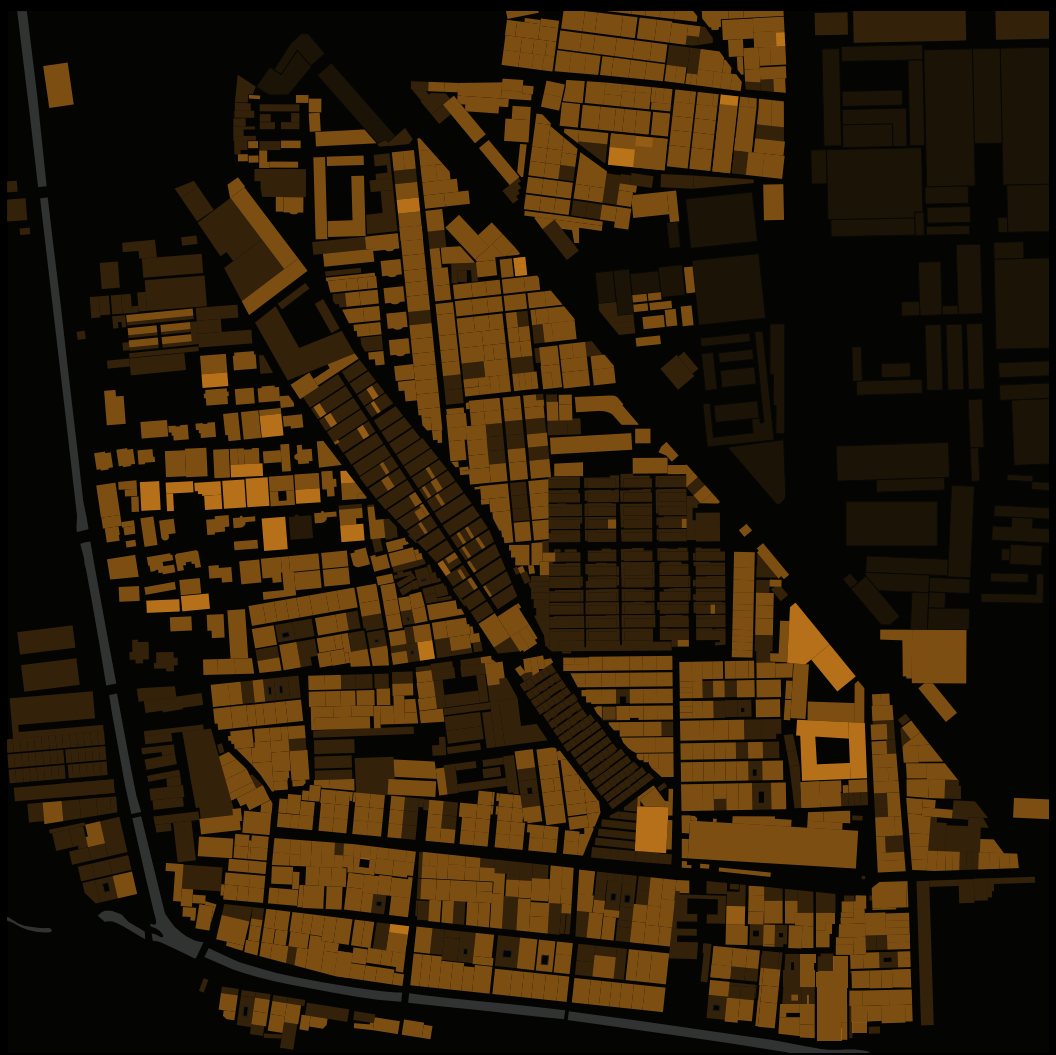
**4.18 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- goods
- production



**4.19 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

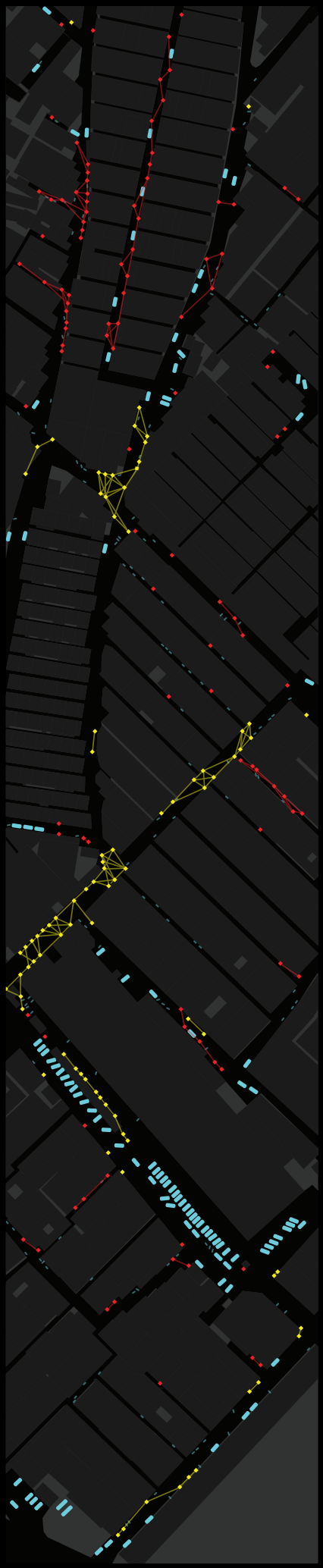
**4.20 appropriation**

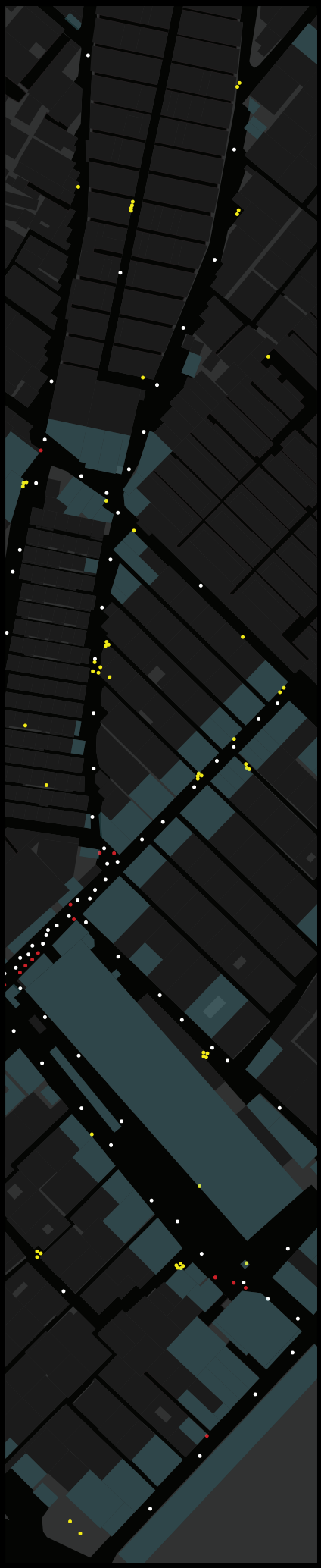
- commercial
- domestic
- vehicular

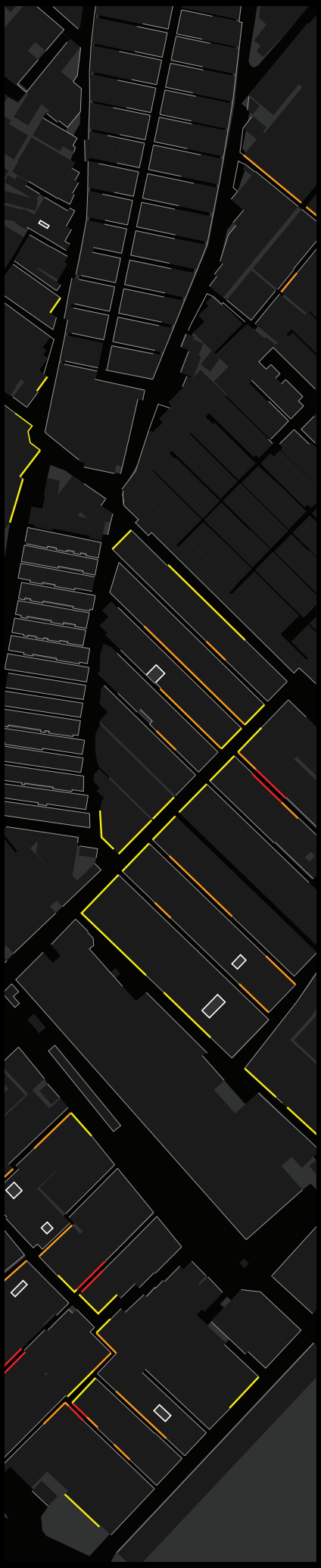
**4.21 activities**

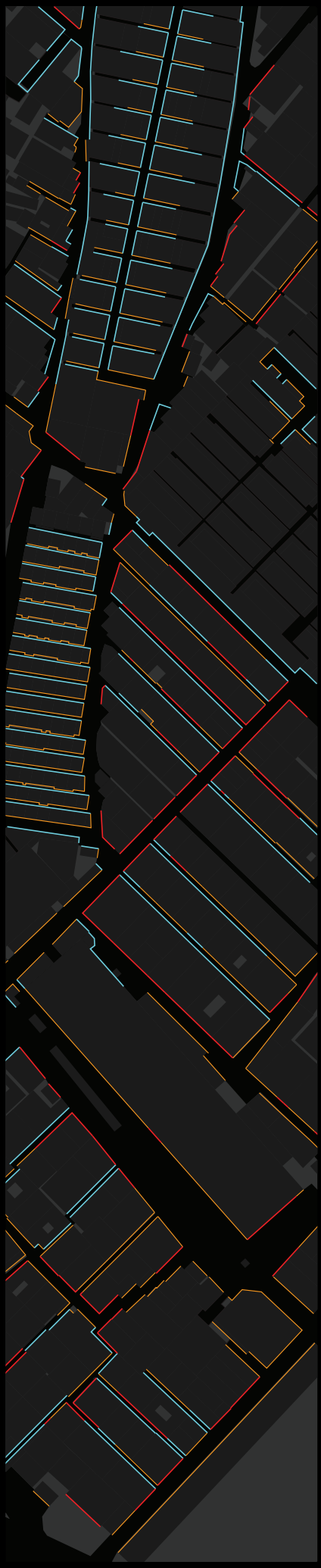
(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi







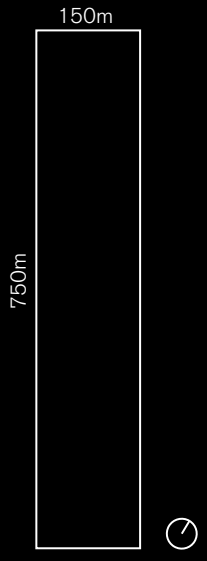


**4.22 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**4.23 interfaces**

- inpermeable
- permeable
- permeable & serrated



expansions, it does not penetrate any of the *xiaochanfang*, further setting these developments apart. The main road that connects to Beijing city centre includes many bus lines and the functional mix here is geared towards increased visibility – including hotels, middle-class restaurants and car dealerships. While there are a few small-scale industrial enterprises along this main road, most other industrial uses happen in dedicated compounds on the village periphery and are not intermixed with the other functions.

Since Hengjiezicun started to urbanize, an estimated 40.000 migrants have settled in the village. As demand for housing increased, the original architectural infill densified, but the way in which varies in relation to the urban design. The parts of the villages that originally had courtyard houses, which includes both the old core and village extensions intended for local villagers, underwent a two-step densification process. While a few traditional courtyard houses remain (see image 4.17c and 4.23), most have been reconstructed as 2 to 3 storey apartment buildings (see 4.17b). The final reconstruction however obscures an intermediate stage that is critical in understanding Hengjiezicun's incremental densification Initially, many courtyard houses could not afford full reconstruction, and an intermediary practice developed in which the courtyard was covered with a glass roof lantern, thereby generating an additional interior space (see image 4.24). This adaptation proved popular as it became a standardized element that was incorporated from the start in several subsequent village extensions. The larger plots of the extension with detached houses densified differently as the formerly open yards were filled in with 2 to 4 storey apartments buildings – in some cases replacing the original villa as well. These apartment buildings provide larger rental units with more amenities, geared to a higher social-economic group than the rental accommodation in the densified old core.

The *xiaochanfang* on the other hand have densified very little. The mixed tenure condition – leased from villagers, occupied by migrants, and built by developers – precludes incremental densification. In one *xiaochanfang*, the inhabitants had been able to acquire their unit from the developer and a series of second stories was subsequently added. However, the densification process stalled as local authorities had raised concern about the legality of these additions. Hence, most densification does not happen vertically, but horizontally, through a process of encrusting. The residents of the largest *xiaochanfang* have extended their units into public space – reducing formerly 8-metre-wide lanes to 4 metre, and formerly 3.5-metre-wide lanes to 1 metre. These extensions are always associated with the front-side of the unit, while the backsides remain unchanged. Photo 4.17e shows how even an additional 0.5 metre is considered worthwhile to

**4.24** remaining courtyard house with two layers of encrusting

**4.25** standardized units with built-in lantern – the houses intended for local villagers (left) show additional encrusting

**4.26** transformation of laneways through cantilevering

add. Notwithstanding the tenure situation, the low cost and direct benefit to the residents have made these adaptations proliferate. The practice of encrusting extends to villager-occupied plots, such as can be seen on photo 4.17c. The courtyard house marks the edge of the laneway that was originally 3.5-metre-wide. While the brick-built extension is still clearly distinguishable from the courtyard house, in the new multi-story apartment building visible in the background, that zone has been encompassed entirely in the new construction. Even the standardised units seen on photo 4.24a have been encrusted.

These crusts provide functional flexibility to the residents – especially in smaller houses they allow functions that were not originally incorporated like storage or toilets, while in larger houses they are also rented out as separate dwellings. This infill zone also provides flexibility for the addition of staircases to rental units on upper floors, that can be added and accessed independently from the main building. However, as built appropriations are added they generally reduce the functionality and flexibility of the shared public space. If the laneway is wide enough, activities can spill out into the laneway (see image 4.17d and 4.23) but this function is increasingly compromised with reduced laneway width. Those dwellings that wish to retain this function of public space prefer cantilevering out over public space, rather than encroaching it. Map 4.21 shows where cantilevering has taken place and a comparison with map 4.22 reveals that 80% of all cantilevering happens above serrated edges. While these serrated edges could be built-over – 'filling in' the space underneath the cantilever – there is a socio-economic incentive to retain these semi-public spaces. The *xiaochanfang*, not being able to perform such cantilevering, feature no serrated edges.

**4.27** serrated edges are occupied by built appropriations, losing its social function

**Urbanity**

Serrated edges such as seen on photo 4.17b, 4.23 and 4.25a provide a space for activities to spill out. Map 4.19 shows the intense clustering of commercial appropriations along the main through-lanes. This appropriation is often related to hawkers, who congregate in several of the busiest intersections of the village (see map 4.20). Domestic appropriation happens in two distinct ways. Impermeable interfaces such as the compound walls of the *xiaochanfang* along wider laneways, allow storage for longer periods of time. Residential lanes of 2-metre-width or more have domestic appropriation in the form of potted plants and seating. The intense appropriation is related to the limited parking, which mostly happens in a designated area around the market hall but is otherwise limited. The walkable environment and ample opportunities for appropriation contribute to Hengjiezicun's liveability. Map 4.20 shows the typical activity pattern in the transect between 3 and 5pm on weekdays, in which an average of 151 people were observed in the transect. Approximately half of the people were engaged in stationary activities, socializing in small groups spread out through the village. Image 4.26 show how the gradual built appropriation of serrated edges also reduces space for stationary activities.

The wide range of different plot sizes and building typologies has generated a highly heterogeneous community, providing space for people of various socio-economic backgrounds. Those migrants that were able to acquire their *xiaochanfang* plot have gained additional rights with a more permanent stake in the future of the village. Yet, the Beijing 2035 masterplan indicates that most of the village is destined to be demolished and transformed into an ecological zone. Unlike some of the smaller urban villages, Hengjiezicun' considerable size means it has more resources to challenge its impending fate. If the village has any chance of overcoming its fate, it needed to challenge the perception of its urbanization as 'chaotic' and demonstrate control over its urbanization, and secondly, it needed to address the environmental agenda that has been raised about urban villages as sources of pollution.

Hengjiezicun provides two examples of such a challenge. First, in 2016, the village agreed to co-finance the implementation of a coal-to-gas conversion project in collaboration with the municipality (see photo 4.17a-b). While the installation of the gas system is an environmental asset to the village, it also generates concerns about liveability. Image 4.25c shows how the elevated gas line deprives the laneway almost entirely of light and creates slum-like conditions at the ground level. While the village wide gas-heating system represents a sizable investment in the village and would make sense to implement as part of a long-term upgrading effort, it's worthwhile asking why the municipality would agree to an upgradation

project when they themselves have marked the site for demolition. As the gas-to-coal project is managed by a different department than the one in charge of compensation and demolition, this might simply be read as case of gross inter-departmental miscommunication and it is not entirely unlikely that the upgradation effort will be torn down soon after it has been completed. Second, the village committee has engaged in 'self-demolition' in an effort to demonstrate that its urbanization is not an uncontrolled relentless densification, but a rational urban design process. While a small section of the village was demolished in 2003, Hengjiezicun still owned most of its former agricultural land till 2017. It then sold most of the land it had leased to industries in its periphery through a standard municipal acquisition process. While these industries were subsequently demolished, the village collective took its own initiative in 2019 to take down several village-owned buildings within the residential section of the village, including several industrial compounds and the village-owned market. These were replaced with public parks and a large amount of parking (many villagers got rich from the previous municipal sale of land) While removing several profit-generating premises and lowering the village's functional mix, the self-demolition generated an image better aligned with municipal concerns and perhaps secured the long-term livelihood of the villagers.

## Magezhuangcun

**Magezhuangcun is a village 18 kilometre east from the forbidden city. Well beyond the 6th ring road, the village lies at the edge of Beijing's built-up area and agriculture was still practiced here till 2016. Magezhuangcun's urban environment provides a contradictory experience – houses without proper sanitation, but with expensive cars parked in front – houses fitted with cheap plastic sheets against leaking, but with state-of-the-art solar power lighting and CCTV cameras. These contradictions flow from a decision that has been made about Magezhuangcun's future. The village was originally part of a densely patterned area of village settlement, but from 2004 onwards these villages have been demolished one by one. This accelerated pace of demolition so far out in the urban periphery, is directly related to a municipal decision to transfer all its administrative departments to nearby Tongzhou (C. Wong et al., 2018). This ancient city was largely razed – and Magezhuangcun at just 7 km away was prone to follow soon. The fieldwork on which the analysis is based was conducted a year prior to its demolition in late 2018 – but was its demolition necessary and what has been lost in the process?**

**4.28 figure ground**

building footprint

**4.29 public space**

public space

1. market

2. school/former ancestrall hall

100m

## Urban Design

Prior to its demolition, Magezhuangcun still had many of its traditional courtyard houses intact. Its residents could retrace the history of the village back to over a thousand years. During most of that time, the village was centred around its ancestral hall, but this building was removed during the cultural revolution and replaced with a primary school, according to the residents. Directly south of the former ancestral hall lies the oldest part of the village. The figure ground 4.26 shows a densely built-up area, loosely organized in a patchwork of elongated blocks. The courtyard houses within them all face south to take benefit from the winter sun. As plots were added incrementally, based on the perceived need of the family that requested land from the village committee, there is considerable variety of plot sizes in the old core, ranging 200 to 400 square metres. The laneway network was also added to incrementally, evinced by the substantial number of dead-end lanes (see photo 4.29b) that provide access to those plots deeper inside the block. The dead-end lanes of the old core are predominantly in north-south direction, while the wider main lanes tend to run east-west (see photo 4.29a)

In many ways, the same process of incremental growth continued through the rapid expansion of the village in the 1980's and early 1990's when the village more than doubled in size from 20 ha to 50 ha. However, as the need for housing accelerated, rather than assigning individual plots to families, entire clusters of plots were added to the village. These clusters were added along existing inter-village routes and emulated the east-west direction of the laneways in the old core (see photo 4.29e). As they are laid out in clusters, the plots here show less variation in size than the older part of the village (250 to 300$m^2$) and have their entrances more consistently facing south. The laneways are more fine-grained with less dead-end laneways, allowing every plot to face public space on at least two sides. As the building typology is the same as in the older part of the village, they are almost indistinguishable to a contemporary visitor. A third phase of growth started in the early 2000's, when much of the village's peripheral land was leased to industries. The large plots of these industrial compounds are organized with their own internal access structure, encrusting the village and limiting access to a few main roads that provide through connection. By 2008, the last agricultural land to the south and west was built upon and even two former waterbodies within the village were filled in and used for community open space.

## Architecture

Over the years Magezhuangcun developed as a specialized centre for the construction, storage and distribution of equipment used for outdoor

**4.30** Typical set of laneways for old core and new village extensions

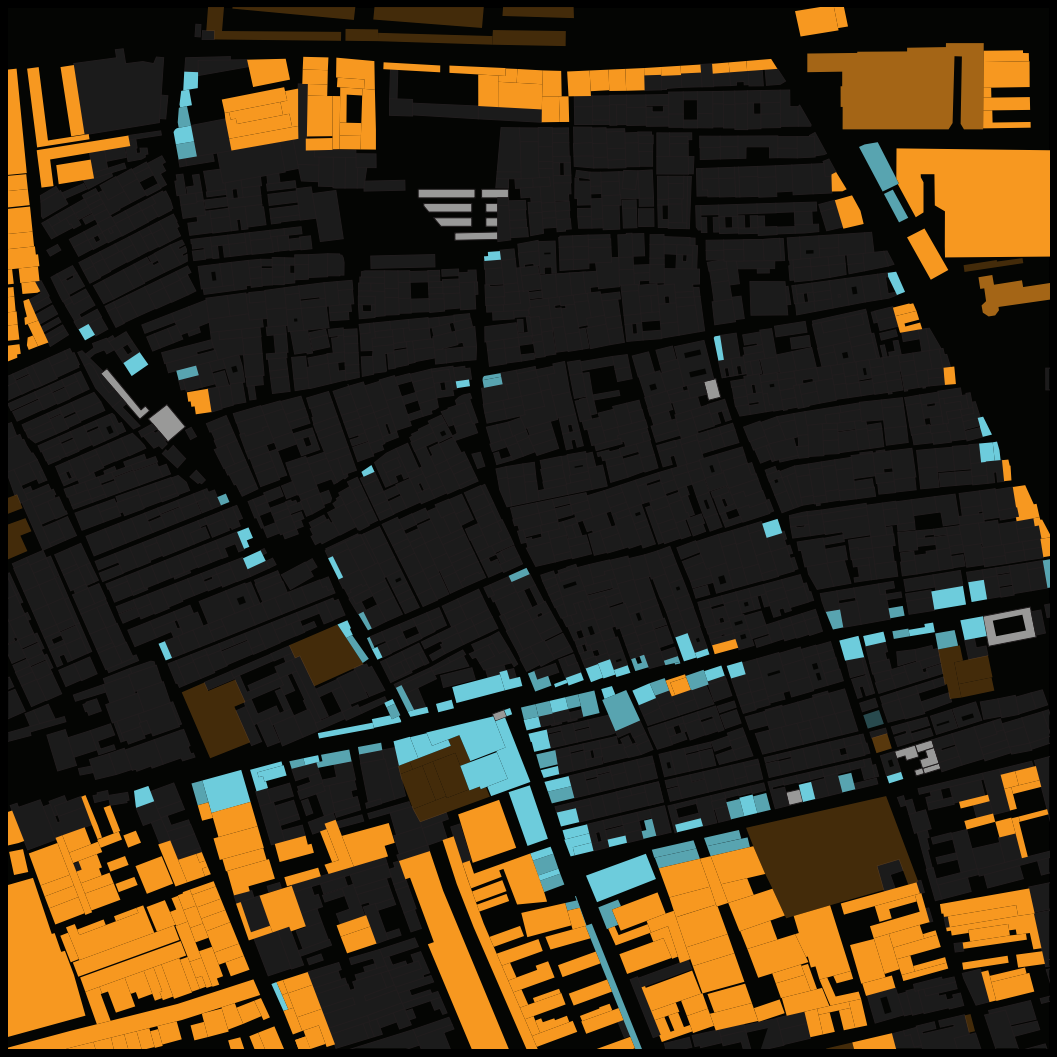
advertising and exhibitions. While the village as a whole has a high degree of functional mix, combining production and consumption of goods in the same neighbourhood, these uses remain distinctly segregate – see map 4.30. While there is no formal land-use plan that aims to achieve this segregation, through the village committee's ability to control lease agreements they kept industrial uses separate, yet within walking distance of the residential area of the village. Except for a few neighbourhood shops, most of the commercial activity is at the boundary between the residential and industrial parts of the village, so that the diners and other shops can cater both to the residents as well as the industrial workers. At the centre of this commercial axis the village built a covered market hall.

Up until the late 2000's most of the village consisted of traditional single storey brick courtyard houses, known as siheyuan. The siheyuan in Magezhuangcun are all single-courtyard dwellings, which are considered the smallest courtyard house configuration within the context of Beijing. As all siheyuan are roughly orientated south, the location of the entrance depends on the orientation of the laneway. The siheyuan in the oldest part of the village have their entrances mostly at the side (see image 4.29d) – in between the main house and the side building – while courtyard houses in later village extensions have south-facing entrances (see image 4.29e). Due to Magezhuangcun's peripheral location, the village never attracted many migrants, and local villagers generally refrained to invest in the reconstruction of their old courtyard houses. Rather, buildings densified incrementally as additional structures were built on top of the existing courtyard house as seen in images 4.29a&e. These light-weight structures of industrial sheeting from plastic and metal provide a dual purpose – to protect the old roofing material of the siheyuan against rain and snow and to provide additional rental space for migrants. As these structures often cover the entire plot, the former courtyard becomes an internal space and the bright blue colour of the corrugated steel makes it possible to track the use of this practice over time in satellite imagery. Within a few months in early 2010, such adaptations went from just a handful to cover 70% of all dwellings. In fact, these changes were not limited to Magezhuangcun and many villages across Beijing's periphery adopted this practice at the same time.

Map 4.31 shows where this transformation has taken place and increased the height to two, sometimes even three stories. In subsequent years however, the municipality has cracked down on these additions and many now stand vacant. Even though two storey buildings in villages are allowed according under Chinese law (Urban and Rural Planning Law, 2007), the Beijing municipality suspected their use as migrant accommodation and subsequently actively repressed these additions.

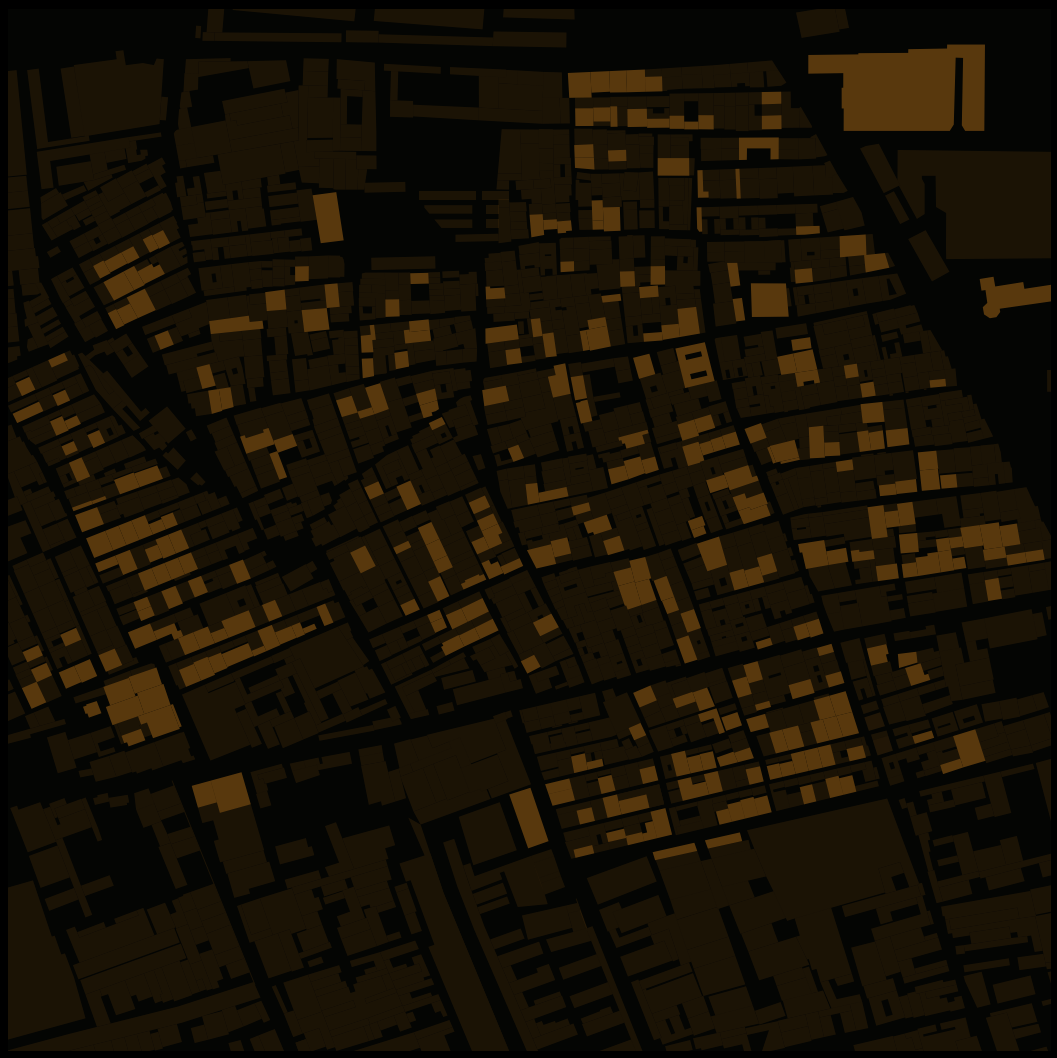
**4.31 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- production
- goods



**4.32 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

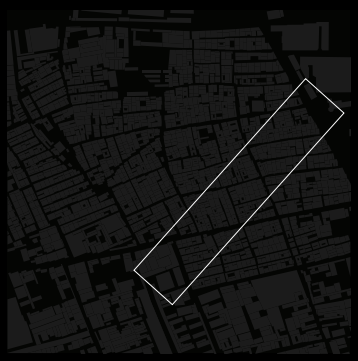
**4.33 appropriation**

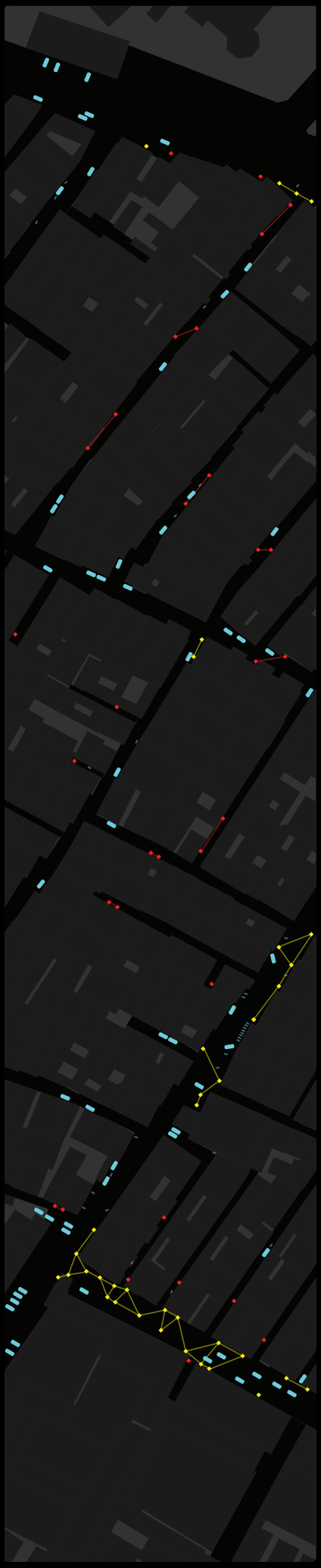
- commercial
- domestic
- vehicular

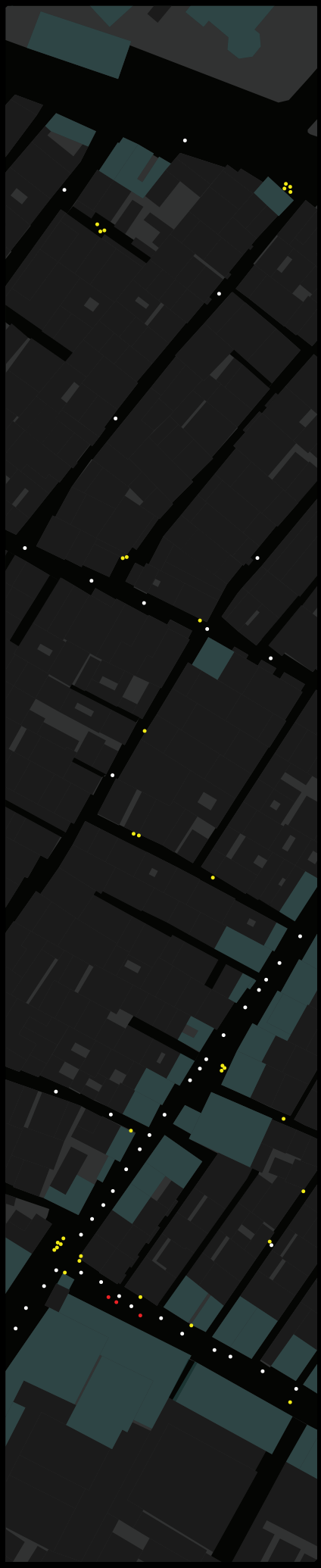
**4.34 activities**

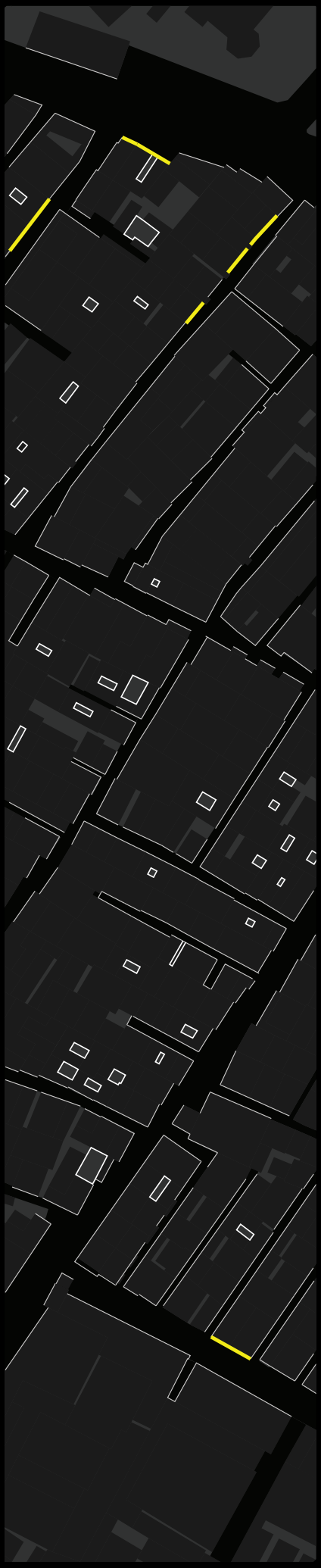
(3pm-5pm weekdays)

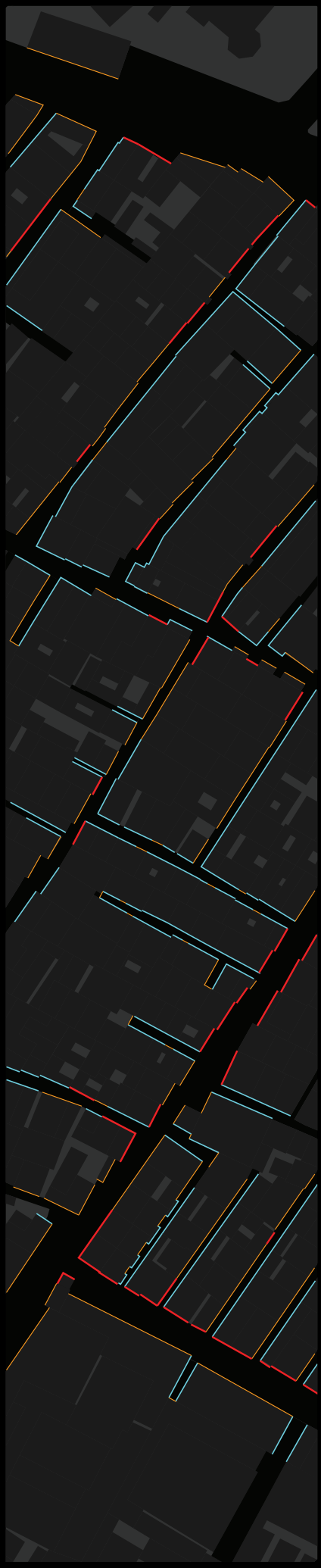
- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi









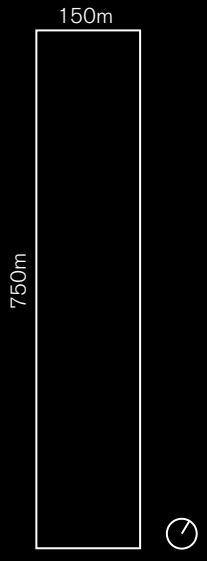


**4.35 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**4.36 interfaces**

- inpermeable
- permeable
- permeable & serrated



Public announcement posters found in the village make it clear that the rural migrants are considered illegal and that local villagers who offer rental accommodation to rural migrants, risk forfeiture of their right to future compensation.

In addition to vertical extensions, there is also considerable encroachment of the laneways. Image 4.29e shows the most common practice in which brick-built additions are extended several metres into the laneway. The original *siheyuan* remain largely residential and any new functional mix is absorbed in the transitional zone around the courtyard house encrusting the building in the process. The horizontal extensions are possible because light is provided through the internal courtyard (see map 4.34). These adaptations occupy the space on either side of the main entrance, while still permitting access. As most building entrances face south, these additions are more common along east-west laneways. Image 4.29b shows how the inhabitants decided to use the front interface for a commercial adaptation about 2 metre in width and keep the side interface free from any additional structures. Map 4.35 shows that most interfaces along the side and back of the house are completely impermeable. While ground floor encroachments are very common, map 4.34 shows that cantilevers are very rarely used in the village. This is linked to the low built density, but also to the aforementioned metal and plastic construction technique that makes cantilevering difficult.

**Urbanity**

The distribution and orientation of built encroachments frames the appropriation of public space. Map 4.32 shows that there is only limited appropriation, which occurs mostly along the main street and is associated with commercial uses such as seen on image 4.29c. Domestic appropriations were few and tended to happen along the southern edge of the house, as this is where the main entrance is. The opposing northern interface rarely features entrances and generally lacks any appropriation, such as can be seen in image 4.29e. As most lanes in the oldest part of the village are quite wide, they almost all allow car access. The public space is predominantly used for the parking of cars, which happens most often along blank interfaces. The use of public space for cars also explains why villagers would prevent appropriations that would limit such use. While most of the daily life happens inside the courtyard houses with little spill out, the activity survey visualized in map 4.33 still shows that an average of 78 people were observed using the transect, out of which almost half for stationary activities.

The Beijing masterplan states that the village is planned to become an ecological zone. Compensation and rental income made some villagers

wealthy, but as the prospect of demolition loomed over the village for years prior to its final demise, there was little incentive to invest in the upgradation of its built environment. This government-induced stagnation became a self-fulfilling prophecy – its lack of development demonstrating that the village is not worthy of preservation. Unlike the characterization of Beijing's urban villages as overcrowded and lacking social order, Magezhuangcun displays neither. Adequate access to motorized vehicles and functional segregation do not fit the characterization that is generally used to justify village demolition. While *hutongs* and *siheyuan* are protected in central Beijing, the architectural features of the traditional dwellings in Magezhuangcun and embedded cultural practices – such as on image 4.19 – are not considered worthy of preservation by the municipality. In 2017, a 20ha section of the village was already demolished to make way for a waste recycling and incineration plant (Ming, 2017). Social media accounts and satellite data shows that the whole village was abandoned in early 2018 and subsequently demolished in late 2018.

## Comparison

Beijing's municipal practices have been geared towards the long-term removal of urban villages and its inhabitants. The development of urban villages is framed as a 'transitional phase' that will eventually give way to 'fully urban' communities. In this logic, urban villages have been "passively urbanised" and should be converted to "real urban areas" (Xu et al., 2018). The need for demolition is also grounded in the belief that villages have limited capacity to self-organize their development and require government support to assist in their upgrading (C. Wong et al., 2018). Through the extensive description of the spatial development of Shicun, Hengjiezicun and Magezhuangcun this chapter critiques this narrative through two key insights that emerge from their comparison. One, urban villages are actively suppressed which has induced horizontal densification and slumification, which in turn provides an argument to demolish them. Two, the spatial rationale deployed against urban villages which centers on low density, chaotic land use and insufficient infrastructure is fundamentally flawed. Beijing's urban villages are primarily organized through a socio-spatial ordering principle in which traditional morphologies are emulated into new urban forms. While this research attests incremental upgrading practices and the local potential for villages to organize their own development, the current policy framework severely reduces that potential.

Different morphologies have different capacities to densify. Beijing's urban villages extend through spatial practices that link specific morphologies to designated user groups. This is not only apparent is their architectural aesthetic, but also in the plot size and laneway structure, which affects their potential to adapt and densify. Housing intended for local villagers emulates the old core in plot size and laneway hierarchy. It is distinct from housing intended for migrants that emulates the morphology of work-units and from housing intended for middle-class that emulates villa-communities. Only the housing intended for local villagers shows significant vertical growth, often made through temporary additions that experiment potential for more permanent additions. While the morphology has the capacity for densification, the intensive municipal repression to curtail this capacity, leads to ever increasing horizontal growth, making much of the informality so loathed by the government self-induced. In part, this is the result of the municipal restrictions on building height, that leave villagers who rely on rental housing for their income with only one option – to fill up every public open space in the village and encroach upon the laneways. The traditional fabric consists of relatively large plots along comparatively wide lanes – and this leaves plenty of open space to be filled in. This process can be demonstrated by comparing the lanes in the traditional fabric of Magezhuangcun which are wider than in Hengjiezicun, which are in turn wider than Shicun. In all three cases the ground floor is incrementally encroached, resulting in a informal crust of around the traditional houses. This crust is a flexible zone that is used for secondary uses including temporary appropriation and more permanent infill such as shops, amenities, or staircases. The encrusting process is mediated by traditional orientation – it is most intense at the south-facing front interfaces, and much less at the north-facing back interfaces. Because no formal plot boundaries exist, horizontal encroachment can happen relatively unnoticed , intermediated only by local coordination, while the increased visibility of vertical extension attracts municipal attention and potential intervention. While the municipal government supplies services such as sewage and gas that support village life, the larger story is that they restricts most incremental development and uses various tactics to deter the village's improvement.

While official sources have expressed concern about social disorder in urban village (Y. Wang, 2016, p. 170) and the presence of 'low-end' people (Chan, 2018; Yuwen, 2018), the municipality has aimed to underpin the demolition of urban villages with a spatial rationale so that it can be perceived as operating a 'rational planning apparatus' (R. Liu, 2015). This research demonstrates this spatial rationale is inconsistent at best and insidious at worst. The first rationale revolves around density. Beijing lacks a formal building code for village development, which generated a condition

of “suspended regulation”, where the local municipality is the final arbiter on any new development. While the 2007 Urban and Rural planning Law formally allows two-storey buildings, its application in Beijing is inconsistent. While floor-to-area ratios in urban villages are close to national objectives of 2.0 (Zacharias et al., 2015, p. 261), the villages have be blamed for ‘sprawling’ (Deng & Huang, 2004) as well as being too dense. The wholesale demolition and reconstruction of other villages in Beijing has shown that densities are reduced at huge financial costs (Gu et al., 2015; Lin et al., 2014). Established municipal practices that link compensation to plot and building size, act as a deterrent to the formulation of a formal building code that would allow further development and potentially escalating compensation costs. In other words, a legal FAR *limit* would likely *encourage* multi-story development in villages. The current municipal redevelopment model is dependent on suppressing village development.

Apart from the density rationale, there are two other spatial rationales condemning urban villages – they are claimed to have incompatible and chaotic land uses and insufficient infrastructure . However, this research demonstrates that urban villages have a highly symbiotic functional relationship with the city and often provide better local accessibility than surrounding formal development. This symbiosis is also made possible by a morphology that supports an interconnected set of different laneway and plot sizes. Villages provide an environment that is more walkable than formal development. By demolishing urban villages, the city loses a critical asset not only in the supply of affordable housing, but also in the associated morphology that supports functional mix within the village. In the case of Shicun this symbiosis happens on a neighbourhood scale between the production and storage of garments along the laneways of the village, and the sale of garments along the main roads of the city. Symbiosis in Magezhuangcun happens on a city scale, where local production of exhibition equipment allows Beijing to cheaply operate large-scale international events. While urban villages are claimed to have chaotic land use, in both Hengjiezicun and Magezhuangcun there is little mix of industrial and residential functions within the same building. A self-organized process of functional clustering segregates commercial uses, most often along the traditional east-west lanes, just like in the old city of Beijing.

The future of Beijing’s urban villages is bleak. Jeong (2011) documented the shift from a ‘low-end’ alliance with migrants to a ‘high-end’ alliance between the local government and real-estate developers, resulting in the gradual demolition of the villages and displacement of its residents. This research demonstrates that the removal has accelerated in pace and critically has shifted from piecemeal acquisition to wholesale removal.

The piecemeal removal that characterized the period in the early 2000's, provided the villagers with funds to upgrade and densify the parts of the village that remained. The piecemeal acquisition followed a clear pattern that was inverse to the extension process, starting with the acquisition of land-extensive industries and warehouses, then low-density *xiaochanfang* and finally the denser villager-occupied plots. As wholesale removal has become more common in Beijing, the spatio-economic process that allowed incremental upgrading with financial compensation from acquisition is disappearing as well. To an extent, there are socio-spatial similarities between the current processes in the village and those happening in the central *hutongs* of Beijing several decades earlier. Removal of traditional institutions by the state – such as the ancestral hall – have arguably lessened the capacity of the village to coordinate urban development. Processes of self-organized functional mix and encrusting of traditional houses have been noted in the old city of Beijing too (Y. Wang, 2016). The dilapidated condition that prevailed in Beijing's *hutongs* similarly might be ascribed to municipal practices that forbad vertical intensification and migrant housing. A change of municipal policy has allowed some *hutongs* to be preserved architecturally although their role has largely changed from housing to tourism (Zacharias et al., 2015). A similar dramatic change in municipal practice is required if a same fate is to be averted for the urban environment of Beijing's urban villages.

# chapter 5 Guangzhou

Guangzhou's urban villages are among the densest and best documented urban villages globally. Guangzhou lies amidst a dense network of cities including Shenzhen and Hong Kong, which encompasses an urban region of more than 50 million people. Especially after the Chinese economy opened up in 1987, this urban region rapidly industrialized, earning the Pearl River Delta the accolade of 'factory of the world'. Hong Kong was the 'front-shop' to the 'back-factory' of the cities on the Chinese mainland. Urban villages have been crucial to that development – both in supplying affordable housing to the influx of migrant labour as well as in organizing much of the small-scale production that supplies larger factories (Leaf, 2007; Zhang et al., 2003). While other affordable housing arrangements such as hostels and construction sites exist in Guangzhou (see Chan, 2004; Hulshof et al., 2011), the primary form of informal urbanization are urban villages.

Guangzhou's urbanization is a dual-track urbanization – where state-supported formal urbanization develops symbiotically with village-organized informal urbanization (Shen et al., 2006). These two tracks are not on equal footing –urban villages occupy just 20% of all urbanized land but they house more than a third of the total population (Zacharias et al., 2013) and between 70% and 80% of all rural migrants (Yanliu Lin et al., 2011; Tian, 2008). Based on an estimated 18 million inhabitants living in the Guangzhou-Foshan twin city (Demographia World Urban Areas, 2016), that translates to approximately 6 million urban village residents. Authors such as Al et al. (2014), Davis & Brown (2011) and Kochan (2015) have argued that the spatial characteristics of urban villages have an important role in enabling the incremental improvement of migrant's livelihood. While migrants initially consisted mostly of single males, hailing from rural villages and employed in factories, the migrant population is becoming increasingly diverse. – most now have families and are self-employed or work in the service industry (Chan, 2004). About one eighth of all urban village migrants in Guangzhou have migrated from other urban areas, rather than rural areas (Wu, 2016). As average square metre rental prices are between half and a fifth of formal prices (Tian, 2008), urban villages accommodate not only rural migrants, but increasingly other groups such as students who cannot afford accommodation elsewhere in the city (He, 2015).

## Municipal practices

Urban growth and farmland requisition practices in China vary from city to city (Tian, 2008). Guangzhou's municipal practices towards urban villages take place within the context of the collectivization of land and the interlinked *hukou* system as elaborated upon in chapter two. Under this system, villagers have the legal right to develop their own housing in the old core of the village, known also as *zhaijidi (*Zhang et al., 2003*).* Increasing demand for housing incentivized many villagers to maximize the use of their land by densifying their plot. The Guangzhou municipality requisitions farmland for formal city and leaves the built-up village land to the villagers (Zhang et al., 2003). Financial compensation is linked to the total amount of developed floor area, and the dense built-up area of the village is left untouched to avoid the compensation and relocation fees associated with its acquisition. In addition, Guangzhou upholds a program of 'reserved housing sites' in which 5 to12% of the total farmland is allocated for self-initiated village extensions (Al, 2014). The spatial conditions of these new village extensions on the reserved housing sites are very different from the village's old core(van Oostrum, 2018). While slum conditions do exist, the majority of dwellings is in relatively good condition – more than three quarter of urban villages dwellings in Guangzhou for example have independent kitchen and bathrooms (Wu, 2016).

Villages mediate their urbanization through their own institutions. While the clan organizations that used to manage rural affairs have eroded in many parts of China, in southern China these organizations are still active. Even villagers who have moved overseas remain connected to their ancestral village and often invest in its development (Oxfeld, 2001). These bonds are reinforced by the continuing presence and maintenance of ancestral halls, that provide a physical space to commemorate family links among local villagers. During economic collectivization these clans formalized into village committees, which in turn formalized even more with China's economic liberalization into shareholding companies that build and manage real-estate much like a developer (Wang et al., 2009). Company shares cannot be sold but are distributed among the villagers, to whom it provides a steady income to supplement the rental income they derive from their own buildings (Zhu & Guo, 2014). The formalization of village organization is mirrored by a new generation of migrants, who often hail from cities or have been long-time urban residents (Liu et al., 2012). The formalization also extends to the rental agreements with these new residents, which are increasingly managed by written contracts rather than verbal agreements (Wu, 2016). Village level governance is engaged in urbanization in one of four ways.

The most straightforward way is direct construction by the village committee but this is relatively uncommon. The second way is when the village merely lays out an urban design, while the architecture is filled in by the villagers (Y Lin, 2011). The third way is when the committee leases out the land to formal developers who construct and subsequently sublet buildings (Liang et al., 2018). In the past, limited financial capabilities of the villages made formal developers dominant in the negotiation of the value of the land, but increasingly these relations are more equal (Liang et al., 2018). Finally, the village committee can even invest in land outside the village, but this practice is rare.

As Guangzhou's villages urbanized, municipal building codes have been adapted to keep pace with the increasing densities. While some authors have asserted that construction in urban villages is not subjected to any municipal building code (Tian, 2008, p. 290), interviews with residents revealed that all buildings in the village currently require a formal permit. During the 1980's, Guangzhou had no specific system for building approval in villages, but as their urbanization intensified, a set of simple rules was developed. First, any reconstructed building had to stay within the same building footprint as the original structure. In the old core these dimensions varied slightly, but in new village extensions these dimensions were fixed at 80 square metre. Second, a 50cm side margin was mandated to prevent the spreading of fire, while cantilevers were restricted to 80cm (Tang & Chung, 2002). Third, a municipal height limit was set on four floors (Tang & Chung, 2002), which according to interviews with villagers was recently increased to six floors. Finally, interviewed villagers also described a building approval application that requires the signed approval of four adjacent neighbours.. The application is lodged together with an application fee, which effectively functions like a deposit – on completion of the building, municipal officers check whether the building complies with the rules and the fee is reimbursed to the owner. The building approval process is often mediated by the village committee, who lodges applications to the municipality on behalf of the villagers.

While Guangzhou's urban villages are initially left untouched by formal development, the continued village densification has raised municipal concerns about their image. In the context of Shenzhen, Bach (2010) argues that urban villages do not fit into the government's narrative of progress, civilization and order. Recent academic literature on Guangzhou's urban villages supports such claims:

"Compared with other newly developed urban areas with state land, urban villages with collective land are characterized by congested built

environment, poor housing conditions, and low quality infrastructure, and, therefore wasteful land use." (Lai et al., 2014, p. 185)

"There is hardly any space between the houses, only narrow dark alleyways. (..) [According to the Guangzhou Public Security Bureau] around 75% of criminal cases and 80% of unauthorized buildings were reported from *chengzhongcun* in Guangzhou in 2003." (Tian, 2008, p. 291)

"Problems like insufficient water supply and drainage, poor water quality and road pavements, etc., all result in bad ventilation, traffic congestion and lack of sunlight in the villages. With the poor living environment, it is not difficult to understand why urban villages are considered seedbeds of social evils." (Chan, 2004, p. 16)

"[The] village was regarded as dirty and chaotic, basically the standard image most other urban villages have. There were narrow streets, back-to-back residential buildings built without following the proper regulations, mixed use of street level retail activities and densely-built residential buildings on the top of these shops. In addition to the poor physical environment, the neighborhood was infested with serious problems of illegal construction, lack of fire protection measures, unsafe and insecure environment and bad sanitary conditions." (Li et al., 2014, p. 301)

Scholars such as Wu (2009), Schoon and Altrock (2013) have argued that while fire hazard, high crime rates and chaotic land use are often cited as the primary reasons for village redevelopments, the real underlying driver is land scarcity. Farmland acquisition and subsequent sale of the land (together with formal development rights for that land) is the main source of municipal revenue – generating as much as 70% of income (Zhao & Zhang, 2016). As municipal authority only pertains to urban land, village land cannot be subjected to municipal taxes (Hao et al., 2013). Hao et al. (2013, p. 6) argue that apart from the economic incentive, redevelopment is also a way to gain administrative control and more direct control of the urban environment. Competition between cities to attract foreign investment, has incentivized city governments in China to remodel their physical features to provide a more aesthetic urban representation (Yu & Padua, 2007), such as through events like the 2010 Asian Games which led to huge investments in city beautification (Schoon & Altrock, 2013).

When the municipality expanded its administrative boundaries in 2000, a huge amount of land became available for conversion to urban use. Despite this new land release , continued pressure on centrally located areas led to a new policy called 'Three Old's Redevelopment' (*sanjiu gaizao*),

which was proposed in 2009 and focuses on the redevelopment of urban villages, the historic city centre and brownfield sites (Schoon & Altrock, 2013). According to Altrock and Schoon (2011), two kinds of urban villages redevelopment are practiced – 'comprehensive' redevelopment, which involves full-scale demolition and 'integrated' redevelopment, which is aimed at improving the existing fabric. Although the Guangzhou municipal government fostered the ambition to redevelop all 138 urban villages in the period 2000-2015 (Crawford & Wu, 2014), associated costs and villager resistance reduced that to only a handful of villages. In the case of comprehensive redevelopment, villagers ae financially compensated separately for their land, their properties and their relocation costs (Tian, 2008). Especially this last compensation is contentious because, as it incentivizes villagers to build additional floors for which the can negotiate extra compensation. The village committee typically negotiates on behalf of the villagers, but still relies on consent from at least 90% of local villagers to ratify any deal struck (Schoon & Altrock, 2013). While these compensation costs are a huge financial burden to the municipality, as ownership rights and *hukou* status of the villagers are transferred, the villagers also face a financial cost in loss of sustained rental income. Hence, in practice only around a fifth of all villages that are approached by the municipality has opted for 'comprehensive' redevelopment (Schoon & Altrock, 2013). The best known of these is Liede village, which was redeveloped in 2009-10, as has become a key case in the debate around 'comprehensive' versus 'integrated' development Some researchers consider Liede's redevelopment successful based financial and aesthetic grounds (Li et al., 2014), while others expressed concern over the exclusion of the migrant population (Yanliu Lin et al., 2011; Wang et al., 2009) and the removal of any social assets associated with the pre-existing village morphology (Davis & Brown, 2011; Smith, 2014). The Guangzhou municipality recognizes the complexities in the redevelopment process and the specific conditions of each village and has adopted an approach that treats each village on a case by case basis – 'for each village, a policy' (*yi cun yi ce).* The future of urban villages in Guangzhou is thus still undecided.

### Spatial outcomes

Since the founding of Guangzhou in the early 3rd century AD, the region around the city became more intensively used for agriculture (Bosselmann et al., 2010). The Pearl River estuary was gradually reclaimed and dotted by many villages that established a close relationship with the surrounding water. Following the ancient custom of *Fengshui*, Guangzhou's villages open up towards a waterbody, while the rear faces hilly or mountainous terrain (Knapp, 1992). This waterbody can be a river, canal or pond and is always connected to the main public space in front of the village, which

**5.1** Urban villages in Guangzhou

| | | |
|---|---|---|
| 1. Shipai | 23° 8'0.68"N | 113°20'7.91"E |
| 2. Jiangxiacun | 23°12'42.40"N | 113°16'19.16"E |
| 3. Xiabei | 23° 3'51.40"N | 113° 9'36.91"E |
| 4. new CBD | | |

urbanization till 1950

formal

urban village

often doubles as a threshing floor for the harvest and contains the main community buildings (Knapp, 1992). The built-up area of the village is compact, with the traditional rural houses arranged along narrow laneways (*sanjian lianglang*) that link to the main public space in a comb layout (Gu et al., 2008). The Guangzhou municipal government formally recognizes 138 urban villages (Yanliu Lin et al., 2011), but these are all within the former 1999 municipal boundary. In 2000, the Guangzhou municipality tripled in size after incorporating various suburban districts within its boundaries. Hence, the entire Guangzhou municipality now stretches to more than 7000km$^2$, including hundreds of villages that have urbanized in varying degrees, yet are not recognized in any formal count.

Map 5.1 shows the distribution of villages throughout Guangzhou's metropolitan region. Within the 1600km$^2$ study area there are around 450 clearly identifiable separate village settlements. There are only a few villages have been removed completely – notably around the new central business district (CBD). Apart from natural features such as the Baiyun mountain range, urban villages are spread fairly evenly across the territory, on average around 2 to 3km apart. Each village previously had walkable access to agricultural land at about 1 to 1.5km from the village nucleus, which result in around 6km$^2$ of agricultural land per village on average. The policy of 'reserved housing sites' that sets apart a percentage of the total farmland for village extension means that most urban villages have roughly doubled their built-up area.

The three villages selected for in-depth morphological analysis are based on the urban to rural transect. Shipai is the densest urban villages in Guangzhou and located very close to the new CBD. This village has experienced little horizontal extension as is typical for those centrally located villages. Jiangxia is a village that features typical village extensions seen in much of Guangzhou's urban periphery. Xiabei has least densified and still retains many traditional houses. Its position along a canal, makes it morphology representative of a villages that grow along the myriad of waterways, particularly in Guangzhou's southern districts. The villages were also chosen to tie in with existing research, to provide the necessary social and cultural context to the morphological research.

# Shipai

**Shipai is one of the densest neighbourhoods on earth with an estimated 55.000 (Zacharias et al., 2013) to 90.000 (Yanliu Lin et al., 2011) people living on just 25 ha of land. The village lies 8 kilometre west from the old city of Guangzhou, but more importantly, just on the edge of the new central business district. Many more urban villages used to be here, but over the last two decades many have been demolished such as Liede (1997), Linhe (2010) and Xiancun (2017). Shipai is one of the best known and best documented urban villages globally. Zacharias et al. (2013) focus on the role Shipai plays in the public transport system and economics of the city and argue that Shipai has some of the most productive land in city. Huang and Tao (2013) investigated the changing architectural typology of Shipai and the ways in which traditional power structures still play a powerful role in the daily affairs of the village. In her chapter *The Morphological Transformation and Planning Practices of Shipai Village*, Lin (2011) describes how the village was enveloped by the city and densified to house an influx of new migrants. The municipality perceived this to be a haphazard process and launched a failed attempt to remove and redevelop the village. But to what extent has densification of the village deteriorated its urban environment and is this process really haphazard?**

### Urban design

Shipai's lands traditionally covered around 14km$^2$, but by the 1950's had already ceded about half its agricultural land to Guangzhou' municipal government (Y Lin, 2011). After the village was incorporated into the new Tianhe district in 1997, only 70 ha of land remained (Huang & Tao, 2013), out of which 27 ha constituted the built-up old core of the village. The fast-paced and early envelopment of Shipai prevented new village extensions and most of the current urban fabric consists of densified old core. Map 5.2 shows the tightly packed building footprints of Shipai, which are primarily accessed by 2-metre-wide parallel laneways as can be seen in image 5.4b&e. These lanes form several loose grids, all facing a general southern direction, which has been suggested to be due to the prevailing summer winds that cool the houses (Y Lin, 2011). Slightly wider lanes of 3 to 4-metre-wide that have a more meandering character (see image 5.4a), connect these different grids as well as several larger public spaces. Historical maps (Provided by Shipai village collective in Huang & Tao, 2013) indicate that only small additions to the public space have been made since Shipai was enveloped – primarily the infill of former ponds and other marginal lands on the edge of the village.

The history of the village can be traced back 700 years. The local villagers in Shipai are divided into four clans or lineage groups – the Dong, Chia, Pan and Xian (Huang & Tao, 2013) that each occupy a particular part of the village. The four clans are each organized around their own ancestral hall (see image 5.7a) – as well as a shared representation in the collective institution of 'the neutral hall'. While the clans have recently mixed and social boundaries become blurrier (see map in Huang & Tao, 2013), the former socio-spatial organization retains its morphological component. The areas inhabited by the different clans coincide with the shifting of grids in two predominant angles and map 5.3 shows how the permeability of the public space is affected by these former clan boundaries. Most urban blocks are very small at under 100 metre perimeter, but alongside clan boundaries these can go up to 300 to 400 metre. Around 30% of the length of the laneway network is constituted by dead-end lanes – the majority of which occur at clan boundaries as well as the edge of the village. An historic map of the village made in 1985 features an almost identical laneway network (available in Y Lin, 2011), which indicates that despite low permeability in certain parts of the traditional laneway structure, no extra laneways have been added to improve access.

The restrained access is repeated on a larger scale at the edge of the village with the formally planned city. The formal envelopment of the village is only punctuated at 12 points, which have become the entrances to the village. It is evident from map 5.3 that pedestrian permeability is much more fine-grained in the village than the surrounding formal city where 60-metre-wide highways segregate the city into isolated islands.It is possible to walk along the municipally built roads without ever knowing the existence of the nearby urban village. The urban blocks along the edges of the village go up to 800 metre in perimeter and are considerable barriers to movement. The eastern village edge is the only one that is both visible and accessible to the formal city, since here an older village track has been upgraded and integrated in the formal city grid. When the village lost its last agricultural land in 1997, the village collective transformed into a joint-stock company to better manage its collective assets and invest in the construction and maintenance of new properties (Huang & Tao, 2013). As the sale of village-property to the formal market is not allowed, plots at the edge of the village that faced the formal city were leased out to formal developers (Zacharias et al., 2013).

**Architecture**

Access to the formal city has structured the village's functional mix. Map 5.5 shows that the ground floor space in Shipai features an intensive functional mix – around a quarter of all ground floors in the village have

**5.2 figure ground**

building footprint

waterbody

**5.3 public space**

public space

clan boundaries

1. market
2. school
3. former ponds

100m

a non-residential function. The fresh meat and vegetable market is an important node in the network (see photo 5.4d), which together with the primary school and community centre form the focal point of public life in Shipai (see map 5.8). The lanes that connect the market to one of the twelfth village-entries are lined with shops for daily commodities and small eateries (see image 5.4a). Corner locations such as seen on image 5.7b are particularly popular and shops often connect two laneways to generate a larger semi-public space. Zacharias et al. (2013) have demonstrated that the intensity and the rental value of commercial activity is geared to the pedestrian volume. Even without a functional masterplan, the intensity of pedestrian flows self-regulates functional mix – with eateries along the busiest routes, followed by shops, while storage, workshops and finally residential are along the least busy routes. Adjacency also plays a role in the distribution of functional mix, as there are more workshops and storage spaces towards the northern entries, where they link to 'Tianhe technology street' – a wholesale electronics centre.

While functional mix self-organizes in a clear configuration, building heights are distributed evenly throughout the village. Map 5.6 shows that the average height of the village is currently 5.5 floors, ranging to a maximum of 9 floors. This is an 10% increase since 2012 (Zacharias et al., 2013) – and as the survey found 44 buildings currently under construction, this growth does not seem be abating. , A substantial number of buildings transgressed the municipal height limit at six floors. Interviews with the villagers revealed that while some buildings are built without formal approval altogether, more commonly buildings acquire partial approval for the first 6 floors, while adding  the other floors extra-legally. This incremental growth is enabled by the tightly packed built form, which obscures any extra floors from the people walking down the narrow laneway below.  Such transgressions are also mediated by the neighborhood approval system which both restricts and enables them. Map 5.6 shows that these transgressions often occur in small clusters of 3 to 10 buildings – once a resident has built the initial transgression, other neighboring villagers seem validated in adding their own extra floors,. revealing a shared agreement between neighbours Villagers who are reluctant to approve their neighbor's application might seek monetary compensation, further adding to the complex set of informal relations. The municipality seems to be getting increasingly aware of these transgressions, as the local villagers reported that building approvals were increasingly denied, on the basis that they would only be granted if the municipality considered them 'dangerous' and that reconstruction was required for 'safety reasons'.

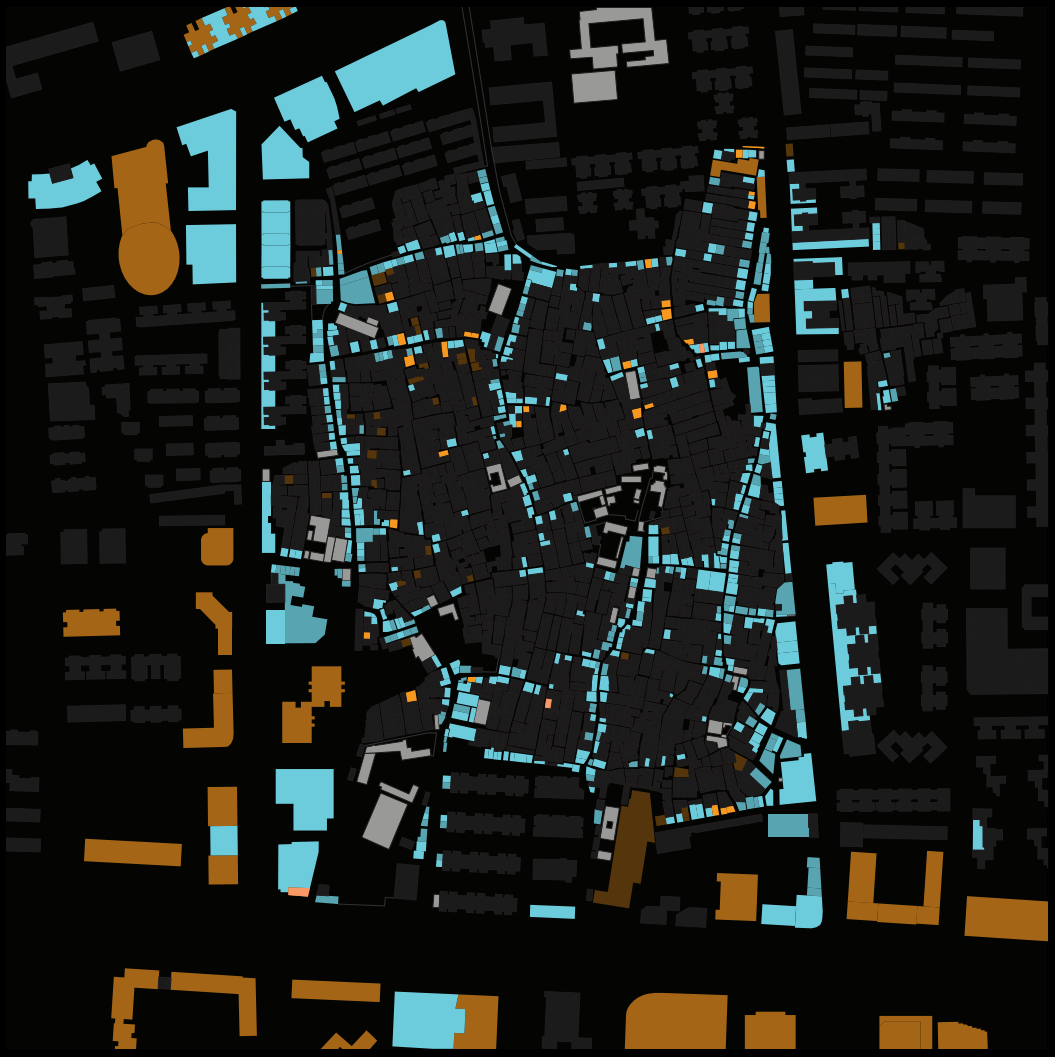
**5.4** Typical set of laneways for old core and new village extensions

Increasing demand for affordable housing has generated taller buildings but also increased cantilevering. Map 5.11 shows the distribution of cantilevers throughout the village and the degree to which they render the public space below in darkness. The cantilevers generally extend up to 1 metre from the building edge, effectively entunneling all laneways of 2 metre and below (see image 5.4b). These are the so-called 'handshake buildings', which account for 40% of all interfaces in the transect. The formal code that limits cantilevers to 80cm is not effective in ensuring daylight access in laneways below 2 metre. In wider laneways residents have added their own a rule-of-thumb which limits cantilevers to 1/3 of the laneway width (see 5.4a). According to the residents, any extreme transgression of this rule rarely happens, since then "people will laugh at you". Interviews revealed a reciprocal relation between neighbours – after approving increased height or cantilevering to one of your neighbours, it is expected that similar approval will be granted in return when extending their own dwelling. About one in eighth interfaces have sufficient distance to the opposite interface to prevent entunneling even with cantilevers on either side of the lane. About a quarter of all interfaces do not have any cantilevers and this is geared to two spatial conditions. The first condition are community buildings and older buildings, which are often limited in height and use of cantilevers. The second condition occurs at the backside of buildings, such as can be seen in image 5.4e. Traditionally, all houses would have been oriented towards the south, leaving their other interfaces blank. An informal code emerged that linked the entrances to the right to cantilevers. A lack of entrances on their rear interface thus means that cantilevering is informally restricted. Similar informal restrictions apply to cantilevering over your neighbour's access lane as in image 5.8a. Through these informal codes, very narrow lanes such as on image 5.8b sometimes have more access to light than much wider laneways.

As Shipai densifies, this singular southern orientation of the traditional architecture is gradually eroded. Map 5.12 shows that only a few interfaces remain without entrances, and that most formerly non-permeable interfaces have transformed to allow more access into each building. Along some laneways, this process of increasing permeability is coupled with additional extensions into public space. Image 5.4a and 5.8c show how steps extend into the public space and provide space for laneway appropriation. The presence of a serrated edge is dependent on a minimum width of the laneway – no serrated edges occur in laneways below 1 metre, and are only very limited in 2-metre-wide lanes. While there are multiple factors at play here, a key informal restriction on encroachments into public space is geared to the minimum width required to allow the passage of the 3-wheeled vehicles for cleaning as can be seen on image 5.4e. No villager

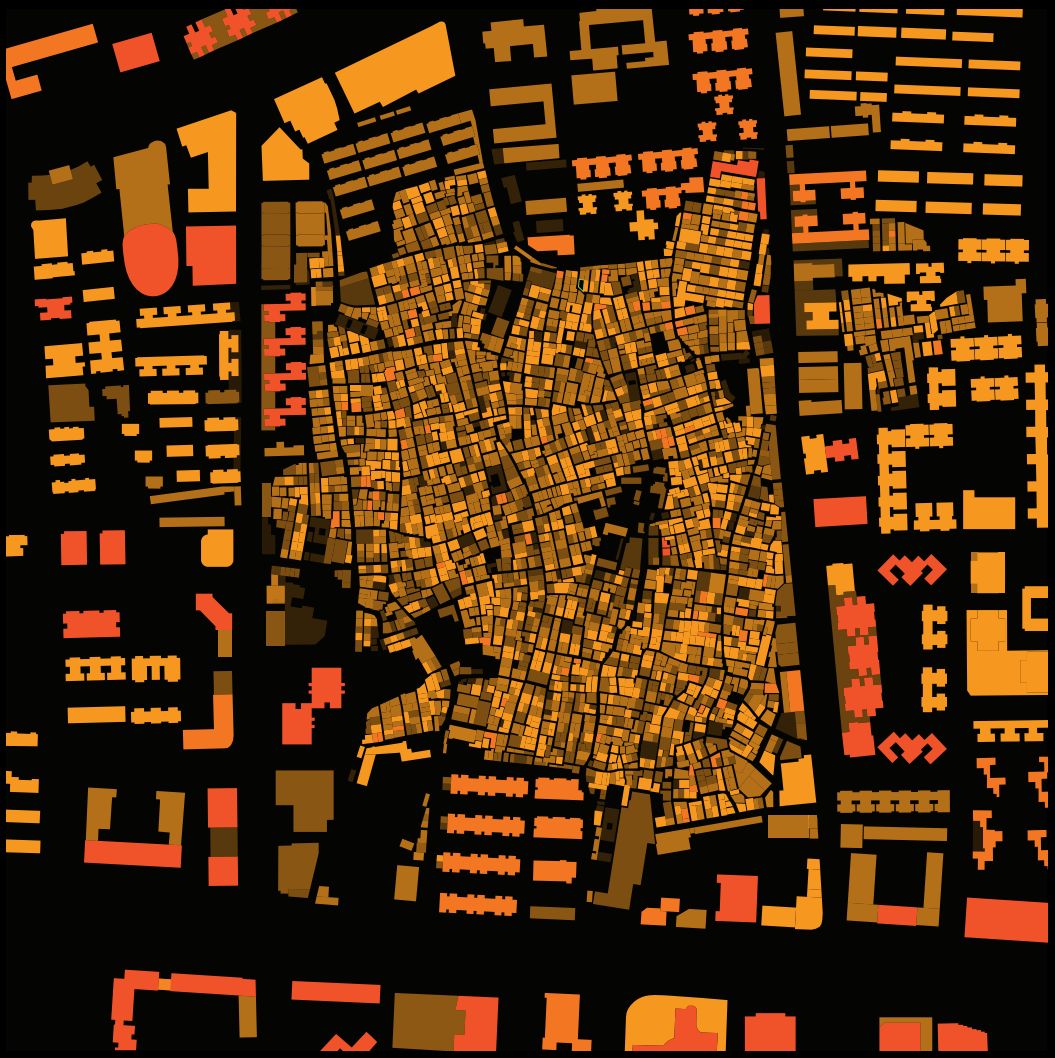
**5.5 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- goods
- production



**5.6 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

would want to be responsible for impeding the garbage collection of its neighbours. Map 5.9 shows that most commercial appropriations happen in laneways wider than 3 metre, while domestic appropriation primarily happens in niches between buildings, dead-end lanes or spaces otherwise outside the flow of people. One of the key factors why appropriations are limited is that the serration of an interface is coupled with the cantilevering of that interface. More than 80% of all serrated interfaces also have a cantilever, while only 10% of all interfaces without cantilevers have a serrated edge. The capacity of an increased social function that is generated by the serrated edges is subsequently negated by the lack of light from cantilevering. Image 5.8c shows how the use of a serrated edge underneath a cantilever is only possible on account of the light that is generated from the absence of cantilevers next door.

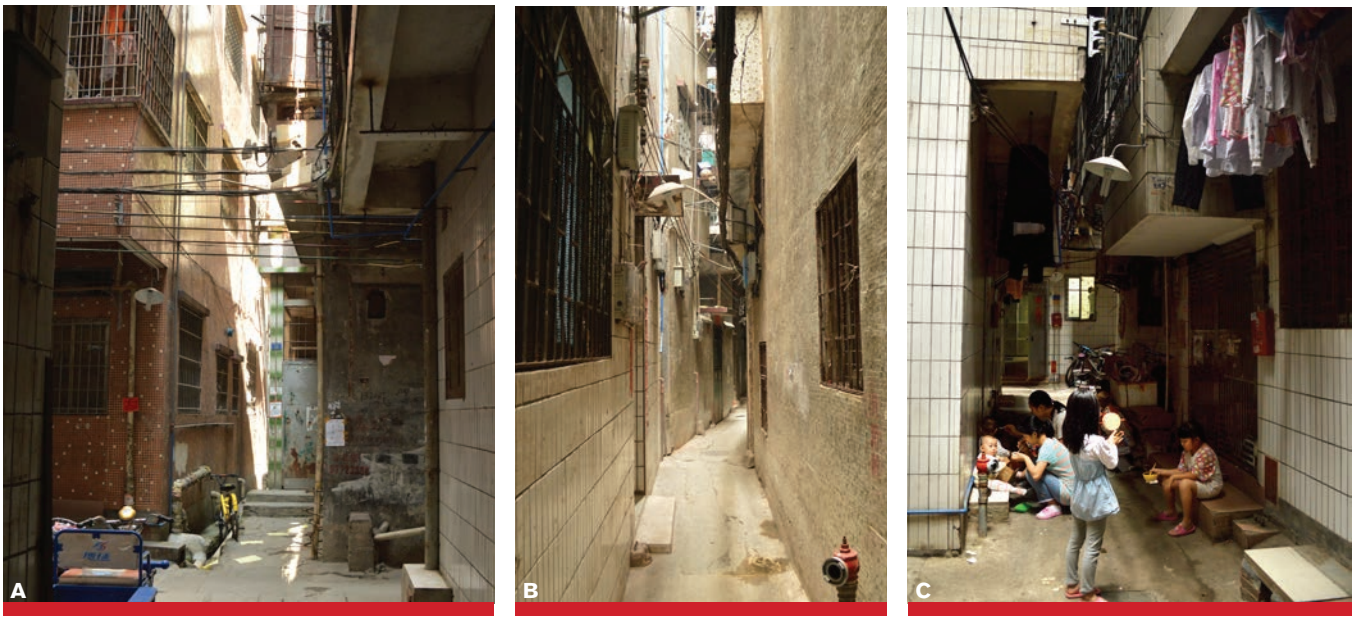
**Urbanity**

This lack of social use of public space is best demonstrated through map 5.10, which shows the typical activities in the transect between 3 and 5pm on weekdays. While around 350 people were using the village's public space, only one third used the space for stationary purposes. Moreover, almost all the stationary social activity is concentrated in the few larger public open spaces. Another important social space in the village which was not systematically counted in this survey are eateries, which provide a semi-public space as an extension to the scarce open space in the village. Especially at night, once workers return from their work, do these eateries become the focus of public life (Song et al., 2016).Two thirds of users

**5.7** traditional public space in front of ancestrall hall and new semi-public space carved out from buildings

merely move through the village' public space on their way to the formal city. Pedestrian movement is highly concentrated to the limited number of laneways that connect to the formal city. The north-western entrance connecting to Tianhe technology street has around 1000 people per hour – sometimes with their wheeled trolleys – making their way to and from the village. This intense movement of people between the formal city and the village is related to the stationary activity of real-estate agents who await potential customers to guide them through the labyrinthic structure to any new rental properties. The village entrances are often also controlled by a guard, who ensures no large vehicles enter and keeps an eye out for any undesirable behaviour.

The apparently relentless intensification of the village and the decreasing quality of its public space disconcerted the local government. In 2006, the Guangzhou urban planning bureau prepared plans for the large scale demolishment and redevelopment of Shipai (Y Lin, 2011). Since then such schemes have been implemented for nearby Xiancun, but local media reported that this was met by strong opposition by the local villagers ("IUD," 2015). Shipai refused to participate in such a scheme and the villagers were successful in convincing the local government to hold off demolition for the foreseeable future. Hence, the district government tried an alternative 'integrated' redevelopment approach by initiating an in-situ upgradation scheme in 2016. Image 5.13 shows the upgradation of the pavement in several lanes in the south-west of the village – as well as a transformation of the ground floor façades to include faux Chinese-style eaves. While this




**5.8** building orientation is geared to cantilevering, serrated edges and ultimately social life

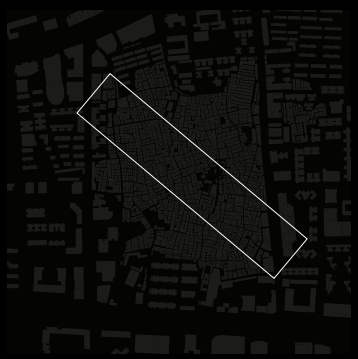
**5.9 appropriation**

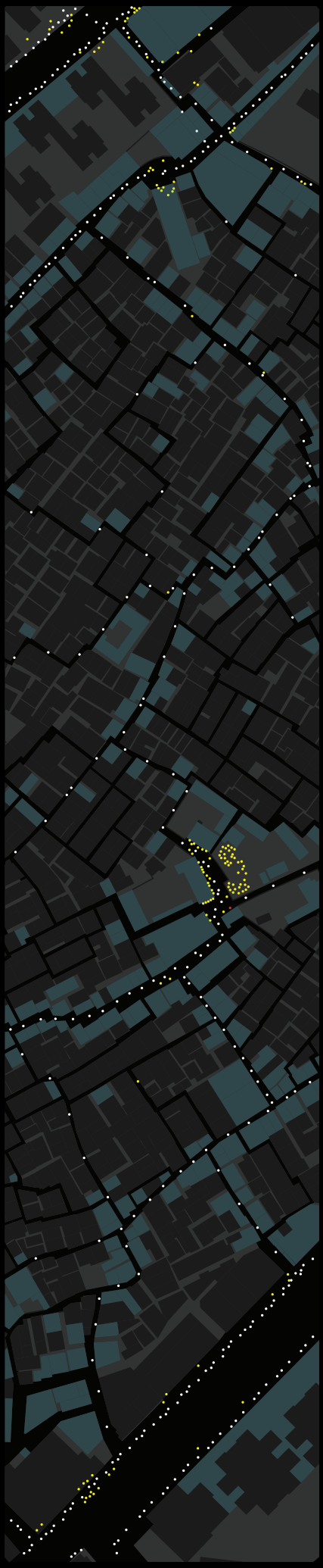
- commercial
- domestic
- vehicular

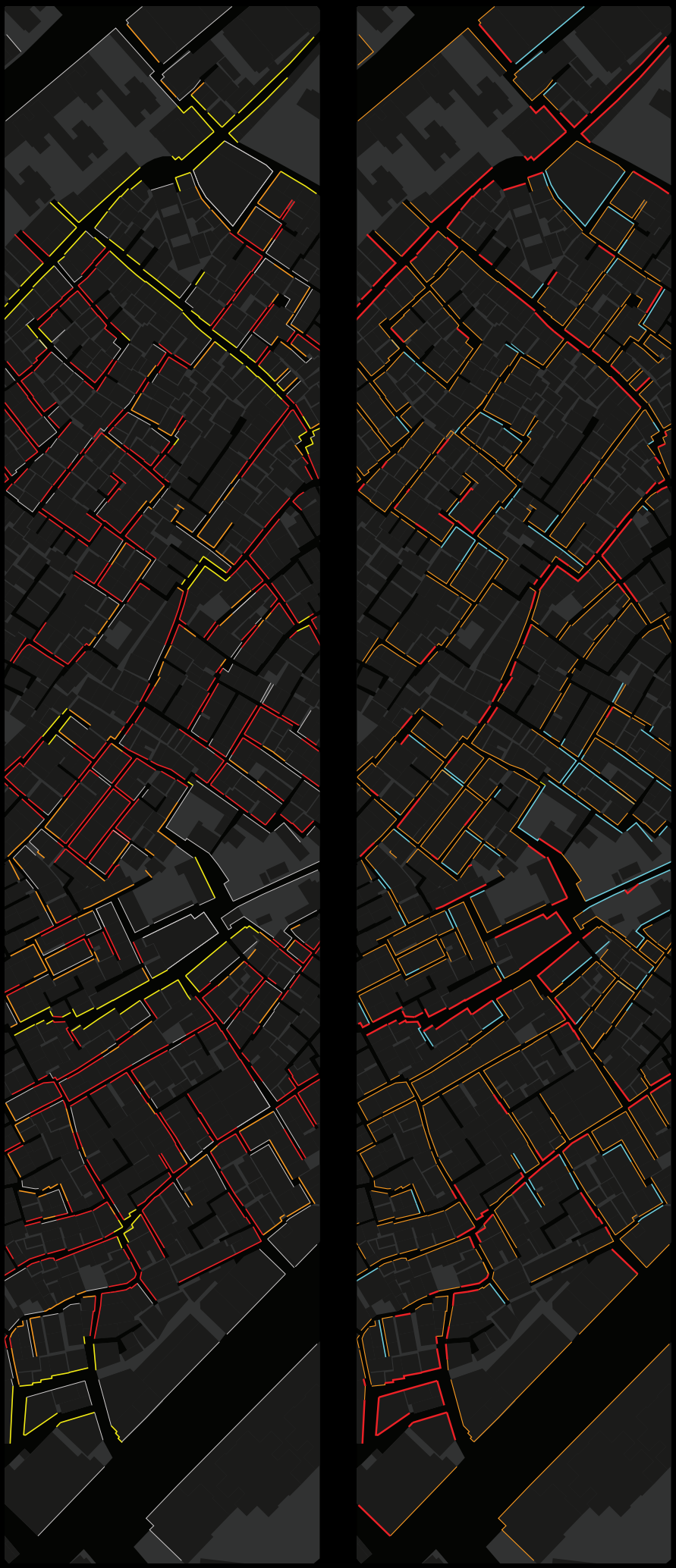
**5.10 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi







**5.11 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**5.12 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

upgradation scheme does not directly deal with the lack of light in narrower lanes, it does improve the image of the village and acknowledges that the village has a rightful place within the city. A second phase of the scheme is currently under construction. If these interventions are indeed able to change the image of the village, demolition might be postponed indefinitely, generating opportunity for further incremental improvement.

**5.13** in-situ upgrading of paving and ground-level facades

# Jiangxiacun

**Jiangxia lies about 10km north from the old city of Guangzhou and a similar distance away from the new central business district. Jiangxia is surrounded by many other villages, each having urbanized their own former agricultural land so that a continuous informally developed urban village fabric has emerged. Historic satellite imagery shows that the informal development of village land preceded the formal infrastructure, which was subsequently inserted only later as parcels of village land were acquired by the municipality. Some of this formal infrastructure, such as a new metro line which opened in 2010, greatly increased the accessibility of Jiangxia to other parts of Guangzhou, only accelerating the growth of the village. Its density is now similar to much more centrally located urban villages. Jiangxia is characteristic of villages in Guangzhou's periphery, which feature a mix of old core densification and newly planned village extensions. While some description of such extensions exist for other villages (Y Lin, 2011), not many spatial details are currently known so how does the spatial transformation of semi-planned village extensions differ from the old core?**

### Urban design

The urban design of Jiangxia' old core is closely intertwined with the local landscape . The village' traditional civic space was centred around the threshing floor, pond and ancestral hall, which sit on the eastern slope of a small hill. This civic space connects to several inter-village routes that fan out along the lower-lying parts of the village. Along some sections, these routes have narrowed to 5 to 6-metre-wide lanes as they are encrusted by the village (see image 5.17b), while along other sections they have widened as extensions of the city grid. These routes provide the backbone from which the main built-up area of the old village core is organized. The traditional urban design of villages in this regions is organized as a comb layout (*shushi buju*) (Gu et al., 2008) in which1 to 2-metre-wide parallel laneways gradually ascend the two hills (see image 5.17a&c) following the principle of graduated privacy – the decreasing publicness of the lane is indicated by the increasing elevation of the terrain and the decreasing laneway width. At least four clearly distinct comb layouts can be identified, each on different angle, meeting the lower-lying route at a right angle. The houses in this region are known as *sanjian lianglang (*meaning 'three-rooms two-corridors') (Gu et al., 2008) which are U-shaped buildings between of around 100m$^2$ that embraces a small courtyard. They are laid out with their sides along the 'teeth' of the comb, with their back towards the hill.

Starting from the 80's, the villagers narrated that the village' agricultural land was gradually being leased to developers or sold off entirely to the municipal government. This provided funds for two initial village extension in the late 80's that the local villagers referred to as 'Jiangxia's Deng Xiaoping' – indicating the experimental nature of these extensions that parallel Deng Xiaping's national economic reforms. The first extension is constituted by a loose grid(see production team number 10a on map 5.15), but with a high number of irregularities and shifting alignments as the previous structure of ponds incrementally crystallized into an urban structure . The morphology indicates that settlement happened without conscious urban design decisions – a characteristic reflected in a remark by one of the residents who called the area 'messy for historical reasons'. A second extension took shape directly east of the former (number 10b on map 5.15). Its morphology is more planned as neat rows of plots are laid out along narrow laneways, emulating the urban design of the old core. Yet, they differ in one critical aspect, as the front of each house no longer faces a tertiary space, but are directly accessed from the main laneways This allowed an even more closely packed urban form than the old core.

These two experiments provided a testing ground for a much larger village extension. In 1995 , the village committee decided to the built-up area of the village from 19 ha to 41 ha. Although the decision for village extension was made collectively by the village committee, the actual urban design was prepared by the local production teams, who were in charge of working the fields. . Each of the ten production teams in Jiangxia was responsible for their respective section of the former agricultural land – their original numbering and boundaries are indicated on map 5.15. The only constant in these urban designs was the maximum plot size of $80m^2$ which was set by the municipality. Diagram 5.16 shows the diversity of urban design responses which can be understood along four key variations – orientation of the lanes, width of the lanes, dimension of plots and position of cantilevers. Each of the production teams preferred one of three plot dimensions which each add up to $80m^2$ – 8m by 10m, 9m by 9m or 6,7m by 11,7m. Compared to the old core and the early experimental village extensions, the laneways in these extensions are significantly wider. Most production teams designed 4 to 6-metre-wide east-west lanes for primary access (see image 5.17f), while narrower 2 to 3-metre-wide lanes provide access to light at the sides (see image 5.17d). This represents a shift in orientation from the traditional layout, in which lanes for through movement ran alongside rather than in front of the dwellings. Some production teams also included larger open spaces in their design such as can be seen in image 5.17e – demonstrating that the extensions were not only planned to generate rental income, but also to create a liveable environment.

**5.14 figure ground**

building footprint

waterbody

**5.15 public space**

public space

production team boundaries

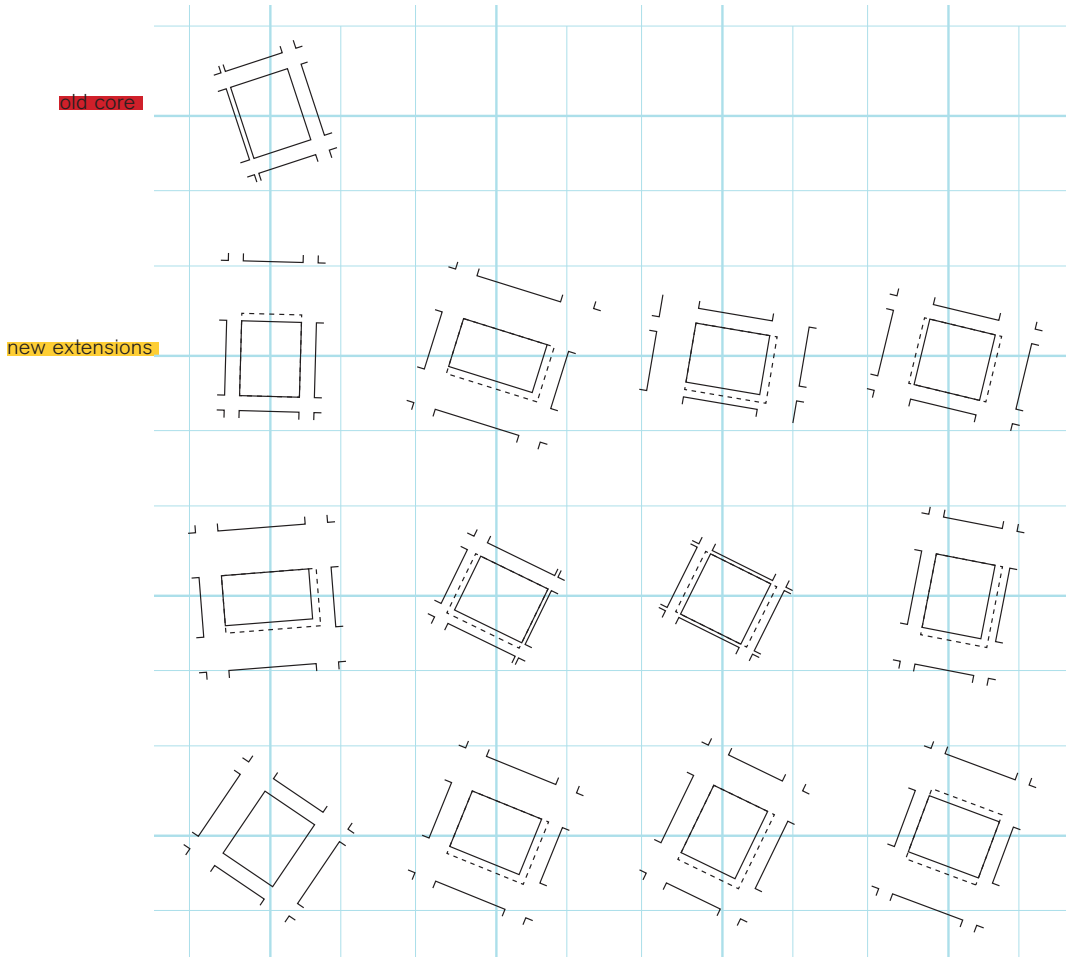
1-10 number/name of production team as retrieved from interviews

A. ancestrall hall

B. market

C. metro station

D. Top of the hill




**5.16** variations on plot-level in urban design of new village expansions

While the traditional layout of the old core consisted of a comb of unconnected parallel laneways, map 5.15 shows that in many places these lanes have been connected, improving its permeability. As the village densified (on which more later) a tertiary space was included in front of each new reconstructed house. The former dead-end combes have also been extended further up the hill and have been interconnected with each other, further adding to the permeability. Village extensions have been planned with a hyper permeable urban design from the start, enabled by small plots and public space along all sides. The accessibility that existed between each production team' agricultural land and the village old core along the erstwhile inter-village routes, continues to provide accessibility to the new village extensions. Yet, permeability between the new extensions of different production teams is more brittle. Direct boundaries between production teams are still clearly marked such as in image 5.24a, where bollards segregate vehicular movement between production teams. Permeability is also impeded at the extension's rear sides that are often encrusted by industrial development or formal land acquisition. Barriers to movement are especially apparent in the way the village connects to the formal city. Apart from production team 3, which directly faces formal infrastructure, there are

**5.17** Typical set of laneways for old core and new village extensions

only seven connections between the village and formal city. This encrusting has limited village-to-village accessibility – nearby Hebian village for example, while only 900 metres away, takes more than 30 minutes to reach on foot.

**Architecture**

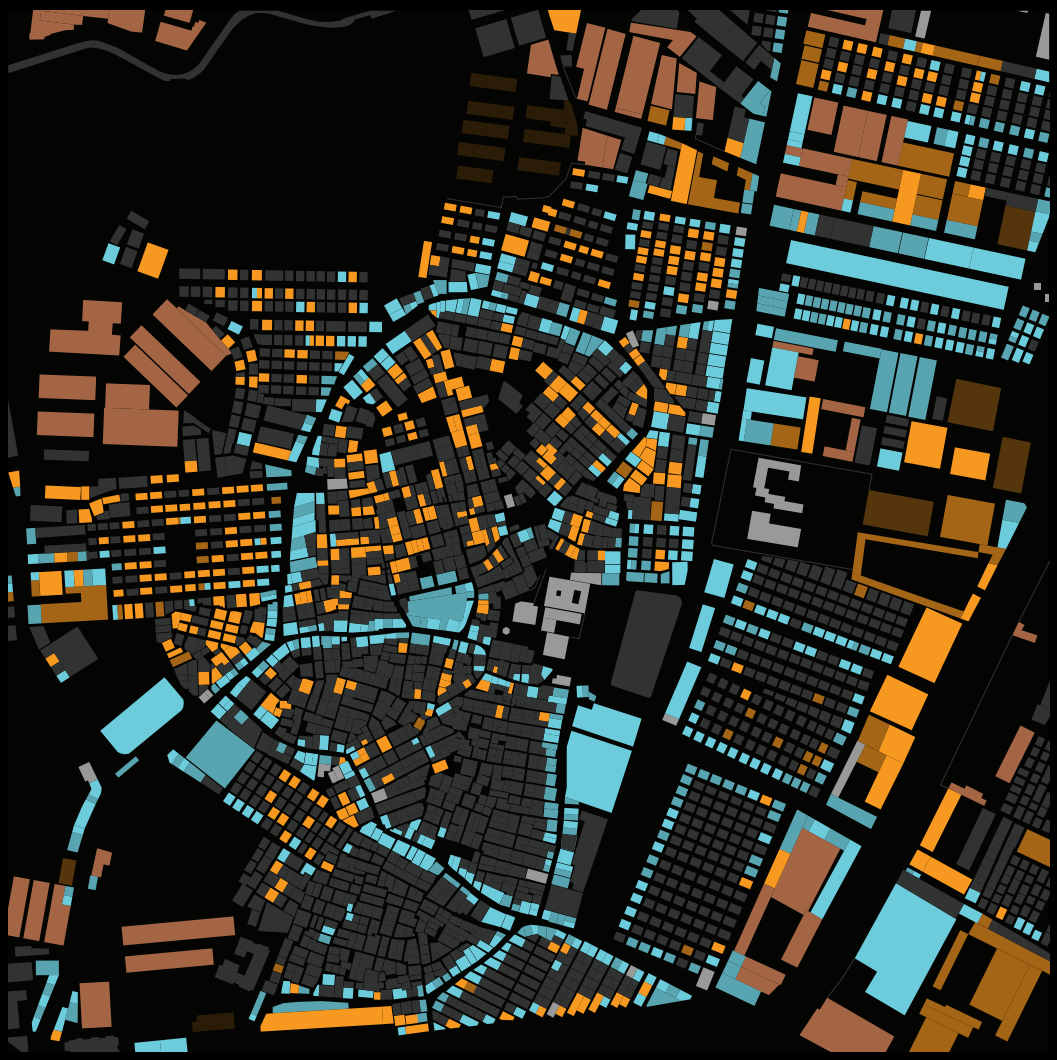
Map 5.18 shows the intense functional mix of Jiangxia – combining consumption and production of goods in the same neighbourhood. Many of estimated 100,000 migrants that reside in the village, also work and shop here. Consumption functions are primarily organized around the inter-village routes, that connect to larger commercial nodes such as the village market. Most shops and eateries directly cater to the migrant population and need to be near their places of work and residence. Closer to the metro stations, the functional mix is increasingly geared towards outsiders, including hotels and more chain stores. Whereas commercial use dominates the main lanes, in the secondary lanes small workshops prevail. Most are small textile workshops that perform subcontracted work for nearby companies who do the final assembly and distribution. These workshops are almost exclusively in the central and western parts of the village, close to the warehouses that they cater to. Rental spaces alongside the formal infrastructure to the south and east of the village largely specialize in car-related workshops and showrooms. A key component in the emergent distribution of functions is laneway width. The lanes in new village extensions are wide enough for small-scale industries that rely on vehicular access for deliveries of raw material and finished goods. The emergent functional mix in the old core and village extensions is enabled by rental contracts that are directly negotiated and paid to the owner of the building. This stands in contrast to the large warehouses that are leased from the village committee and where functional change is less incremental and characterized by large-scale change as entire warehouses are replaced by more profitable commercial uses and middle-class apartments.

Despite Jiangxia' distance from the CBD, densification has been intense. Historic satellite imagery reveals that densification initially happened primarily in the new village extensions, but by the mid-2000's the old core was rapidly densifying as well. Map 5.8 still reflects this 'lag' as building heights in the old core have a much broader range than the new extensions, with a mix of many very small (below 5 floors) and very tall buildings (above 8 floors). The plots also tend to be smaller than in the new extensions, as the former U-shaped courtyard houses have often been subdivided, such as between two brothers inheriting their parents' house.

While it could be expected that buildings would be taller along major commercial streets or closer to metro stations, this is not the case.

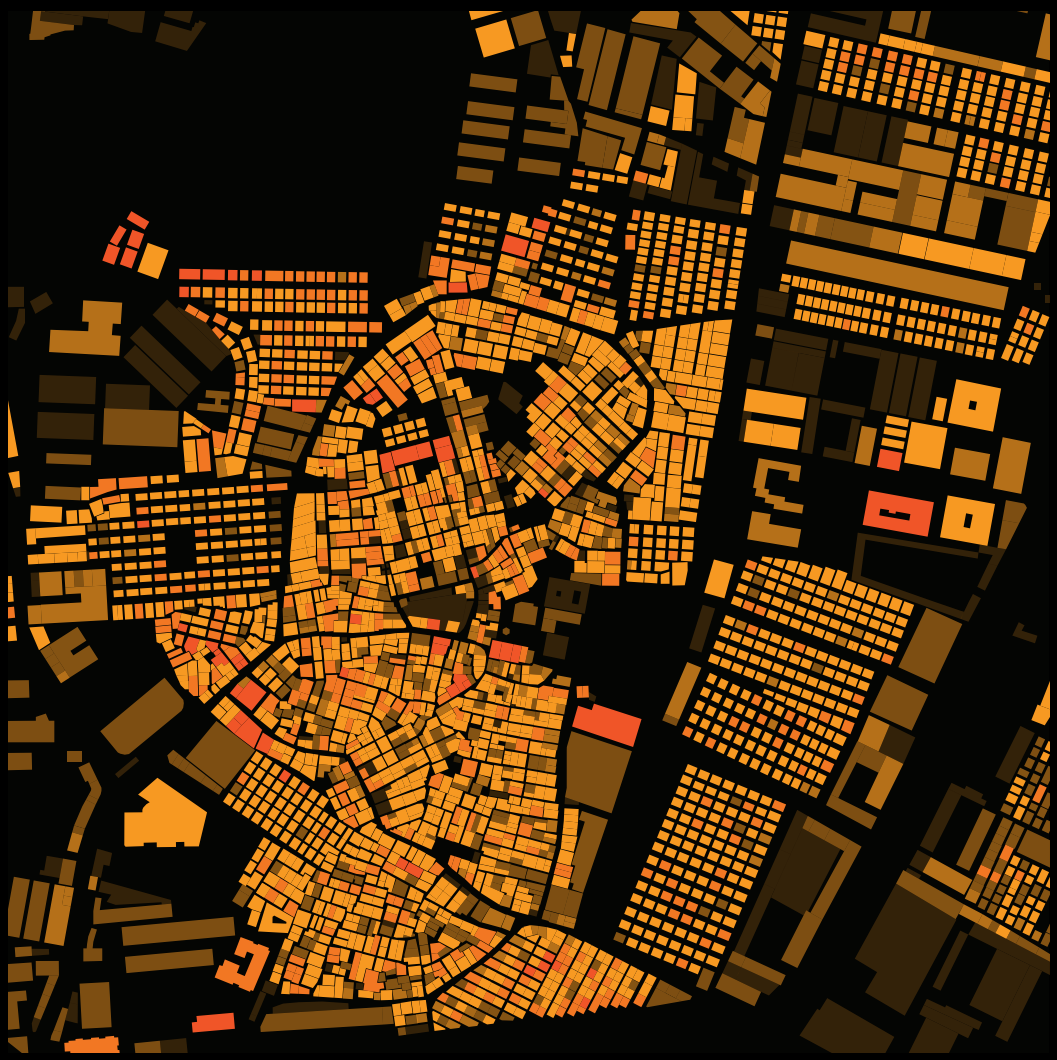
**5.18 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- goods
- production



**5.19 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

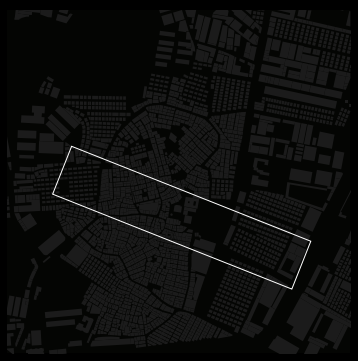
**5.20 appropriation**

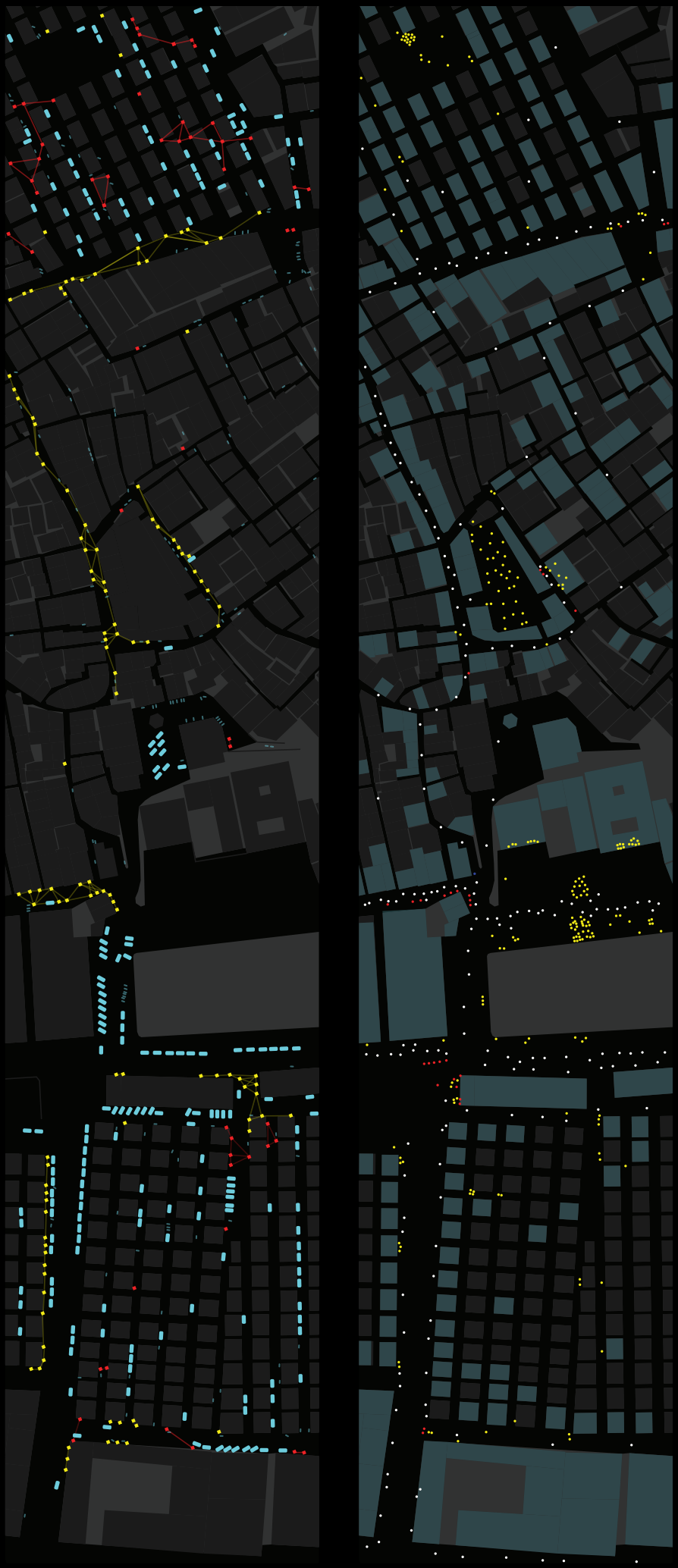
- commercial
- domestic
- vehicular

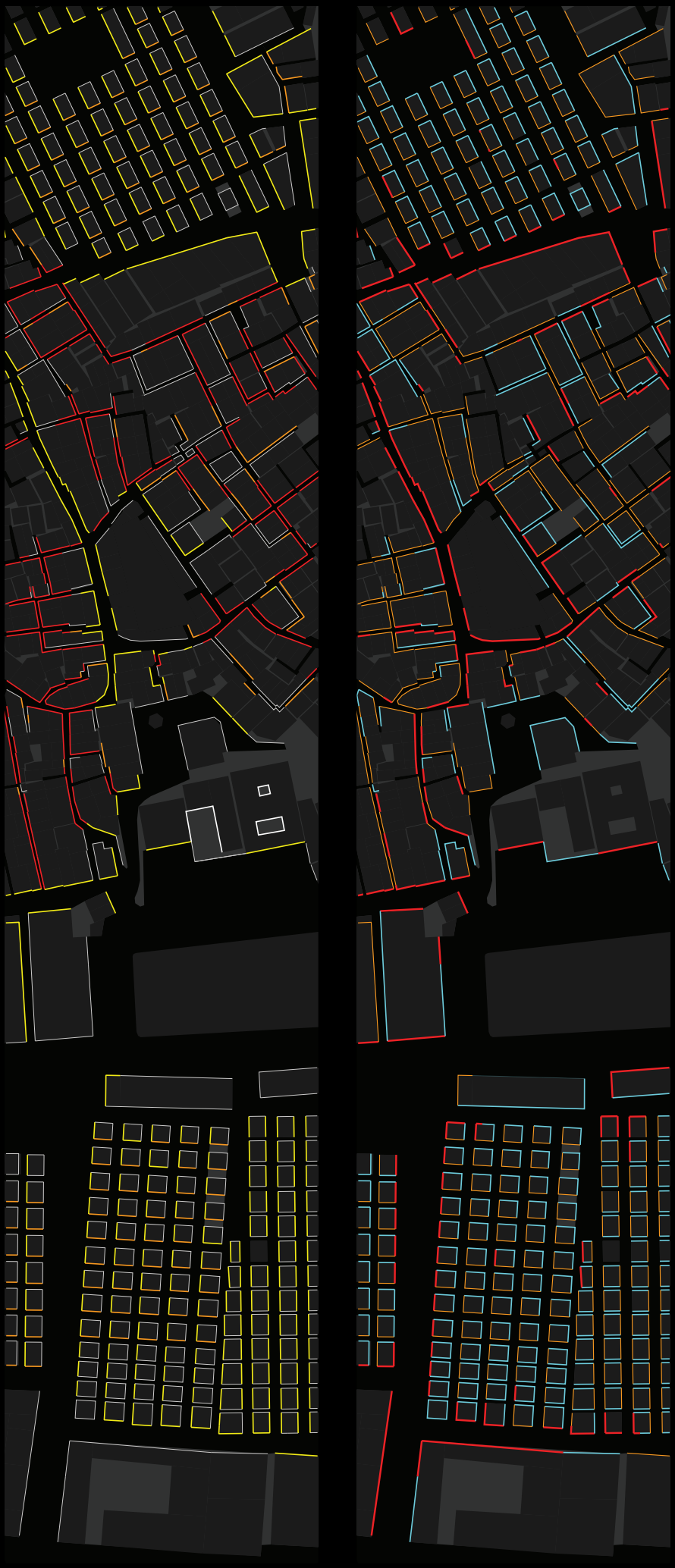
**5.21 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi







**5.22 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**5.23 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

This irregular height distribution is linked to the land allocation within each extension. Since all lots are owned by local villagers who are not allowed to sell them to outsiders, market forces that would drive densities up are resisted – each plot depends on the capabilities of each individual family to develop. As all villagers have equal right to housing within their production team, interviews with villagers revealed that the original plot allocation within each production team happened through a lottery system that allocated either one or two plots depending on the size of your family. Despite some speculation that occurred after this initial distribution of land as wealthier families acquired land from families with less financial means, the lottery's randomness still mixed families with various financial capacities. This process resisted clustering of taller buildings in places of high value within the extension. Yet, map 6.5 also features many transgressions above the formally allowed limit of 6 floors, which do tend to cluster. This distributed clustering resembles the outcome of the mutual neighbour reciprocity described for Shipai.

While plot size and building height are municipally regulated, the practice of cantilevering is informally managed through balancing the benefits of extra floor space with the negative impact on access to light. Diagram 5.16 shows that the production teams self-regulate through restricting cantilevers to only two building interfaces – usually above the main entrance and the left-hand side of the building (see image 5.17f and 5.24b). As most buildings face south, cantilevering happens predominantly on the south and east side of the building. These cantilevers also play an important role in the daily life of the residents as they provide shelter for drying laundry and storing of goods, especially during the heavy downpours in the months from April to August (see image 5.24b-c). The social importance of these cantilevers is demonstrated in an example between two opposing interfaces along a shopping street – one north-facing without cantilevers (image 5.25a) and one south-facing with cantilevers (image 5.25b). The owners of the north-facing buildings have added sunshades to compensate for the lack of shelter that the cantilevers otherwise provide. Map 5.22 shows the spread of cantilevers throughout the transect and the degree to which the adjacent laneways has been entunnelled. None of the new village extensions face lack of light and no transgression of the informal cantilever rule was observed. Around 65% of all interfaces in the old core have cantilevers, but only about 40% of laneways lack adequate daylight. The large variation in building height and the presence of several larger public spaces lowers the length of laneways entunnelled.

The informal practice of cantilevering feeds back into the enforcement of formal municipal codes on height restriction. Municipal

**5.24** public spaces in new extensions

officers that check height limits start counting the first floor from the point where the cantilever juts out. Image 5.17b shows a common adaptation whereby the cantilevering part of the building only starts at about 6 metres. By elevating the cantilevering section, residents can squeeze in an additional mezzanine floor in between the ground floor and the formal first floor, without transgressing the formal height limit. A second common practice is the addition of an extra storey on top the legally allowed limit. The top floor is set on a little set-back, which not only makes it more difficult to see but also renders it technically no longer a 'full floor'. Through these two practices, many villagers are able to effectively get 8 floors out of a formal limit of 6.

### Urbanity

The design decisions that shaped these new extensions are not necessarily the outcome of a 'design process', but rather the accumulated experience from previous practice. Each morphological adaptation (both at the scale of urban design and architecture) is a testing ground, where both functionality as well as legitimacy of the adaptation towards others can be tested. A similar adaptive process happens in public space, as different appropriations cluster and self-organize along particular morphologies. Map 5.20 shows how the main lanes of the village are almost fully appropriated by shop-owners, excluding parking from these spaces. The new village extensions on the other hand are dominated by parking through a practice to use the rear-side of each building along the east-west lanes for the parking requirement of the building facing that laneway. As can be seen in image 5.17f, this common space is often claimed permanently by one resident for the

**5.25** the owners of the north-facing buildings (left) have added sunshades to compensate for the lack of cantilevers (right)

specific purpose of parking – even when there is no car. Image 5.17f also shows how in the western village extension, parking mixes with domestic appropriation geared to production. Domestic appropriation in the eastern village extension is more geared to leisure, does not mix with parking and rather occurs along larger open spaces, where it mixes with commercial appropriation. These new extensions arguably have too much open space, creating a car-dominated environment and leaving many side alleys unused (see image 5.17d). In some laneways the owners reappropriated this space by repaving the ground surface and restricting through movement (see image 5.24b). Appropriations in the old core are rarer as narrow laneway width, a lack of serrated edges and low-light conditions reduces affordances to such appropriations.

The ability to incrementally improve these spatial practices requires social cohesion and continuity of governance. In this regard, it is significant that all local villagers in Jiangxia trace their lineage back to the same clan – a connection that is continuously reinforced by the ancestral hall that has an active role in civic life to this day (see image 5.26). Figure 5.21 shows that Jiangxia' public spaces are actively used, especially the main public space which features the ancestral hall as well as a primary school. Map 5.27 shows that the village is buzzing with activity – children are being picked up from school, elderly people talk and play games, deliveries are picked up

**5.26** community space in between the village pond and ancestrall hall

from the workshops, and people shop for their daily groceries. An average of 444 people was observed using the public space in the transect between 3 and 5pm. Around 55% of people were using the public space for stationary purposes, mostly in larger public spaces and to a limited degree in the laneways of the new extensions. Most of the use and appropriation in the laneways is related to economic activities, rather than social engagement. The public space are multifunctional In the wider laneways that characterise the new extensions, half of all movement was vehicular, while in the old core it was only a third. Vehicular access is not necessarily at odds with pedestrian movement, as mobile hawkers that sell goods out of the back of small trucks attract large crowds. Issues of mobility are not only evident from urban design decisions, but also from how access into the village is managed. Anyone entering the village is surveyed by CCTV cameras, while access for cars is controlled by boom barriers at one of seven entrances – only residents or people with destinations within the village can enter. To facilitate the movement of pedestrians, the village committee maintains a battery-operated shuttle that runs to and from the metro station. The ways in which transportation is organized is yet another example of the way in which Jiangxia has carefully managed its urbanization. At all levels of scale, from the planning of new extensions, to the management of traffic, Jiangxia evinces a mix of formal and informal practices that demonstrate a capability to generate a liveable and vibrant urban community.

# Xiabei

**Xiabei lies midway between the old city of Guangzhou and Foshan – deep within the Pearl River Delta estuary. The village only lies a few metres above sea-level and the waterways that drain the land traditionally played an important role in agriculture as well as transporting produce throughout the region. This ancient network of waterways has been juxtaposed by a modern network of highways that has been rolled out across the landscape. Deprived from most of its agricultural land, Xiabei's residents responded by leasing out land to informal industries – a process which has been described in detail by Guo et al. (2017) and Zhu and Guo (2014). Xiabei also responded by developing a series of residential extensions, but unlike many other villages has restricted their density. As a result, the village has only grown to just over 15,000 people, three fifths of which are migrants. This has generated a highly liveable neighbourhood – but the imposing tower blocks are fast encroaching upon the village, its shadows casting doubt on Xiabei's future.**

### Urban design

Map 5.27 shows how Xiabei's old core straddles the canal that connects it to the Pearl River. The laneways on the northern bank run parallel to the canal (5.31c) and give access to a series of perpendicular 1 to 2-metre-wide dead-end laneways that become progressively more private towards the end (see photo 5.31d). The traditional houses are much narrower than the traditional village morphology in this region, which is likely the result of a pressure on the available canal frontage, which narrowed the buildings much like the buildings in the old city of Guangzhou were narrowed is response to commercial street frontage (Gu et al., 2008). The houses are arranged in pairs, so that each laneway gives access to dwellings on either side  This comb structure is only interrupted every two to three hundred metres by routes that connect the village to its former agricultural hinterland (see photo 5.31a). Historically, Xiabei grew incrementally as new lanes were simply added along the main canal or inter-village routes, extending the village in a linear fashion.

The village originally had 650 ha of land (Zhu & Guo, 2014), which likely consisted of water-intensive agriculture such as silk production and fish ponds typical for this region (Bosselmann et al., 2010). By the late 1980's, the municipality started to acquire farmland till only 250 ha remained by 1995 (Zhu & Guo, 2014). Without a viable agricultural base, the village established a land shareholding cooperative (LSC) that leased out its remaining land to industries. As part of the LSC, a land-pooling scheme  was

**5.27 figure ground**

building footprint

waterbody

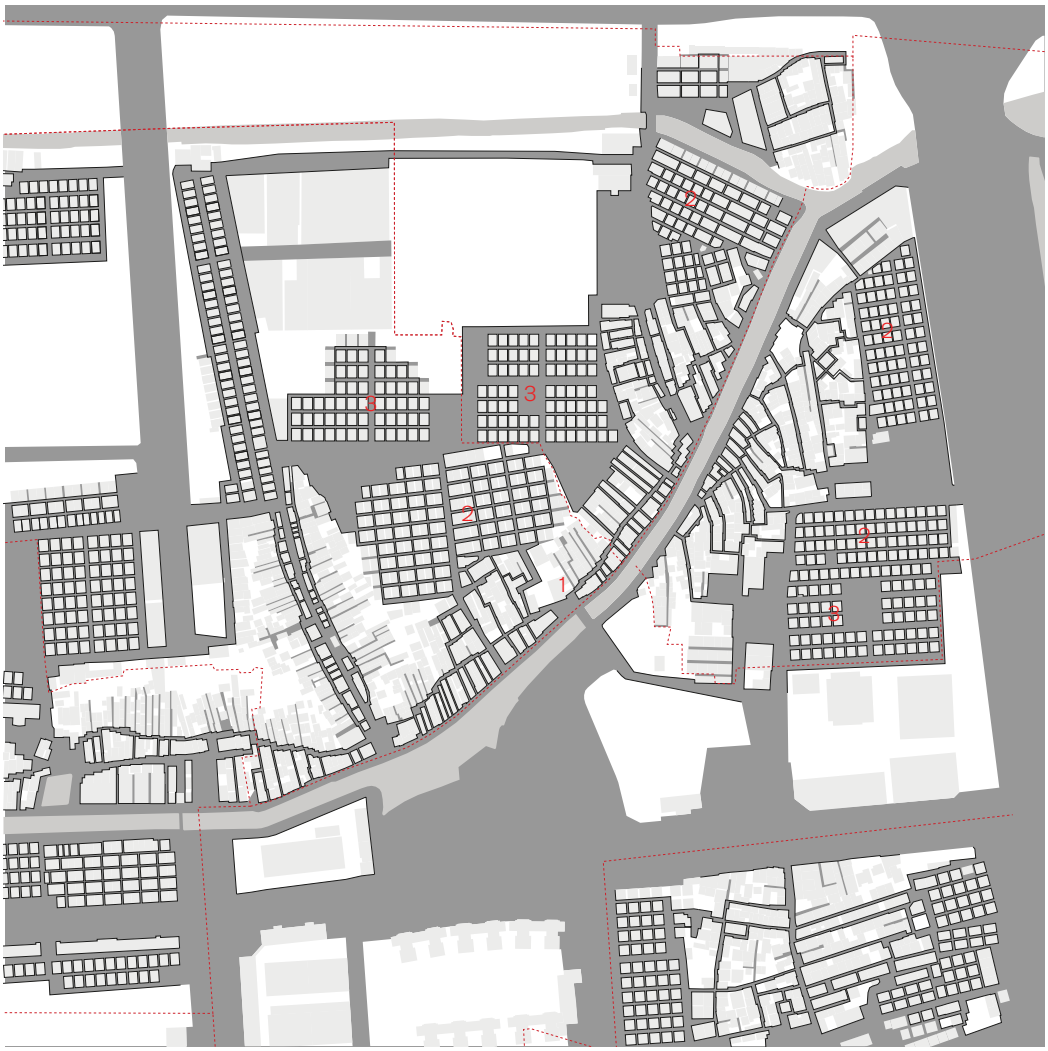
demolished

**5.28 public space**

public space

*zirancun* boundaries

1. ancestral hall
2. first iteration
3. second iteration




100m

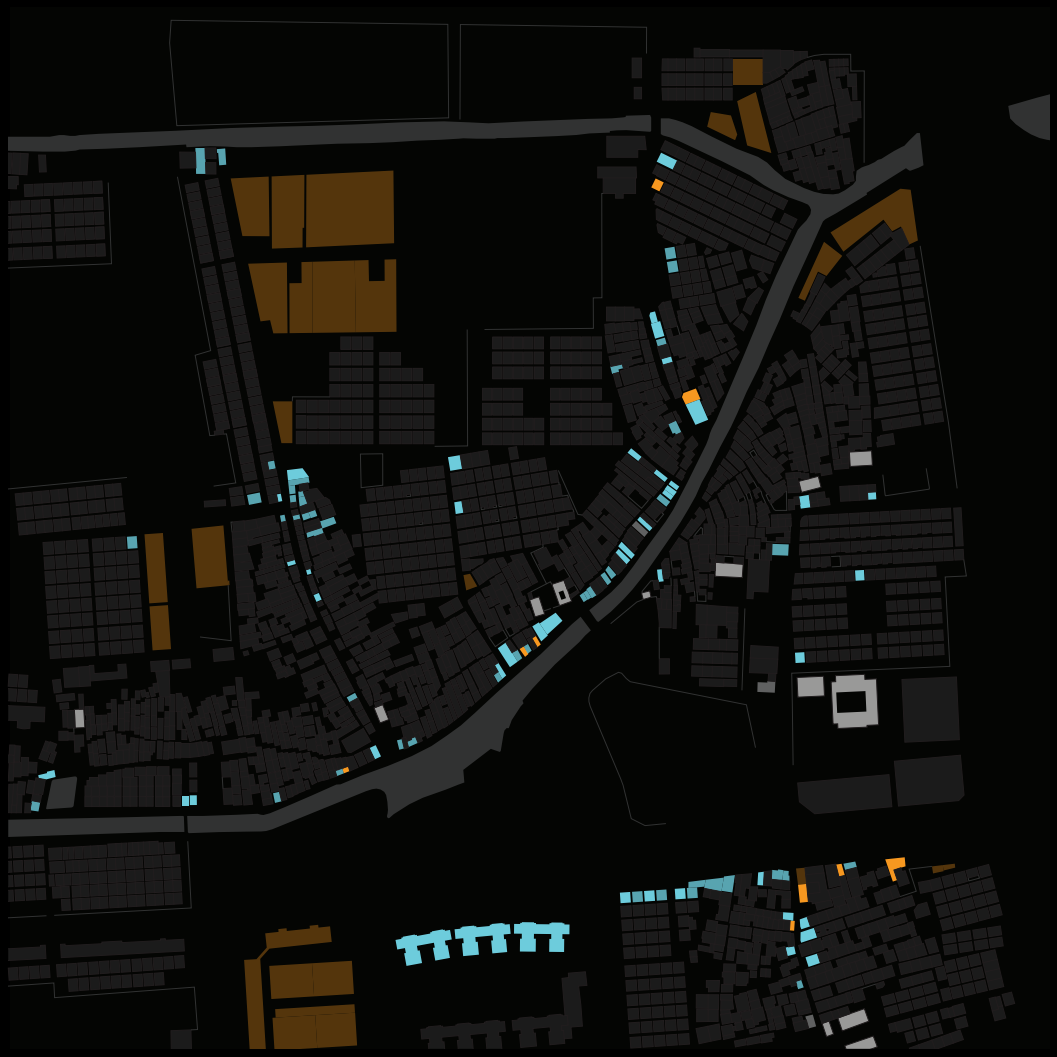
prepared to re-distribute the remaining land among the five *zirancun* of the administrative village (Zhu & Guo, 2014). These *zirancun* (often translated as 'natural' villages) each had a fixed allocation for industrial and residential land. These residential extensions were developed independently, but nonetheless demonstrate several consistencies. First, each *zirancun* abides by the municipal rule that limits plots to 80m$^2$ and which enforces a break from the traditional elongated architectural typology. Second, each urban design is laid out in alignment with the former agricultural parcel boundaries – the extensions that are the furthest removed from the old core align almost exactly north-south.

There are also differences in the new extensions, which can be categorized as two sequential iterations of extensions, the first iterations (marked 2 on map 5.28) still closely resembles the old core morphology while the send iteration has become increasingly car-oriented (marked 3 on map 5.28). The first iteration of each *zirancun* shows a broad diversity of urban design solutions, while the second iterations has become more homogeneous as each zirancun copied its others best features. The first iteration of each *zirancun* is generally directly adjacent to the old core and its laneway's width is similar to the old core. They have added small spaces in between buildings, but these are generally not wide enough to be used for circulation. The most important difference between the old core morphology and the first iterations is that its primary access has shifted from laneways that run alongside the dwelling, to laneways that run in front of each dwelling (see image 5.31e). The second iteration of extensions are more uniform. They maintain the new laneway orientation pioneered in the first iteration, but generally have wider lanes to allow car access (see image 5.31f). They are also more consistently oriented on a cardinal direction. The second iteration of village extensions also incorporates parks, playgrounds and additional car parking lots that are most often positioned on the edge of the housing area, but in two cases carved out from within the grid.

The residential extensions were planned as close as possible to the existing old core within the confines of the *zirancun* boundaries. However, the erstwhile old core morphology of dead-end lanes made it difficult for new extensions to connect to the former laneway network. Furthermore, the different *zirancun* also show limited coordination and long barriers to movement have formed along the boundaries between *zirancun*. Map 5.28 shows the extreme differences in urban block size in Xiabei. The fine-grained laneway structure of the new village extensions is juxtaposed by a new urban grid that defines blocks every 700 to 800m. The highways that surround the village is largely fenced away, barely connecting with the village. The new industries that encrusted the village have not generated a

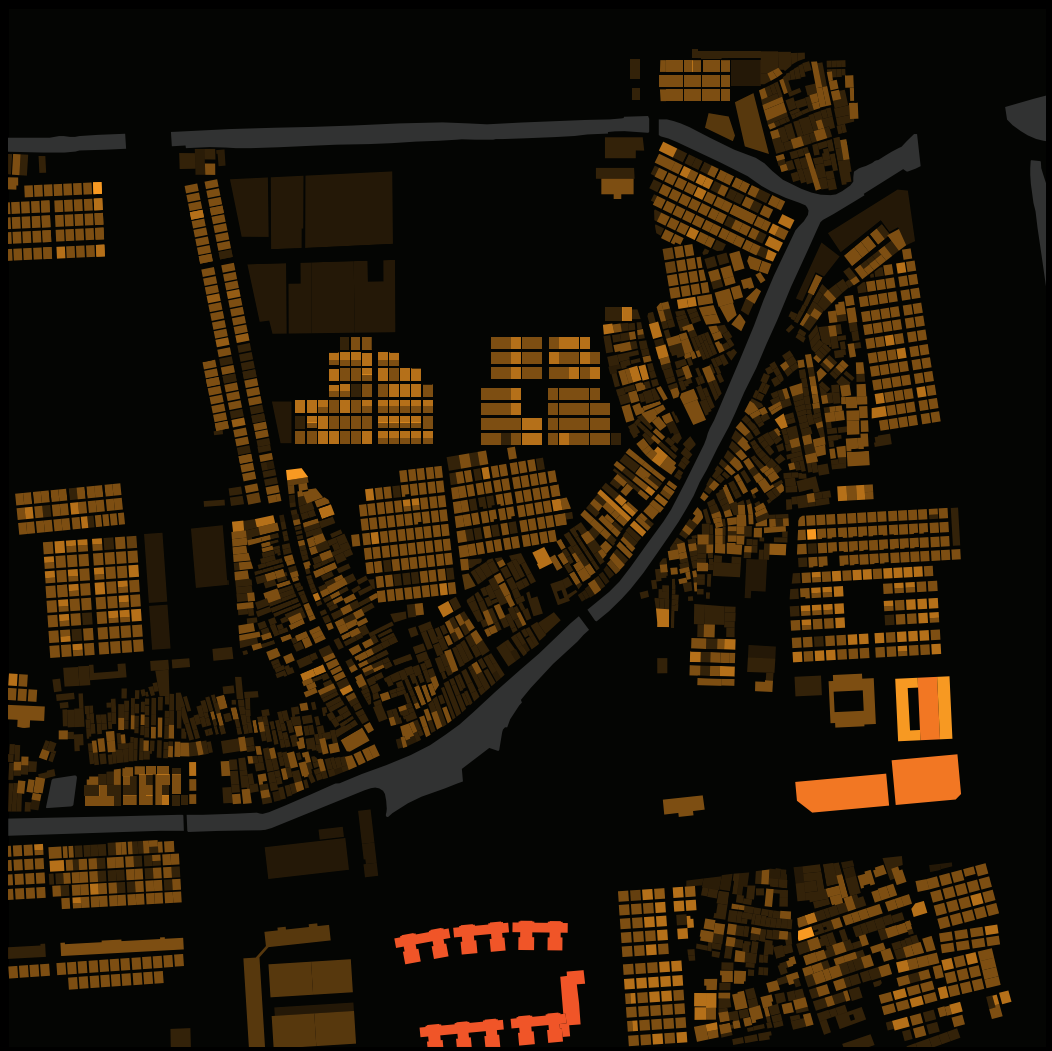
**5.29 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- goods
- production



**5.30 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

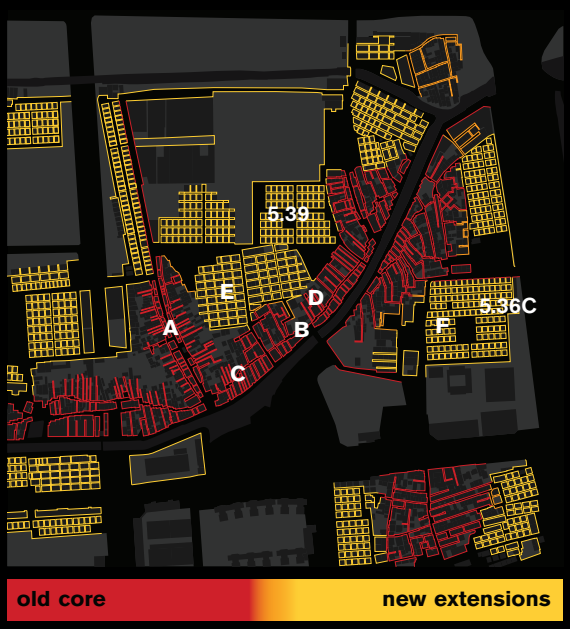
permanent laneway structure to facilitate movement between the village its formal edge.

**Architecture**

The encrusting of the village with industries started in 2000, when the construction of factories and warehouses rapidly accelerated. These low-rise compounds were built on the edge of each *zirancun*. While part of the cooperative's profit from these lease agreements remains with the collective, most profit is distributed among the villagers (Zhu & Guo, 2014). When the municipality engaged in another round of formal acquisition in 2010, villagers were able to negotiate a high price for their industrial land (Guo et al., 2017). Formal construction has not commenced yet on these plots and temporary uses such as parking now takes place here.

Both the profits from the land-leases to factories as well as the sale to the municipality generated funds which the villagers used to extend their houses and improve their living conditions. While such densification often results in very tall tightly packed buildings, Xiabei has only densified to a limited extent. While this may be geared to a lower demand for migrant housing, the main cause is a building height restriction of four floors, which was only transgressed in a handful of occasions. Historic satellite imagery shows that the new extensions were initially filled in with single-storey traditional architecture, and map 5.30 shows that most buildings in the old core remain single storied. Yet, the old core already had started to densify prior to its envelopment. Image 5.31a shows a range of multi-story buildings – the flat-roofed buildings tend to be recent additions, while the pitched-roofed buildings are already several decades old. With a limit of four floors, the limited return on investment makes it less likely for 2-3 storey buildings to be torn down and replaced with a four-storey building. Rather, the restricted capacity encourages floors to be added incrementally, such can be seen in image 5.36c. The two-storey concrete buildings are fitted with metal and plastic frames to enable a third floor, while former balconies are enclosed. The second iteration of extensions, unrestrained by older buildings and with more public space to provide light, have almost all reached four stories. The limited building height and restricted plot size had led to yet another adaptation, where neighbouring buildings are connected at the upper levels (see image 5.36b).

The characteristic parallel laneways (photo 5.31c) that run along the main lane (photo 5.31a) are the likely result of an incremental densification process. The buildings in between the narrow parallel lanes and the main lane did not exist historically and has emerged as owners added new structures in front of their dwellings. Historical *baidu* imagery shows that



**5.31** Typical set of laneways for old core and new village extensions

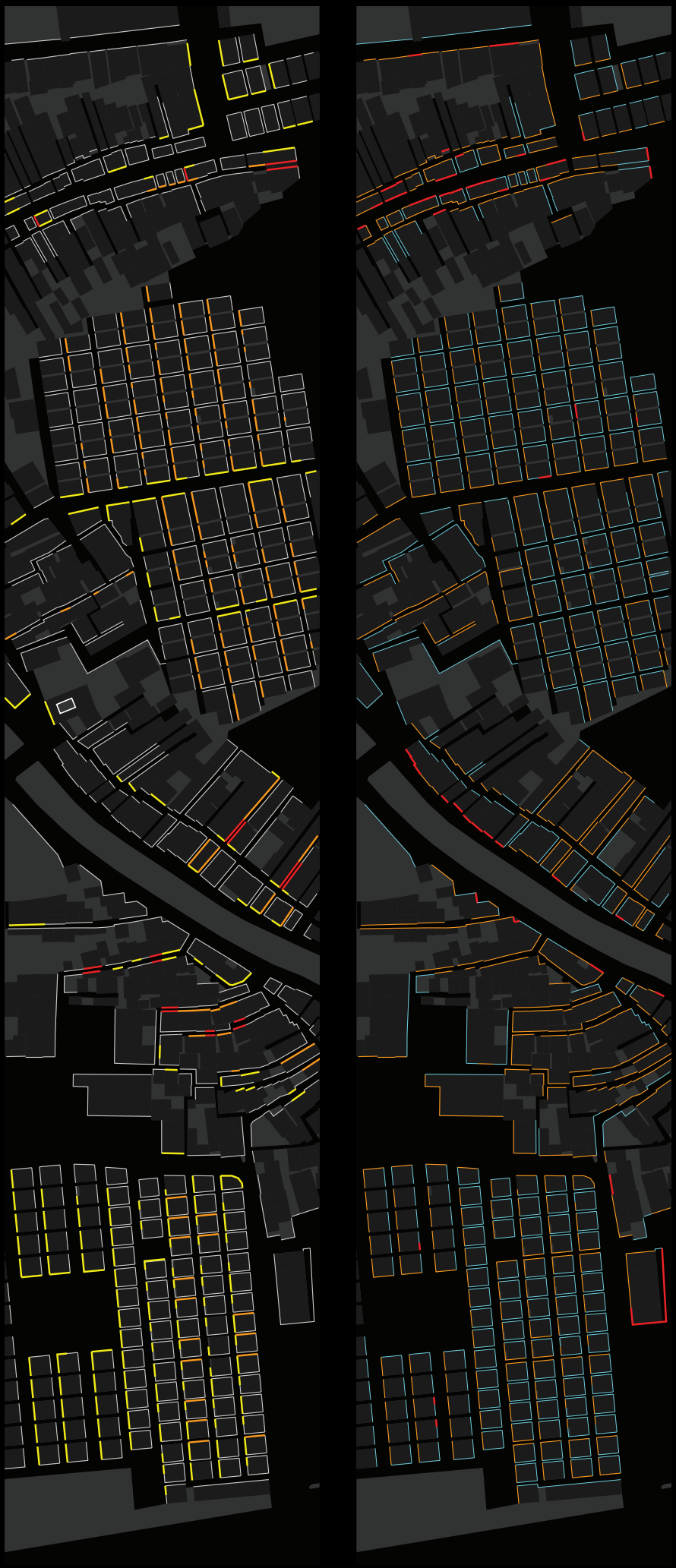
**5.32 appropriation**

- commercial
- domestic
- vehicular

**5.33 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi



**5.34 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**5.35 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

this process continues to this day. Image 5.37b-c show how an empty plot is filled in incrementally over time. The link between the buildings on either side of the lane is demonstrated through the way in which these dwellings have sometimes been connected overhead such as on photo 5.37d. Such links are a precedent that is being emulated in the new extensions. Due to its direct relation to the main lanes of the villages, most of the functional mix in Xiabei is contained within this emergent infill ( see map 5.29)

The easiest way to extend buildings is through cantilevering above public space, but this practice has been strictly controlled by the village committee (see map 5.34). The position of cantilevers is closely linked to the orientation of the house – cantilevers and entrances are found almost exclusively on the front of the house, while the back- and side-facades of the houses lack both entrances and cantilevers (see image 5.31e-f). While almost every building in the new village extensions has cantilevered, the width of the lanes, limited building height and orientation of the cantilevering, has prevented low-light conditions in any of the laneways. This applies to most parts of the old core as well, but as the lanes are generally narrower, they are vulnerable to low-light condition if densification and cantilevering continues. While most buildings in the new extensions have a full plot coverage, in parts a local practice developed where small front courtyards are added to allow more light and provide a small private outdoor space (see image 5.36a). The addition of a front courtyard and partial absence of a cantilever shows that the villagers are not only concerned with maximizing rental profit, but that they are also concerned about the quality of their living environment. It is notable that this practice is limited to particular areas of the village, indicating that this typology spreads through emulation of

**5.36** Architecturall infill in new extensions

adjacent neighbours – an idea well-captured by one the locals who said that when "one person builds, the rest follows". These adaptations are linked by a visual adjacency.

**Urbanity**

The strong clustering of appropriations in map 5.32 highlights the importance of such visual adjacency and the spread of socio-spatial practices. Even in laneways that are spatially identical, only some develop a culture that condones these appropriations, easing appropriations by other residents in a self-reinforcing cycle (see image 5.31e). This culture is enabled by the collective parking areas on the edge of the village extensions that free up space at plot level. As most lanes in the transect belong to the first iteration of village extensions, they do not allow car access. Yet the fine-grained laneway structure lowers pedestrian flows, allowing appropriations to easily spill out into the lane without need for serrated edges that generate a designated space outside the intense pedestrian flow. Appropriation is also enabled by the architectural orientation as every residential lane only has a single active edge, such that the opposite rear-edge provides an easily appropriated extension of the house. Moreover, unlike the old core where houses often have their own private open space, buildings in the new village extensions have no private open space which encourages spill-out. This relationship to private open space is supported by looking at one of the architectural adaptations mentioned earlier, where small courtyards were added at the front of the house. In the lanes where this practice prevails no laneway appropriation was observed (see image 5.36a). Serrated edges only appear along busier main roads, primarily associated with commercial uses. The commercial appropriations

**5.37** Architectural infill of the zone between the main lane and parallel side lanes

**5.38** Haphazard and substandard development or livable community?

happen in a clearly demarcated zone that extends about 1.5 metre from the building, never transgressing the right of way that is painted on the road (see 5.31a). The ability to limit excessive densification and to encourage appropriation is reflected in the large share of stationary activities in public space. Although only  100 people were recorded on average in the transect between 3 and 5pm, most people were using the public space for socializing.

Xiabei contrasts sharply with the typical description of urban villages– the village's development is neither haphazard, substandard or chaotic, but rather demonstrates a strong degree of organization that has resulted in a very livable neighbourhood. The residents in the new extensions have taken explicit care to enhance the aesthetics of their house, such as in image 5.39. Crucially, this urban quality is not merely achieved by investments in the house, but it is enabled by the urban design that provides adequate public space and restricts car movement. Despite Xiabei's considerable spatial quality, the villagers are currently negotiating with a developer who is aiming to acquire and redevelop the land. While the municipal government will have to formally acquire the land, pay compensation and transfer the land to developers, the redevelopment depends on the developer's capacity to make a profit, and they are therefore leading the negotiations.

The billboard in image 5.38 shows the proposed future development in which Xiabei will be transformed into a 'new high-end residential/business district', obliterating all former trace of the village. Even while negotiations

**5.39** The demolition of the existing morphology announced by nearby billboard

were still underway, the municipality had already constructed the adjoining infrastructure to the edge of the built area of the village as if its faith has been sealed – the municipality was right. According to local news reports, in 2019, the western-most *zirancun* agreed to the developer's 'comprehensive redevelopment' offer with 93% of the villager's vote (Zhufeng et al., 2019). The villagers have been promised they will be relocated first before their village will be demolished, and that they will continue to receive an income from a newly built complex that will be owned by the village collectively. Xiabei lays bare the inherent financial, aesthetic and social contradictions in redevelopment. While redevelopment is one of the key means for municipalities to make financial gain, increasing negotiating power by villagers has reduced the margins to be made. While redevelopment is supposed to increase the housing supply, the gain that would result from replacing the village with 18-storey high towers like nearby formal development, would be identical to upgrading all of Xiabei's existing buildings to 4 storeys (both have FAR of 3). If adjusted for apartment size and including space for vertical infrastructures such as elevators and fire-escapes, the residential population in high-rise is expected to decline – forfeiting any social purpose to redevelopment. The usual redevelopment arguments that would support such a financial gain – the negative casting of the village as a place of social vices, crime, overcrowding and fire hazard are completely unfounded here. Rather the opposite – the village's vibrant social life will likely disappear forever.

## Comparison

Urban villages in southern China are the archetypal urban villages – understood as a chaotic process of in-situ urbanization driven through 'rent-seeking' behaviour and characterized by 'wasteful' land use, 'congested' public space and 'inefficient' urban from. As one interviewed official put it, they are a 'problem left over by history'. This chapter has demonstrated that these assumptions are incorrect or at least insufficient in describing ground reality. A large range of spatial differences in quantity, quality and use of public space are collapsed into the archetypical urban village image. Scholarship that has aimed to nuance this view has often singularly focused on high dense, centrally located villages, which has actually reinforced the archetypical image. A comparison between Shipai, Jiangxia and Xiabei reveals three key insights. One, new village extensions differ from the old core in both quantity and quality of public space and transformations in functional mix and density and closely linked to these morphological differences. Two, intensification does not happen uniformly and is strongly mediated by orientation. Three, rural morphologies are emulated into new forms, there is a strong sense of emulation of mediated by village governance.

Guangzhou's urban villages have distinct spatial differences between their old cores and new extensions. While old cores have just 15% public space, new villages extensions have close to 50% public space, incorporating parking and other public open spaces into the design. There is arguably an overproduction of public space as many spaces have become neglected or are reappropriated as more private spaces. Village extensions not only have more public space – it is also organized differently. While the logic of the grid is emulated from the spatial organization of old core, new extensions are characterized by a shift in laneway hierarchy in which the embedded. graduated privacy is lost. These extensions connect to inter-village routes and have a very high internal permeability, but considerable barriers to movement arise between extensions planned by different clans, production teams and *zirancun*. The biggest barriers to movement do not result from the informal planning of village extensions but are induced through the formal envelopment of the village. This emergent permeability, or lack thereof, is critical to the ways functional mix operates. A self-organized process of functional clustering segregates consumption functions along the most integrated routes, from production functions in the interior of the village. The 'front-shop back-factory'-relation that has been used to characterize the relation between Hong Kong and the other Pearl River Delta cities plays out at the smaller scale within the village. Shops rely on visibility and flows of visitors while the workshops rely on a pool of cheap land and labour.

**5.40** Redevelopment and 'normalization' in Liede – the future of urban villages?

The use of public space in Guangzhou's urban villages is closely related to its densification and increasing cantilevering. As the village gets denser, the amount of people using the public space increases, but critically the share of people engaged in socializing decreases. While the larger public open spaces are important even in low dense Xiabei, socializing increasingly clusters in these few larger public open spaces. This shift in use is geared to increasing entunneling of old core. Entunneling does not happen in new village extensions through the combined effect of laneway width and coordination of cantilevering. Laneways in new extensions are assessed on their capacity for cantilevering, and strict self-enforced rules govern the orientation of cantilevering among villagers. This 'planning-through-coordination' is even at work in the old core – many rear-interfaces remain without entrances or cantilevers. Despite its risk on entunneling cantilevering is not all bad. While cantilevering originates from the desire to maximise floorspace within restricted plot sizes, the sheltered space that is generated below is easily appropriated. The serrated edges that generate affordances for social life are almost all below cantilevers.

Both the village extension process and subsequent intensification are characterized by an emulation of the rural morphology and its embedded socio-spatial practices. Adaptations to subsequent village extensions indicate a learning process in which previous faults and achievements are incorporated. Of critical importance to this learning process are the ways in which these adaptations are mediated by institutionalized village governance. Municipal codes emulate and institutionalize the rural morphology into a set of development controls. The village committee regulates these controls while precise configuration is done at the neighbourhood level. The clans,

production teams and *zirancun* that operate at this level are themselves emulated forms of neighbourhood organization. While the governing role of clans was formally replaced by production teams and subsequently by *zirancun*, the relations embedded in each governance unit can be said to linger and many of its characteristics are retained. The adaptive process is further enabled by an emulation of cultural norms that are embedded in collective land ownership. As each villager had an equal share of the collective land, all plot sizes were uniform, which enabled land readjustments that are required for new village extensions. This equality also facilitated the setting up and monitoring of urban codes since a single set of rules could be applied to all plots. These intermediate organizations can also help facilitate local subversion of established village practices, like the spread of mezzanine floors in Jiangxia or the front-courtyards in Xiabei. While the ways in which these architectural adaptations spread through the morphology are not governed directly, they exist in an environment where those adaptations are acknowledge and tolerated.

This chapter concludes by considering the future of Guangzhou's villages. Shipai and Xiabei provide examples of the two alternative approaches to development (Altrock & Schoon, 2011) discussed earlier under municipal practices – 'integrated' redevelopment in Shipai and the prospect of 'comprehensive' redevelopment in Xiabei. The redevelopment of Shipai's pavements and facades is a promising step but provides no solution to density related problems such as the low-light conditions. Whereas the villagers in Xiabei have no nearby precedent to evaluate the impact of the proposed transformation, the villagers in Shipai are keenly aware of the redevelopment of nearby Liede – a former village that was 'normalized' into the city (see image 5.40). The billboard on image 5.38 gives an impression of the new urban environment in Liede – an anonymous modernist tower complex that has lost all associated benefits of the fine-grained urban village structure. The mapping in this chapter demonstrates that these benefits go beyond the financial argument that merits the urban villages for the provision of affordable migrant housing. The morphology of the village allows the co-existence of housing, places of production and consumption, while the public space's flexibility allows appropriations that facilitate those functions and through which social life emerges. These issues play out across all of Guangzhou's urban villages and as the city keeps expanding, an even larger number of villages will be faced with a similar set of issues, eventually reaching all of the villages within the Pearl River Delta.

# chapter 6 Delhi

**Delhi was one of the first cities where the phenomenon of urban villages was recognized and subsequently documented and researched. In the book *Urban growth and urban villages* Tyagi (1982) defines an urban village as "a village which has acquired urban characteristics due to reduction in its agricultural base by the process of acquisition of land holdings for public purpose or by its transformation into residential or industrial colonies". Tyagi describes how urban villages in Delhi have played a key role in housing large number of migrants, who did not have access to formal housing. Many migrants ended up in Delhi's urban villages, as well as urban villages within the urban agglomeration that includes other large cities like Gurgaon, Noida and Ghaziabad. In Delhi, the urban village is not only recognized as a socio-spatial phenomenon, but it is also a legal category, shaped by a historic property and tax laws and given renewed importance in contemporary building regulation. This allows a rough urban village population estimate, which Ahmad and Choi (2011) place at 11% of the total population of Delhi, which adds up to more than 2 million people.**

**The urban village in Delhi is part of a much larger assemblage of informality – 76% of people in Delhi are considered to live in unplanned settlements, of which urban villages is only one category (Ahmad & Choi, 2011). Most informal settlement occurs on former farmland that belongs to one of the villages that dot the metropolitan region. According to a recent government survey (Urban slums in Delhi, 2015), the informal settlement of privately owned farmland does not usually produce slum conditions (only 2% of slums in Delhi are located on private land). If formal development is the complete and permanent change of rural ownership, livelihoods and built form, informal development can be understood as a partial transformation from village to city – a transformation that is profoundly shaped by municipal practices.**

## Municipal practices

Urban villages in Delhi exist as a separate legal entity, known as *lal dora*. *Lal dora*, –or red thread– was institutionalized in 1908 by the British colonial government to formalize verbal land ownership agreements and to fix property boundaries between them. The *lal dora* segregates the built-up village core, known as *abadi,* from the agricultural land, also known as *gauchar* land (Shah, 2012). The *abadi* has no formal plot boundaries and is always located on a small mound, which is the accumulative result of hundreds of years of habitation, as structures get torn down and rebuilt (Chandhoke, 1990). Rural tax had to be paid on land outside the *lal dora,* while the land inside the line was exempt from tax, as well as others kinds of municipal authority, including building codes (Chakravarty, 2016; Shah, 2012). While the *lal dora* has a clear legal status and has been embedded into municipal master planning, a range of practices has developed that has blurred the apparent rigidity of the *lal dora*. The governing body of the village (*gram panchayat*) has historically allowed the exchange *gauchar* land for land within the *abadi*. This process depends on negotiation with the *gram panchayat*, and typically involves the exchange of a larger parcel of *gauchar* land for a smaller plot within the *lal dora*. The *gram panchayat* can also grant parcels to certain families based on merit or economic hardship and social consensus (Chandhoke, 1990). So-called *lal dora* extensions have be granted by the municipality throughout villages in Delhi, allowing villages to expand their built-up area. The latest *lal dora* extensions were granted in 2013 (TNN, 2013).

The *lal dora* policy was always intended to simply a complex and highly differentiated cultural and legal rural landscape. While the Indian government has formally abolished the caste system and the landlord-based *Zamindari* cultivation system in the 1950's, these historic arrangements continue to affect the urban morphology. Traditionally, the region around Delhi had *Mahalwari* villages with high levels of village organization, headed by a collective body (*gram panchayat*) (Banerjee & Iyer, 2005). Representation into the collective village body of a *Mahalwari* village varied, and is often related to the amount of land each family owned. Land ownership varied between parcels of shared collective land, parcels that were allocated along ancestral lines (*pattidari*), and land that was freely exchanged. Particular land arrangements are often associated with predominant castes within a village (Cowan, 2018). Caste differentiation affects parcel size – typical land holdings among higher caste families can be as much as 3 to 4ha, while lower caste families typically own 1 ha (Cowan, 2018).

In the paper *Erstwhile villages in urban India* (2015), Kumar describes how villages are incorporated into the city. Urban growth in Delhi in the first decade after independence, happened largely without formal planning until Nehru founded the Delhi Development Authority (DDA) in 1957 (Tiwari et al., 2016). While the *lal dora* institution was meant as a tool to control villages, the formal registry of rural land now enabled villages to demand compensation when the municipality intended to redevelop their former farmland . The municipality tended to acquire the cheaper agricultural land and leave the *abadi* areas untouched (M. Kumar, 2015). The only well-documented case where even the built area of the village was acquired, was for the construction of the Indira Gandhi airport. The first large-scale acquisition was in 1959, when the DDA acquired 16000ha of land, establishing the formal boundaries of the city for the next 20 years (Tiwari et al., 2016). The DDA only started acquiring land again in the 1980's, establishing for example the district of Dwarka. In villages that fall within the administrative limits of the municipality, the *gram panchayat* is abolished and nominally replaced by municipal rule (M. Kumar, 2015). All commonly owned land is nominally transferred to the municipal government – although it is often unclear what land is collectively owned. Privately owned land that is not acquired remains with the original owners. The practices that allowed the shifting of the *lal dora* boundary cease to function as there is no longer a village governing body to approve such shifts. As a result, many villages have extended beyond their original *lal dora* boundaries without formal recognition and these village extensions have often been classified as illegal settlements or unauthorized colonies.

The formal urban extension is accompanied by a masterplan that segregates distinct functional zones. Yet, this masterplan only covers those areas that are acquired by the municipality – rendering and land outside the masterplan or any mix-use land within the masterplan as illegal. Three quarters of Delhi has developed outside this formal framework (Ahmad & Choi, 2011) and as such, much of the current municipal affairs are concerned with legalization and formalization of those settlements. While the authority for land-use and building regulations lies with the DDA (an administrative body), the authority for regularization and upgradation lies with the political authority of the local Member of the Legislative Assembly (MLA). The built-up area of the village that falls within the *lal dora* is legally recognized, but largely unmapped and unregistered (Expert Committee on Lal Dora, 2007), while new village extensions outside the *lal dora* are considered illegal and the municipality refers to them to as unauthorized colonies. Despite their unauthorized status, land is still transferred from the villagers to new owners, through the legal instrument of power of attorney

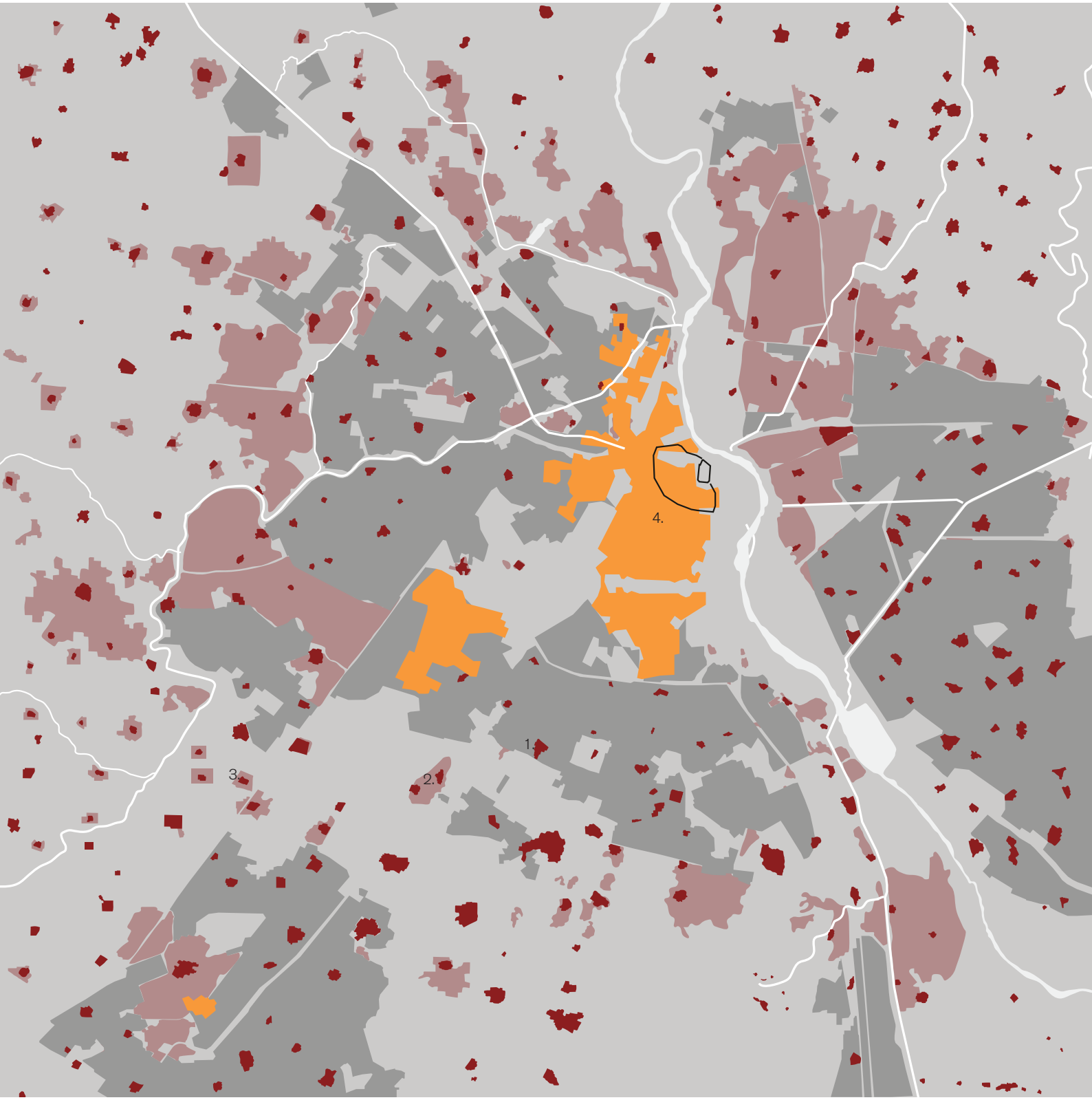
(Zimmer, 2012). This informal exchange of property enables landlords to evade taxation and regulation and increases the income from their property (Pati, 2019). Achieving full registered and legal tenure is still important for residents, not to prevent eviction, but rather for accessing credit and municipal services. Sheikh and Banda (2014) describe that legal land tenure for residents of an unauthorized colony is gained through the legal recognition of the settlement as a whole, after which individual owners can register their own plots. To apply for authorization, the settlement has to form a residence welfare association (rwa), which is charged with preparing a detailed layout plan, containing names of all the residents, plot boundaries and street names (Sheikh & Banda, 2014, 2016). The rwa also must provide evidence that the settlement existed before 2002. Since this is a bottom-up process organized by the residents, who are untrained at surveying, this study found that these layout plans are plagued with inaccuracies. The residents are further required to pay the municipality for 'development charges', even though most of the infrastructure has been financed by the residents. Additionally, the residents pay a penalty for the illegal use of land in the form of a 'recovery charge'. These hurdles essentially require residents of informal settlement to pay twice.

A 1963 municipal notification exempted buildings within *lal dora* from building approval. Yet Pati (2019) has demonstrated that this exemption was interpreted differently over time producing ambiguity as to whether building codes apply and to which settlements. There are currently a limited set of urban control regulations that apply to *lal dora* which have been extracted from the Delhi 2021 masterplan (2007). The building height in urban villages is restricted to 15 metre, enforced through periodic checks. Illegal additions will have to be taken down, although the masterplan indicates a way around this by paying a "penalty to compound [for] deviations from [allowed] limits of the floor area ratio (FAR) to the extent of 5% of the permissible [allowance]" (2007, p. 196). Ambiguity in building regulations extends to regulation on formal development. For plot sizes up to 100m$^2$, the maximum permissible FAR is 3.5 – 3.0 for plots up to 250m$^2$ and 2.25 for plots up to 500m$^2$. However, the masterplan allows for 'additional FAR' that can be regularized by financial compensation (2007, p. 47), while 'non-habitable' space such as used for parking on the ground floor is not counted as part of FAR (2007, p. 45). All plots above 100m$^2$ require a 3-metre front setback, and side-setbacks of 3 metre are required for plots greater than 250m$^2$. However, the masterplan also states that projections above public space which existed before 2007 shall be regularized for any plot up to 175m$^2$ on roads below 24 metre wide (2007, p. 46).

There is a persistent belief that urban villages are characterized by excessive encroachment which needs to be stemmed. Pati (2019, p. 256) writes that "village lanes became narrower and village squares started disappearing as encroachment became extremely lucrative. The more lane area your house could encroach upon, the greater number of one-room sets that could be built". In 2007, a committee was commissioned by the municipality to investigate ways to improve the conditions of the old village core within *lal dora*. They write that the result of the village's urbanization "was extensive encroachments on [agricultural land] and mushrooming of unauthorised colonies [which led to] highly substandard and deficient in urban design and services" (Expert Committee on Lal Dora, 2007, p. 22). Seven key problems were defined – lack of civic services, no access to emergency vehicles, shortage of parking, lack of sufficient light and air, encroachments, exposed power-lines and lack of commercial space (Expert Committee on Lal Dora, 2007, p. 46). Yet, the committee failed to provide a feasible strategy to address the spatial dimensions of the listed problems. Apart from more general commitments to improve the living conditions in the village, the only clearly formulated spatial solution rests on the basis of an amalgamation scheme, enabling the reconstruction of the village within formal building codes (DDA, 2007, p. 29). Plots that amalgamate into an area of 3000m$^2$ or more are incentivized to redevelop through a FAR of 4, which is significantly higher than the 2.25 allowed for formal parts of the city. However, as it is scarcely higher than the FAR of 3.5 currently allowed for small plots in urban villages, the uptake for this proposal has not been transformative.

## Spatial outcomes

The alluvial plain around Delhi has traditionally been used intensively for agriculture and human occupation. Numerous large capital cities occupied the area for thousands of years, fostering the emergence and continued existence of many rural communities that supplied these cities. Intense interaction between the medieval city of Delhi and the surrounding villages existed as wealthy city dwellers received land grants in villages, in return for services to the Mughal rulers (Hosagrahar, 2001). Nair (1996, p. 101) notes that the villages around Delhi sometimes have very specific origins geared to historic urban functions, that can be traced etymologically. The suffix *pur* indicates the village already had some urban functions, while *serai* indicates the settlement existed as a resting place along a highway between cities. Arguably, urbanization of villages had already begun at that early stage. There are contradictory accounts concerning the number of contemporary urban villages in Delhi. According to Tyagi (1982) the city had 25 urban




**6.1** Urban villages in Delhi

| | | |
|---|---|---|
| 1. Munirka | 28°33'19.20"N | 77°10'16.85"E |
| 2. Mahipalpur | 28°32'42.92"N | 77° 7'43.18"E |
| 3. Bharthal | 28°32'37.61"N | 77° 2'57.11"E |
| 4. Rajeev Chowk | | |

urbanization till 1950
informal
formal
urban village

villages in 1931, 47 in 1951 and 135 by 1971. A 1986 DDA report (Gupta, 1986) however notes Delhi had 369 villages in 1981 of which merely 111 were 'urban' villages. Bhan (2013) examined how many villages were formally incorporated in each subsequent masterplan and notes that the 1962, 2001 and 2021 masterplans respectively only incorporated 20, 106 and 152 urban villages. Finally, the Expert Committee on Lal Dora who published their evaluation of urban villages in 2007 merely reiterates Tyagi's 1971 count of 135 urban villages, even though more than 40 years separates the two publications. Moreover, the numbers above remain restricted to a binary dichotomy – urban or rural, which reflects an administrative logic rather than an effort to describe the actual socio-economic condition of the village Tyagi (1982) describes the urbanization process of villages in three stages – rural villages that have been notified for acquisition – peri-urban villages were the agricultural land has been acquired – and finally urban villages that has densified. This idea of three stages has essentially remained unchallenged to this day (Tiwari & Rao, 2017), even though such stage-thinking disregards any specific response to the urbanization process by local villagers, changing municipal policy or the various social and morphological pre-existing conditions in the village.

Map 6.1 shows the distribution of villages through the Delhi metropolitan region. Within the 1600km$^2$ study area there are around 350 clearly identifiable separate village settlements. Apart from the section of Delhi built during Colonial rule, where all villages were cleared, and natural features such as the Aravalli range and Yamuna river, urban villages are spread fairly evenly across the territory. Each village has between 2 to 2.5km$^2$ of hinterland, meaning that each village traditionally had walkable access to agricultural land to about 1 to 1.5km from the village nucleus. The three villages selected for in-depth morphological analysis are based on the urban to rural transect. At least four important transitions characterize this transect. The urban villages within the 1961 municipal boundary are relatively contained. Outside of this former boundary, the old village cores have informally extended, eventually agglomerating into large districts. Villages further out in the urban periphery are still surrounded by farmland and still have space to extend. Finally, urban villages within the boundaries of adjacent municipalities (Gurgaon, Faridabad, Noida and Ghaziabad) are contained as well, like those the centre of Delhi. The selection of villages for this study was made to feature the diversity of the urban transect: Munirka – the most urban village – lies within the 1961 municipal boundaries, Mahipalpur – the semi-urban village – lies just outside the 1961 boundary, while Bhartal – the least urban village – lies well beyond the boundary. The villages were also chosen to tie in with existing research, to provide a social and cultural context to the morphological research.

# Munirka

**Munirka is a centrally located urban village about 10 kilometres south from the centrally located Rajeev chowk along the former 'outer ring road', now deeply embedded in the city. The village is fully enveloped by formally planned residential areas and the sprawling Jawaharlal Nehru University campus. As Munirka was incorporated into the city at an early stage, there has only been limited horizontal extension, and most of the village consists of the transformed fabric of the old core, which now houses an estimated 40.000 people. Munirka is a well-known village that often features in local news which tends to focus on negative aspects of the village, such as overcrowding, unclear legal titles, crime and migrants (Bisht, 2016; Seth, 2016). Mehra (2005) points out that the municipality long neglected Munirka, as it suffered from lack of access to proper water and waste services. In absence of government action, Munirka's inhabitants have self-initiated an informal upgradation process – but have these investments in its architecture threatened the functioning of its public space?**

### Urban design

Munirka's old core is about 800 years old and centred around two main nodes – the village *chowk* and a stone mausoleum atop a small hill that is attributed to *Munir Khan*, a nobleman who once owned the village. From these two nodes, meandering 2 to 4-metre-wide lanes are organized in a system of graduated privacy, where width of the laneway indicates the level of privacy (see image 6.4a-b). Bhagat (1995) details out the social history of Munirka village up to 1994. The largest share of the land, as well as the best located land was traditionally occupied by the dominant *Jat* caste, while other castes settled on the village's edge. To this day, the presence of Christian and Buddhist references commonly associated with lower-caste groups provide visual markers of those caste relations.

The current extent of the village represents the accumulation of four separate *lal dora* extensions that were authorized by the municipality in the period between 1908 and 2003. Houses were incrementally added to the village under nominal consent of the *gram panchayat*, which in time became formally recognized as a new *lal dora* boundary was set. When the village was incorporated in the Delhi municipality (MDC) in 1958, the *gram panchayat* was abolished, but incremental extension of the village continued. A DDA report documented by 1986 up to 30% of Munirka consisted of unauthorized extensions outside the *lal dora* (Gupta, 1986). Expansion of the *lal dora* happened in parallel with a decrease of Munirka's agricultural land. Two land acquisitions in the 1950's – a initial one for the Delhi 'outer ring

road' and a subsequent one for all the remaining agricultural land, reduced the total land area of the village from 618 ha (Mehra, 2005, p. 19) to just 27ha.

Aside from the old core, two other distinct morphologies can be observed – one north and one south of the old core (see map 6.4). The northern part of the village was originally flat agricultural land and was subdivided into an orthogonal plot structure with 3 to 6-metre-wide through-lanes. These through-lanes run along the edges of the former rural parcel boundaries, while the circumscribed land was subdivided among the families of the village into lots ranging from 800 to 1500m$^2$. This initial urban design was incrementally added to as these large plots were further subdivided along dead-end laneways that are only slightly narrower than the main lanes (see image 6.4e). The southern side of the village was undulating and covered with *jungle*, before it was cleared and settled by lower caste families. Morphologically, it resembles the old core due to its incrementality. The 2 to 4-metre-wide through-lanes curve gently along the contours of the terrain, while only few connections exist between the lower and higher ground. The emergent urban blocks are amorphous within which small dead-end lanes have emerged to provide access to subdivided lots. Unlike the northern section, these are shorter as they terminate into the rear-side of housing along opposing routes. Both the winding character of the lanes as well as the wider range in plot sizes are indications that this part was settled with less degree of organization than the northern part.

While the laneway network of the northern part of the village is well integrated with the formally built ring road, as well as the adjacent DDA flats, the southern part has a very sharp edge condition, delineated by boundary walls (see map 6.3). As lanes in the northern section were laid out along rural parcel boundaries, the average size of rural parcels (1 ha in this region) is reflected in the average block perimeter of 400m. Large urban blocks emerge in the transition zones between the southern section of the village and the formal city – in some cases extending above 700m. Even within the village itself, there is a large amount of variation in size and shape of the blocks, sometimes creating impassable barriers for up to several hundred metres. Although the urban design is fine-grained, much of the public space was generated incrementally as dead-end laneways, rather than through connections.

**Architecture**

Munirka has an intense functional mix compared to the surrounding formal city. Map 6.6 shows the most intense mix of uses in the northern part of the village, while other parts of the village have smaller clusters of non-

**6.2 figure ground**

building footprint

**6.3 public space**

public space

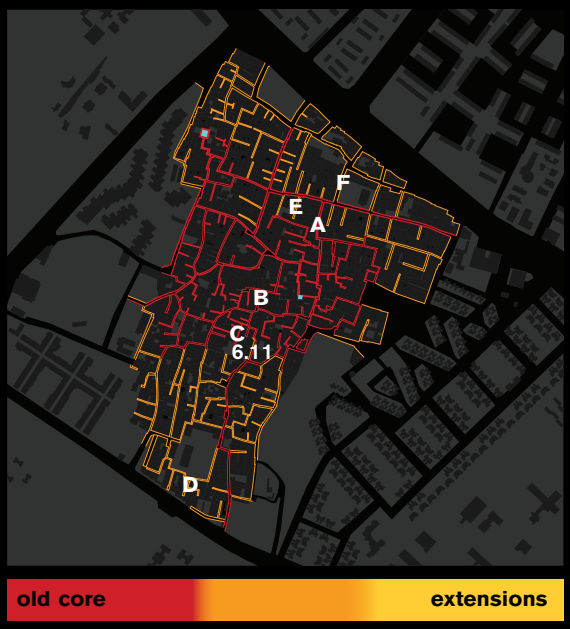
1. Munir khan tomb
2. Babu lal chowk
3. Small hill
4. Sarvoday school

100m

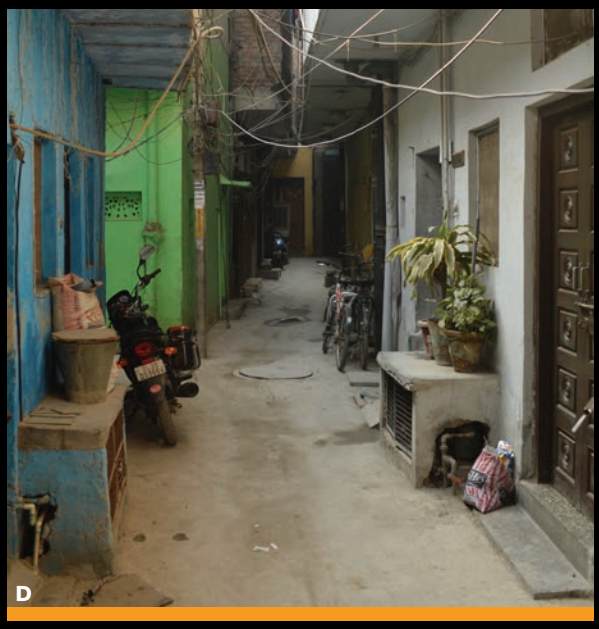
residential uses. Munirka's functional mix consists primarily of small shops, which sell clothing, household articles or provide services. There are some specialized clusters such as the sale of furniture along the outer ring road. The production of goods is relatively rare. The shops are organized along the main routes through the village, where flows of people are the highest. Despite intense pressure on commercial space, shops are never along any of the dead-end lanes that receive little foot traffic. Consumption functions have almost without exception added a small serrated edge to their frontage, appropriating the public realm (see map 6.10). This space is used in a multifunctional manner, to showcase their goods, provide a space for customers to wait and to temporarily store items for delivery. Map 6.7 shows that competition for public space in the northern section of the village has pushed out other uses of public space.

The distinction between the old core and its northern and southern extension remains distinguishable in the architectural infill. The more informal extension in the southern and western parts of the village produced smaller plots, while plots on the northern and eastern side of the village are larger. The southern section densified incrementally as additional floors are added (see image 6.12), while the northern section tend to get densified by the reconstruction of entire buildings. As a result, the southern section has much more diversity in building height. Map 6.5 shows that the average building height of 4.5 floors does not change much throughout the village. Many buildings are built exactly to the 15-metre height limit, while there are few buildings in the village that transgress the municipal restriction. While this could mean that the municipal rule is effective in limiting excessive height, it could also be interpreted as a later formalization of local practices that had already limited the height. The survey found that the village is still densifying further, with many buildings still under construction – within the existing building height limit at least another 20% of floorspace could be added.

Driven by a demand for space, cantilevering is a pervasive spatial feature in Munirka that affects 70% of interfaces. Older, low-rise buildings cantilever through protruding steel beams that extend out from the first-floor ceiling, while newer buildings use reinforced concrete cantilevers. Cantilevers generally extend up to 1 metre from the building edge, effectively rendering many laneways of 2 metre and below as tunnels. Map 6.9 shows that at present 25% of the laneway network has no access to natural daylight. One-third of the lanes are ensured of light through adequate laneway width, but almost 40% of the laneway network is at risk of losing access to light if cantilevering practices continue indiscriminately. Four spatial practices were identified that currently prevent such escalation. First, some laneways benefit




old core extensions



**6.4** Typical set of laneways for old core and new village extensions

from adjacent government-owned land – buildings which are generally built on a setback and without cantilevers. Second, another share of the built fabric gets its light from the 'undeveloped' space above low-rise buildings, especially in the southern part of the village where building heights are substantially differentiated. Over time, the 15-metre municipal height limit evens out these height differences and eliminate this light source. Thirdly, some of the incrementally added laneways in the northern part of the village have no cantilevers at all and this is geared to the semi-private ownership of the laneway and adjacent buildings by the original owner of the plot. Finally, the practice of cantilevering is strongly associated with the orientation of the frontage zone. Image 6.4c and 6.4e demonstrates how interfaces without entrances are most often also without cantilevers.

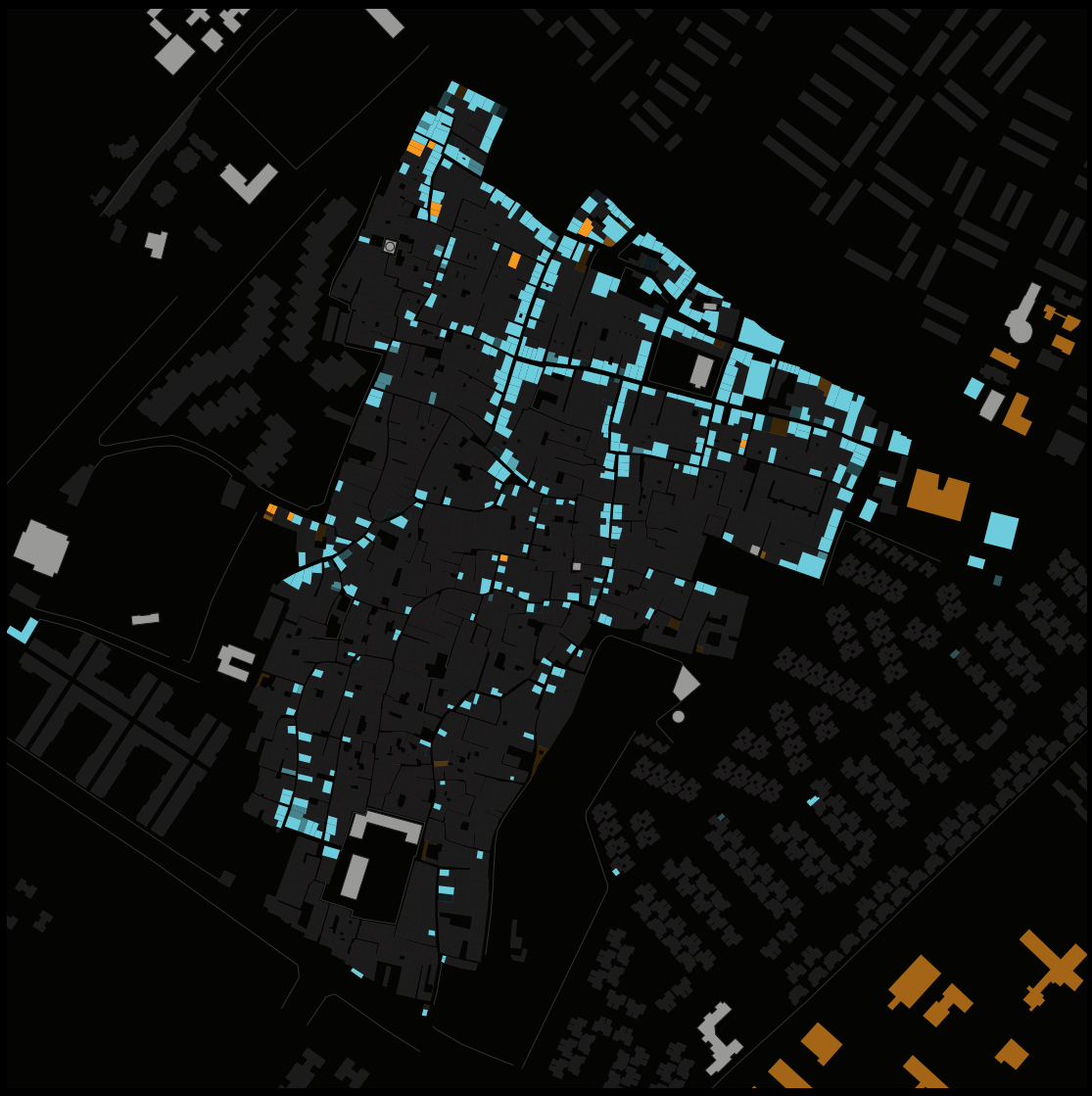
**Urbanity**

Munirka's densification increased the demand on a limited public domain. Only few interfaces along residential buildings have generated serrated edges, as intense demand for 2-wheeler parking drives a desire for smooth spaces that are easily appropriated by parking. Domestic appropriations (see map 6.7) and related social uses are much more likely to happen along serrated edges. Only in laneways above 3m, do serrated edges emerge that allow a transition zone to emerge between the public and private realm (see image 6.4f & 6.11). While map 6.10 shows that non-permeable interfaces have almost entirely disappeared, a lack of public-private transition zone has made these buildings more introverted in order to retain privacy. This increasingly introverted character is also linked to decreasing light from the public space, which engenders a practice where internal courtyards are added to provide the necessary light, especially on larger plots above 300$m^2$ (see map 6.9). While extreme laneway narrowness reduces light and serrated edges, narrow laneways also restricts car movement and enable a pedestrian environment. The transect survey measured that on average 600 people were using the common space in the village between 3 to 5pm. While little more than half of them were using the space merely as a means to move through the village, 45% of people were using the public space for social purposes. Map 6.8 shows that these social activities occur predominantly in the northern part of the village, where larger public spaces are more abundant. The capacity of the southern part of the village to allow these activities depends to a large degree on access to light – barely any stationary activities were observed in areas without natural daylight.

The initial settlement and layout of the village laneway network can be traced to caste divisions and regulating of publicness, but intensification processes in density and functional mix has changed the role of those lanes. The kind of urbanity that has emerged in Munirka stands in stark

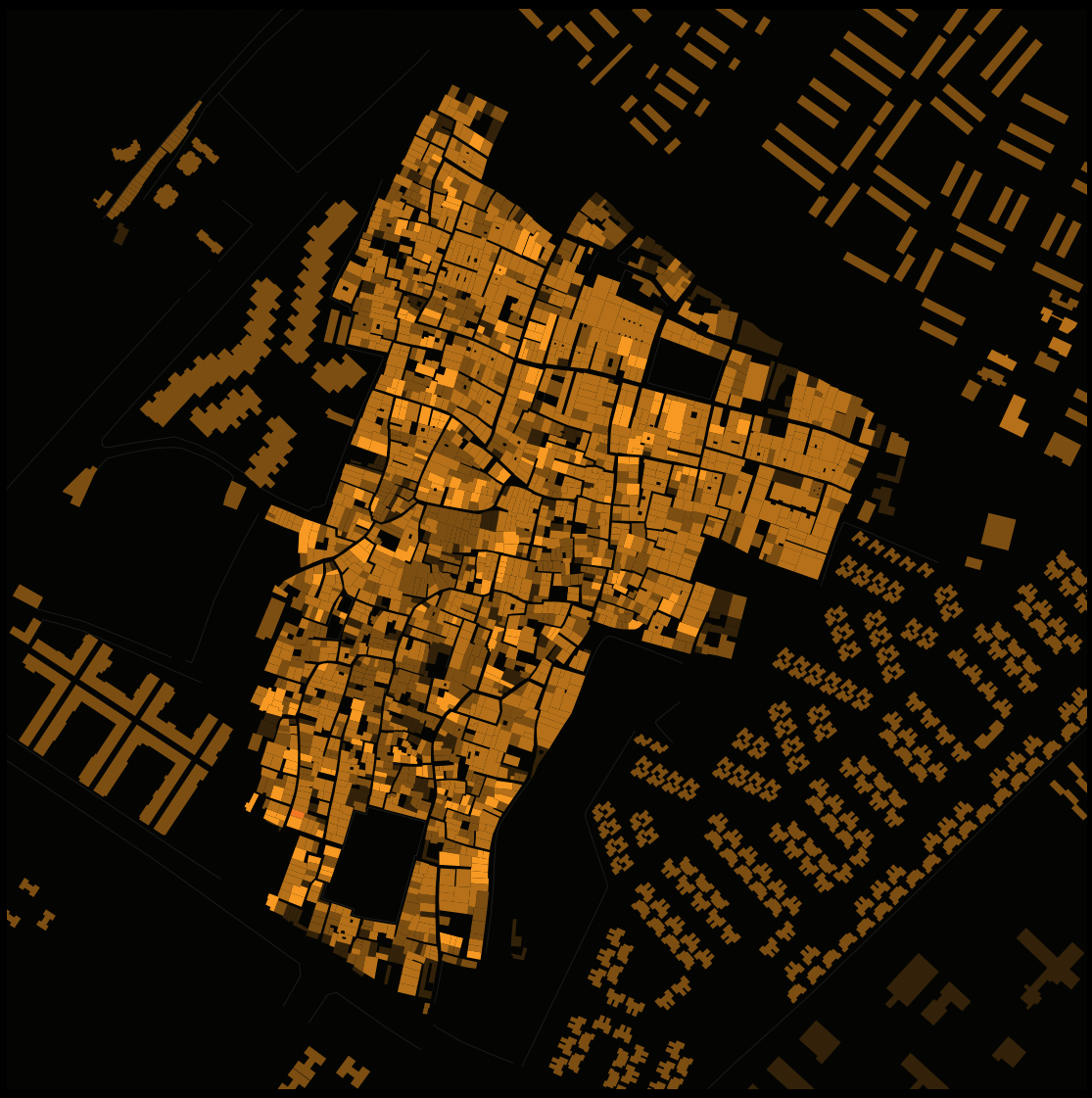
**6.5 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- goods
- production



**6.6 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

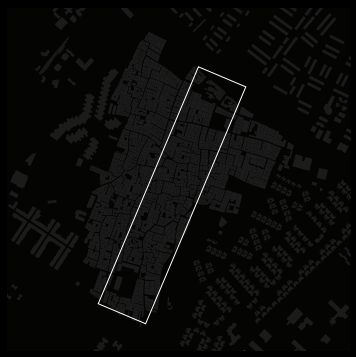
**6.7 appropriation**

- commercial
- domestic
- vehicular

**6.8 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi



**6.9 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**6.10 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

**6.11** serrated edge in residential lane

**6.12** incremental floor additions

**6.13** the end of the laneways becomes increasingly private

contrast with the surrounding formal parts of Delhi. The spatial outcomes and way of life that can be observed here is more reminiscent of Delhi's old city. However, it is exactly those spatial outcomes that popular media have characterized as problematic. While the municipality has invested in the improvement of the village, such as the construction of a primary school in the southern section of the village, in the absence of sustained improvement in the living conditions of the village, a residence welfare association was set up in the 1990's. During the last election cycle in late 2017, the three campaigning parties focused primarily about upgradation of street, sewer and water supply network. This association negotiates disputes between residents and raises issues to the municipality on behalf of the residents, much like the *gram panchayat* that was abolished by the municipality decades earlier.

# Mahipalpur

**Mahipalpur is a 600-year-old urban village that formed around a hunting lodge established by former ruler of Delhi of the Tughlaq dynasty (Verma, 2002). While Mahipalpur lies about 13 kilometres from Rajeev chowk along the Delhi-Gurgaon expressway, it is right next to the airport, metro station and recent high-end aerocity development. Villagers seized this proximity as an opportunity and in the chapter Between informalities: Mahipalpur village as an entrepreneurial space (2016) Chakravarty describes three phases of village's commercial growth – logistics and outlet stores starting from the 1980's, budget hotels starting from the 1990's and developer-built flats starting from the 2000's. Mahipalpur fell outside the 1962 masterplan of Delhi and was only formally incorporated into the city in 1982. At that time, most of the farmland had already been developed by the villagers and as such municipal acquisitions were limited. The intense growth of the village has agglomerated it with the neighbouring village of Rangpuri to the south-west and together these villages form an area of 165 ha, with an estimated population of over 100.000 people. Those parts of the village that fall outside the lal dora are known as unauthorized colonies and are generally regarded as unplanned (Bhan, 2013) – but are the genuinely unplanned or are they merely governed by a different set of practices?**

### Urban design

The old core of Mahipalpur consists of a series of interconnected *chowks*, that are organized in decreasing degree of publicness (see image 6.16a). The largest and most public *chowk* is situated in front of the *chaupal* – a community building where village assemblies were traditionally held. From this main *chowk*, several 4 to 6-metre-wide lanes radiate out as part of the traditional inter-village network. At the low-lying western edge of the old core a water body existed but this has since drained. Elevated above the plain lies the oldest *chowk*, signified by several more community buildings. The laneways between these *chowks* range between 3 and 4-metre-wide, which provide further access to more private dead-end laneways of 1 to 3-metre-wide (see image 6.16b). Mahipalpur's old core occupies approximately 10 ha, but several *lal dora* extensions have increased the legal boundary of the old core to around 21 ha. Whereas the old core grew by incremental plot addition, the extended *lal dora* zone is characterized by plot series of 10 to 30 plots that are added simultaneously by extending formerly dead-end lanes of the old core. Sometimes, new lanes have been grafted on the existing radiating inter-village roads. The dimension of these new

laneways still follows the logic of graduated privacy and are typically 2-3 metres in width (see image 6.16c).

When the last municipal *lal dora* extension was granted, village extensions already extended beyond this new legal limit and the same process of grafting new laneways onto the inter-village route continued thereafter, generating a morphology very similar to that within *lal dora*. In the 1990's a change occurred in this approach as vacant space along the inter-village route was running out and the farmland behind this crust of buildings was lacking pre-existing access to be developed. A series of much wider 6 to 8-metre-wide lanes (see image 6.16e) was projected into the undeveloped farmland and an orthogonal structure of plots and secondary laneways developed around these. About 30% of the former farmland is left as new public space. These orthogonal layouts are not the result of a masterplan, but the outcome of an incremental practice, that was coordinated between neighbouring landowners. The orthogonal grid breaks exactly at the village border between Mahipalpur and Rangpuri, suggesting that the social relations among villagers are a critical component in the coordination.

Individual rural parcels are owned by villagers and are developed at their discretion. According to interviews with these local villagers, the parcel's urban design is prepared by the owner, who might be assisted by a 'dealer', who's basic job is to subdivide the *parcel* into new smaller urban *plots*. These plots are then sold off to buyers informally, while the open space formally remains in ownership of the villager becoming de-facto public space. While the plots in the old core are varied in shape and size, plots in the new extensions are clearly laid out with repeating dimensions. The most common plot depth is 13.5 metre (45 feet), which are almost always arranged back-to-back, although sometimes with a narrow 2-metre-wide back lane (see image 6.16d). The plot width is considerably more varied, as plot owners have subdivided and amalgamated the original plots. The resultant plot size varies from $50m^2$ to $300m^2$ with an average that is significantly higher than in the old core. While these village extensions grew incrementally and are classified as unauthorized colonies by the government, the ample production of public space and the consistencies in plot size and laneway width are the result of informal planning practices.

The incremental nature of the subdivision of rural land in urban plots and streets has an impact on the pedestrian permeability. Map 6.14 shows that while certain areas have a high permeability with urban blocks of just 150 metre in perimeter, there are also large barriers to movement at urban blocks that reach over 700 metre in perimeter. As each agent

**6.14 figure ground**

building footprint

**6.15 public space**

public space

rwa boundaries

A-R 'block-number' of each rwa

1. Old mahal

2. Chaupal Chowk

100m

optimizes land-use efficiency, new lanes are most often in the centre of the subdivision, which restricts the potential of the new subdivisions to connect with the former. As lanes were projected into the farmland by different agents and from different starting points, many dead-end lanes have subsequently formed. Connections can also emerge without coordination, such as can be seen in image 6.17 where the laneways of two separate subdivisions meet. A sudden shift in the width of the lane provides a visual clue that the permeability of lanes is emergent. The old village core in contrast provides more consistently sized urban blocks of between 100 and 250 metre in perimeter. It is only at the edges of the old core, where the one mode of incremental production of public space meets another, that large barriers to movement appear.

**Architecture**

While the old village core and village extension are laid out without any functional zoning, an emergent clustering of functions occurs in relation to the configuration of public spaces. Map 6.20 shows that consumption functions are largely linearly concentrated along the main roads – profiting from intense pedestrian flows as well as high visibility. The shops and restaurants along the expressway are mostly geared to outsiders, while image 6.18 shows that the functional mix along the inter-village routes is largely geared towards local inhabitants. Production functions concentrate in clusters, often away from the main roads, such as hotels in the north-west of the village and light industries and warehouses in the south-east. Even though the village extensions are unauthorized, the companies that operate here represent a mix of more formal and more informal business. Hotels can be booked through formal online platforms and many large airlines rent space in the village for logistical support to their activities at the airport. Much of the land that is temporarily vacant is used in relation to these logistic functions for parking of lorries and trucks. The village thus provides space to many formally registered businesses that cannot afford or cannot find space in formally planned parts of the city. The businesses also profit from an easy supply of migrant labour that can respond to changes in demand and supply. Many migrants that live in the village congregate every morning at '*labour chowk*', where they are hired as day-laborers for nearby businesses (Chakravarty, 2016).

The businesses that are attracted to Mahipalpur and the employment opportunities they generate, drive a densification process. Until recently, vacant plots were still available in some village extensions, but increasingly older low-rise buildings are replaced with multi-storey apartments. This densification process does not occur uniformly throughout the village but is linked to the erstwhile urban design. Map 6.19 shows how taller 5 to 6

**6.16** Typical set of laneways for old core and new village extensions

**6.17** plot-size transition

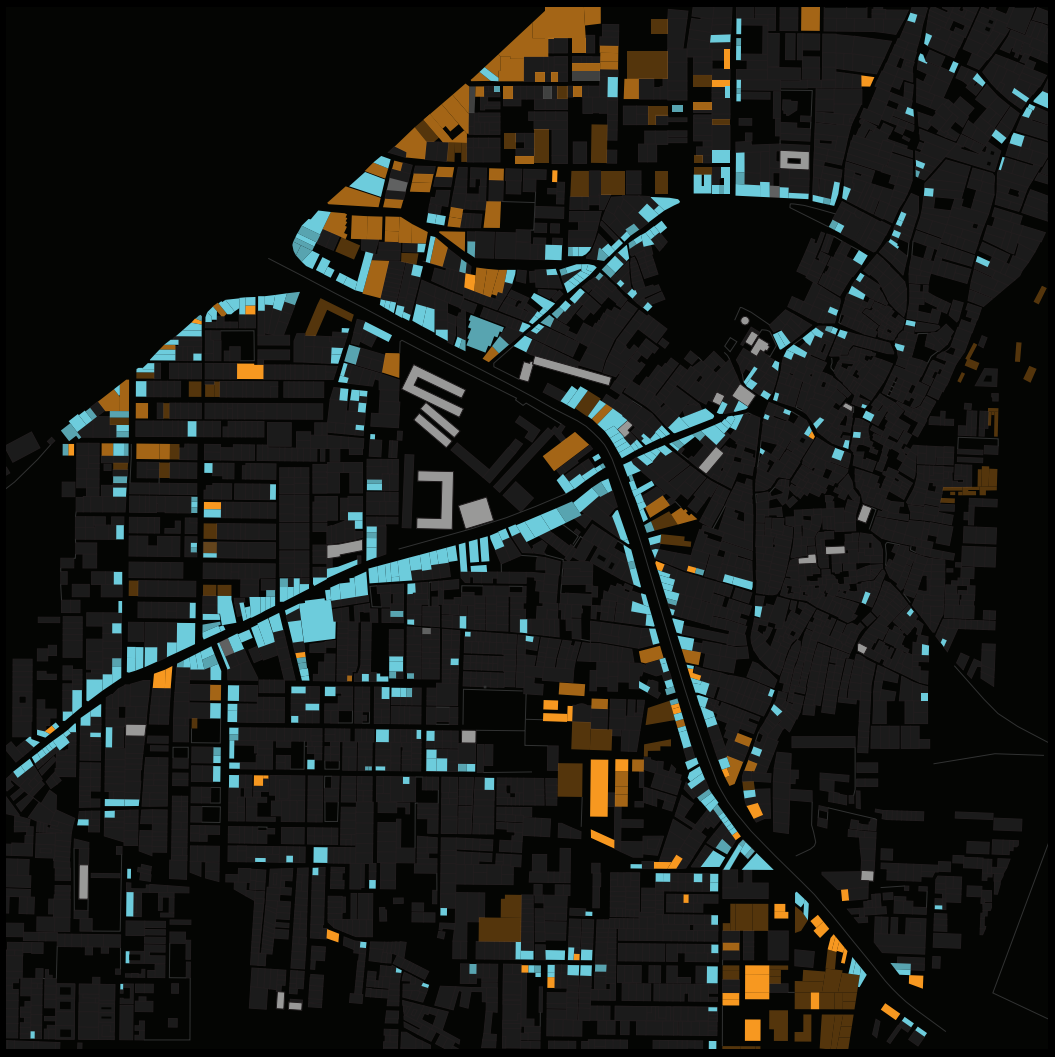
**6.18** functional mix along inter-village route

story buildings tend to cluster at the centre of the new village extensions, where larger and more orthogonal plots with car access provide more attractive development opportunities. Moreover, the urban design of these village extensions was laid out more recently than the encrusted inter-village routes so that many lots were still vacant precluding demolition of older low-rise structure. As the village extensions are not formally recognized, no height restrictions are enforced. Nevertheless, the residents recognize and anticipate the 15-metre municipal limit that would be applicable once the extension is recognized. The old core on the other hand still has many buildings below 3 floors, sometimes still with traditional courtyards. Complex ownership arrangements and an urban morphology that restricts car-access has limited densification of the old core.

Even as most buildings have not reached the formal height limit, the practice of cantilevering is prolific (see map 6.26). From this it can be surmised that these cantilevers are not only added for extra floorspace, but also for the shelter they generate to functions below (see image 6.16e-f and 6.21). In most laneways, these cantilevers add to the functionality of public space and only occasionally generate low-light conditions. Most entunneling occurs in the new village extensions along the laneways that were originally envisioned to provide light at the back of the dwelling. Subsequent building subdivision has led to the development of frontages along these former backsides and the cantilevering above these entrances has transformed these lanes in some of the most undesirable spaces in the village (see image 6.16d). The old core does not face low-light conditions yet, but the grain and width of laneway network in large parts of the old core are insufficient to support much higher densities.

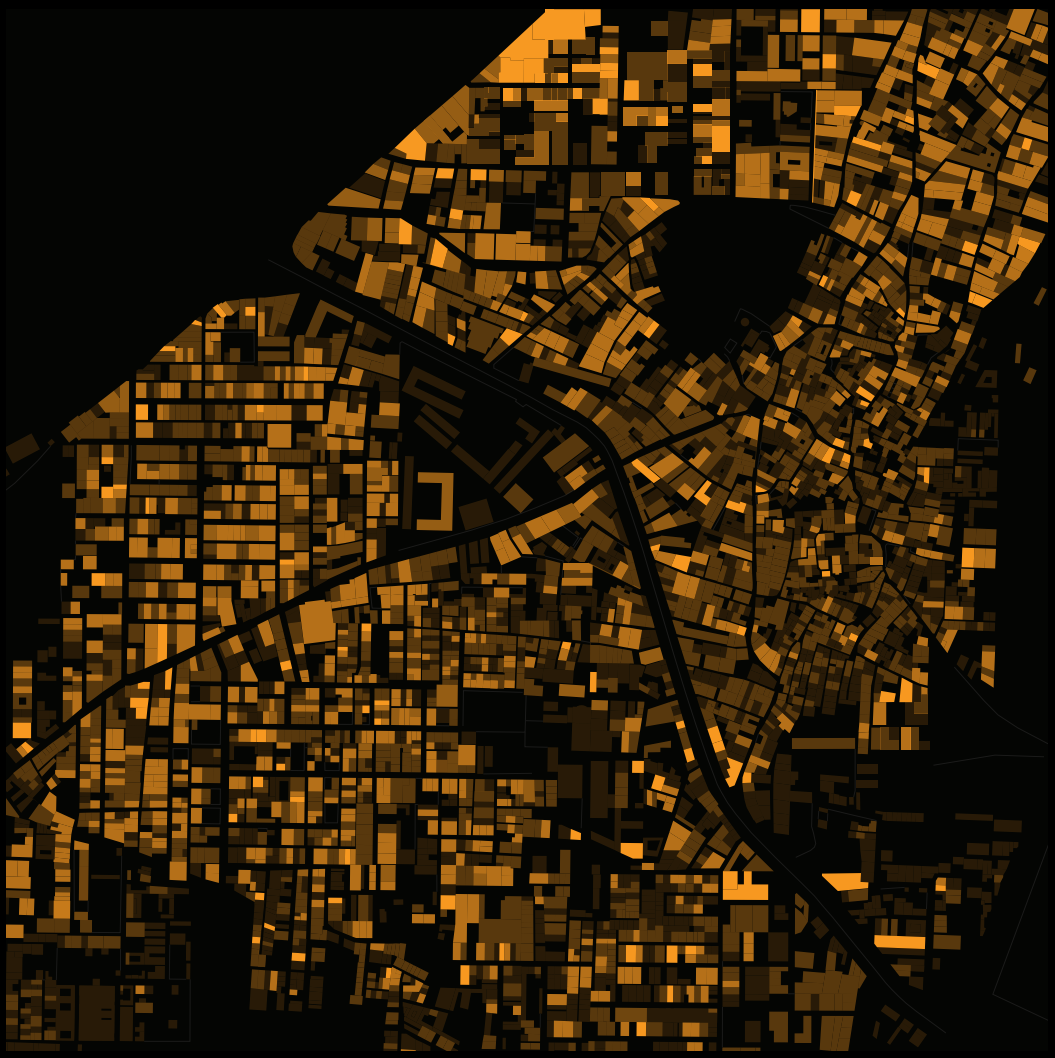
**6.19 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- goods
- production



**6.20 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors

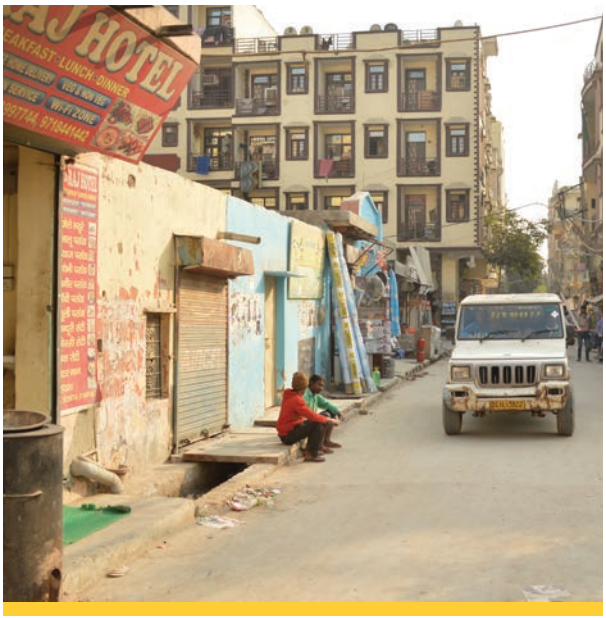


100m

**6.21** open gutter transforms into serrated edge

**6.22** incremental upgrading of the gutter

The densification and functional diversification of Mahipalpur has engendered an intensification process of the ground floor interfaces. This process is best visible in the less densified old core, where many interfaces still have their traditional open waste-and-stormwater drainage system. Along the more intensively used lanes, small walkways have been built across the 20 to 30cm-wide gutter, to provide additional access to the dwellings and negotiate the height level difference between the laneway and the dwelling (see image 6.21). A transition zone is established between the public space and the private dwelling – open to the public but built and maintained by the owner of the house. Most lanes in the new village extensions use a scaled-up version of the same open-gutter typology (see image 6.23). Image 6.22 shows that the intensification of the interface is accompanied by an upgradation of the infrastructure – and that this process happens largely incrementally. This upgradation generates many serrated edges that provide space for stationary activities. Map 6.26 shows that most stationary activities occur along serrated edges in the lanes in the new village extension and the wider inter-village routes. Some lanes do not feature any serrated edges at all. In lanes like on image 6.16c, waste-and-stormwater is drained via a centralized sewage system in the middle of the lane, rather than open gutters on either side of the lane.  As the architectural infill in these lanes was developed in the absence of gutters with a centralized sewage from the start, the processes that produced serrated edges never occurred. While these laneways are not extremely narrow, the absence of serrated edges is paralleled by a lack of stationary activities and a reduction of social life.




**6.23** appropriation of the gutter

**6.24** ramps to car parking invade public space

### Urbanity

As an increasingly middle-class neighbourhood, map 6.25 shows that the share of the public space used for parking is high, especially in the village extensions. While buildings in the old core often have their own private open space, buildings in the new extension do not have any private open space and rely entirely on the public laneways. While laneways in the new extensions are wide enough for parking, the barriers to permeability that were generated in the settlement process lead to much congestion at the limited access points. Map 6.26 also shows that despite higher built densities, the new extensions have less pedestrian traffic than the old core. Stationary activity however shows a reverse pattern – with more people using the public space of the village extensions to socialize. This is possibly linked to higher build densities, but more likely to the lack of private open space. The transformation of open gutters into semi-private zones discussed earlier has set a precedent for other, increasingly larger appropriations of the public space geared to parking. Image 6.24 shows a prevalent adaptation along some of the wider roads, where a ramp for car-parking access extends up to 2 metres in public space. These ramps clearly transgress the zone of the former gutter and interviews reveald they have become contested among the community. The public space that previously allowed different kinds of uses (including parking) has now been reduced to the singular function of access. In narrower 3 to 4-metre-wide lanes, car access is restricted, and it is here that domestic appropriation occurs most often such as can be seen on image 6.16f. These narrower laneways also

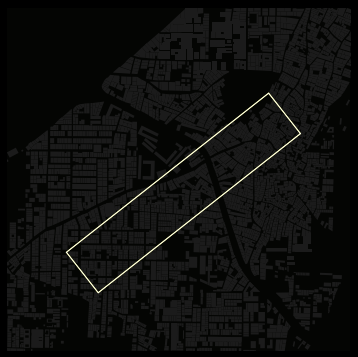
**6.25 appropriation**

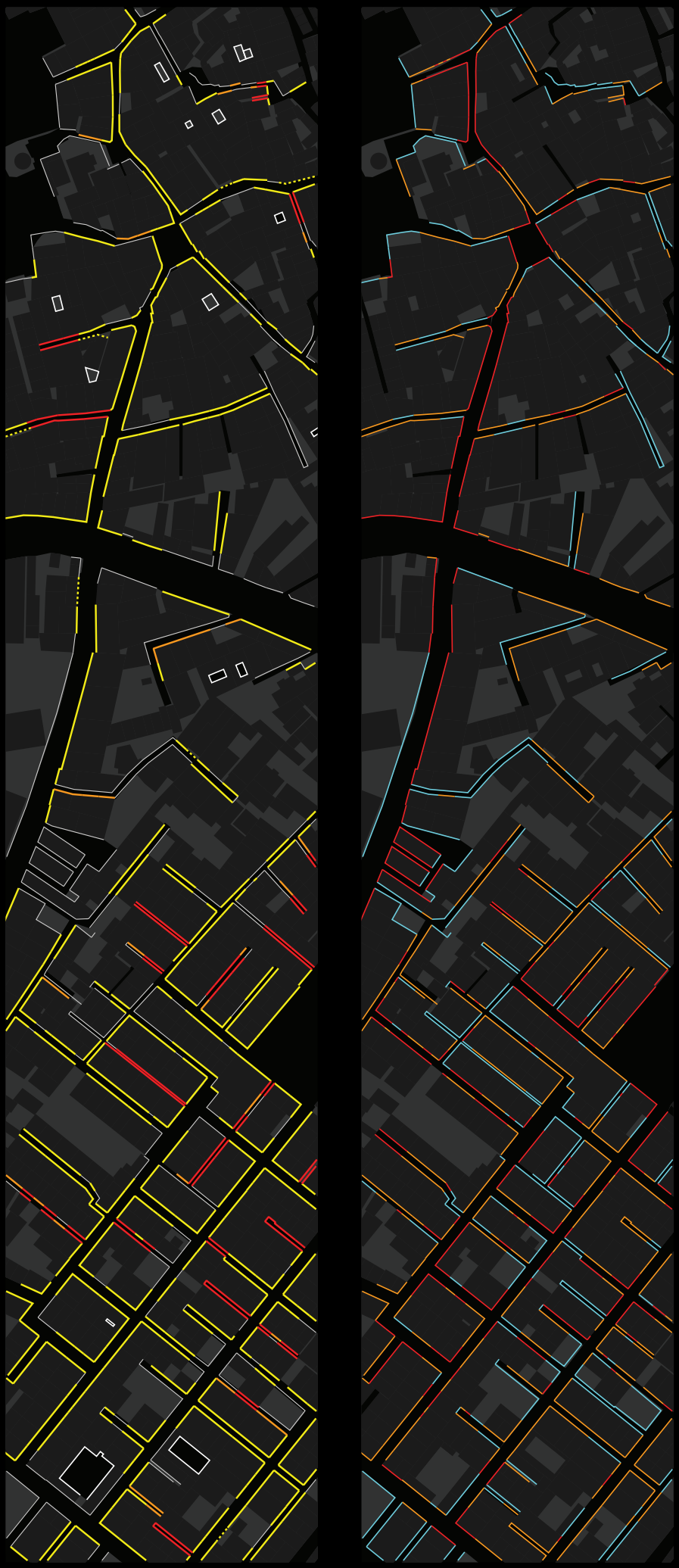
- commercial
- domestic
- vehicular

**6.26 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi





**6.27 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**6.28 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

feature smaller dwellings which rely on the public space as a necessary extension of the house for the provision of services. Along those stretches of laneway that have shops, the parking is pushed out and commercial appropriations take over almost entirely, using the serrated edges on top of the formerly open gutter to showcase goods for sale.

Despite the considerable urbanity that has been generated in Mahipalpur, the 2021 Delhi masterplan labelled the large parts of the village vaguely as 'urbanisable area', even though the village is already denser than formally designated 'urban' parts of the city. While the area within *lal dora* is considered legal, those parts of the village that are classified as unauthorized colonies are lobbying to receive legal status. That regularisation became more tenable when in September 2012, the South Delhi Municipal Corporation passed a resolution which waived all the development charges required from these colonies ("Express News Service," 2012). As part of the requirement for authorization, the residents in the village extensions have formed residence welfare associations (rwa), named after the block they aim to regularize (Block-A, Block K2, etc).These are organized independently from the sequence of land subdivision and rather align themselves between main roads such as the inter-village routes (see numbering and boundaries in map 6.15). The layout plans that the residents prepare for their authorization application show large disparities between the actual built form and the layout that is depicted on the maps. The position and width of the laneways shown often merely approximates the physical reality. Without a proper mechanism to verify the content of these layout maps, legal plot titles could be granted with incorrect locations and dimensions. As development rights are linked to the laneway width and plot size, residents are incentivized to provide a more 'ideal' version of their neighbourhood that grants them more rights. However, by establishing a legal reality independent of the actual morphology, the scene it set for future disputes, continuing the legal fragility that the regularization is supposed to resolve.

One of the supposed benefits of regularization is the provision of services such as sewage and water supply. In absence of those services, most parts of the village have already been fitted with access to these services incrementally, paid for by the residents themselves. In fact, the infrastructure is of the least quality in the only legally acknowledged part of the village – the old core. Even though the old core was incorporated into the city in 1982, the municipality failed to provide the infrastructure they had promised, even after repeated requests by the residents (Verma, 2002). This lays bare the contradiction of Mahipalpur – the village extensions deemed illegal by the municipality are considered to be more desirable by the residents than the legal old core. The village extensions are consciously

developed to attract middle-class buyers, ensuring enough access to light, parking and an aesthetic that resembles formally built apartments. This desire to attract the middle-class is perhaps best reflected in the sales-pitch from a commercial developer operating in a nearby unauthorized *lal dora* extension, who markets the development as "well planned and plotted, rectangular in shape, [with] each plot [being] two-sided, [and] multiple entry and exit roads". This emulation of the formal city does not only help to attract buyers, but also make it easier to follow the formal building regulations in anticipation of eventual regularisation.

## Bharthal

**Bharthal is an urban village still largely surrounded by farmland, at about 19 kilometres from Rajeev chowk, just beyond the Indira Gandhi airport. According to the villagers, Bharthal traces its history back to more than a thousand years, predating the old city of Delhi. The old core of the village occupies around 8 ha of land, while the total extent of the built-up area of the village is approximately 45 ha. Bhartal is formally a part of Dwarka – a newly planned subdistrict where the municipality has attempted to regain control of the urbanization process through a formalized approach. In 2009, construction on the first formal housing in Bharthal's section of Dwarka started and a second development is currently under construction (2018), but most agricultural fields that the municipality has acquired have not been developed yet, leased out back to the villagers on a temporal basis, till development starts. With the compensation money, many villagers bought agricultural land further away from the city, that they still manage or rent out to others. While some villagers in Bhartal cling to its rural past, other have started investing in the transformation of the village – has the municipality regained control of the urbanization process?**

### Urban Design

A historic courthouse marks the symbolic centre of the old core of Bhartal – elevated above the plain after hundreds of years of continuous occupation. Without much densification, the old core of the village resembles its original configuration. The oldest part of the village consists of several 1 to 3-metre-wide dead-end laneways that converge at the village *chowk*. The *chowk* connects to several inter-village routes, which bifurcate as they meet the village, wrapping themselves around the circular shape of the

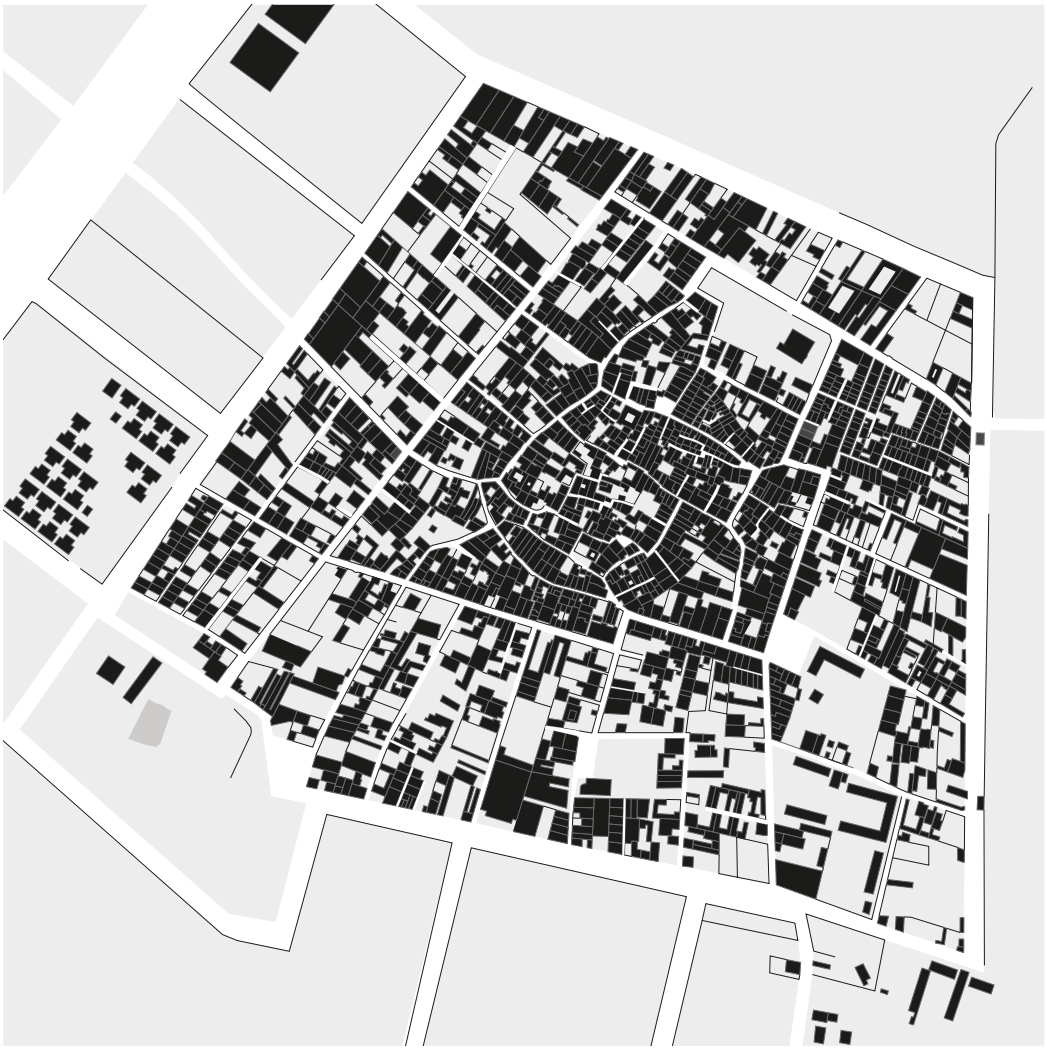
old core. Especially in the northern section of the village, additional dead-end laneways have been grafted onto these routes – encrusting the inter-village route within the built-up area of the village. The inter-village routes are around 4 to 5-metre-wide, although they narrow to 2 to 3-metre-wide through the oldest section of the old core (see image 6.31a-b). A *lal dora* boundary was imposed in 1908, formalizing the informally grown circular limit of the village into a legal boundary. However, the village continued to grow incrementally through the practice of a land trading mechanism, whereby villagers could gain a residential plot next to the old core by ceding double the amount of rural land. According to the villagers in the 1940's these extensions were included in the first government approved *lal dora* extension, delineating a rough square 11 ha in size. The land in this first extension was consolidated following the land-pooling practice of *chakbandi*. The basic premise of the *chakbandi* method is to amalgamate and redistribute village land in order to regularize rural parcels of land into urban plots. The rural parcels were divided by a set of lanes fanning out from the old core, ranging from 2 to 4-metre-wide, that connect up to a 7.5metre ring road (see image 6.31e) which marks the edge of the new *lal dora* boundary.

Bhartal's second *lal dora* extension happened in early 1980's, in parallel with the acquisition of its farmland. The DDA had started the development of the Dwarka district, which prompted two significant changes for Bhartal – all the remaining agricultural land was acquired, and the *gram panchayat* was abandoned and replaced with municipal rule. The villagers narrated that the acquisition eventually occurred in two stages in 1986 and 2002, after a substantial amount of farmland was already bought by the airport authority in 1972. As the village is formally part of the Dwarka subdistrict, the DDA was actively involved in the urban design of the second *lal dora* extension in negotiation with village representatives. In similar fashion to the first *lal dora* extension a set of 6-metre-wide laneways fans out from the former village boundary, connecting to a new ring road. Through the negotiation process about financial compensation for the ceded farmland outside the *lal dora*, a deal was struck where the villagers agreed to a lower land value in return for an increased road width (see image 6.31f). The ring road is much wider than it needs to be for the amount of traffic, but the villagers recognized that the value of their plots within the *lal dora* along this road would rise considerably as the municipally allowed density along wider roads is much higher. Stories of prolonged legal battles for higher financial compensation are often in the news (see Dabas, 2017), which persuaded the villagers to agree to this indirect means of compensation. The range in each family's share in the original farmland is reflected in the allocation of new urban plots, which varies considerably between 300m$^2$ up to 2000m$^2$. Not only did each land-owing family receive a new urban plot, but through

**6.29 figure ground**

building footprint

waterbody



**6.30 public space**

public space

lal dora extensions

100m

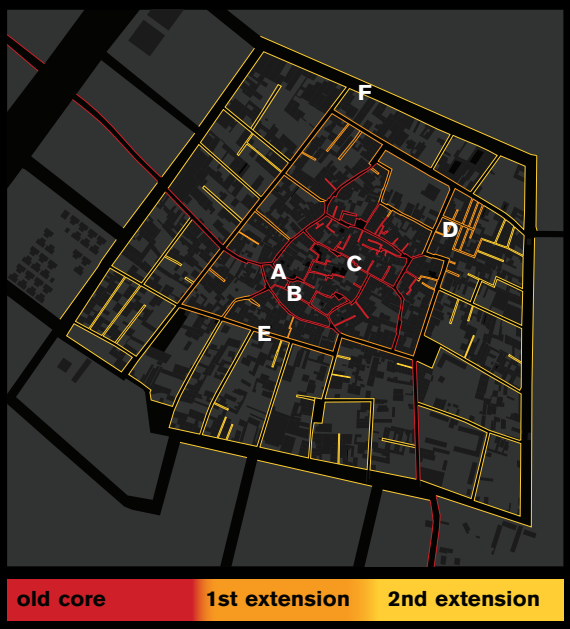
the *chankbandi* practice a land allocation was made for scheduled caste agricultural labourers who had previously held no land. This land was gifted to them under a clause that they could only use the land for their own accommodation and that resale of the land was prohibited. Each family received a 100m$^2$ plot, along 4-metre-wide lanes (see image 6.31d), which was half the width found in other parts of the *lal dora* extension. There was also a land allocation made for public buildings.

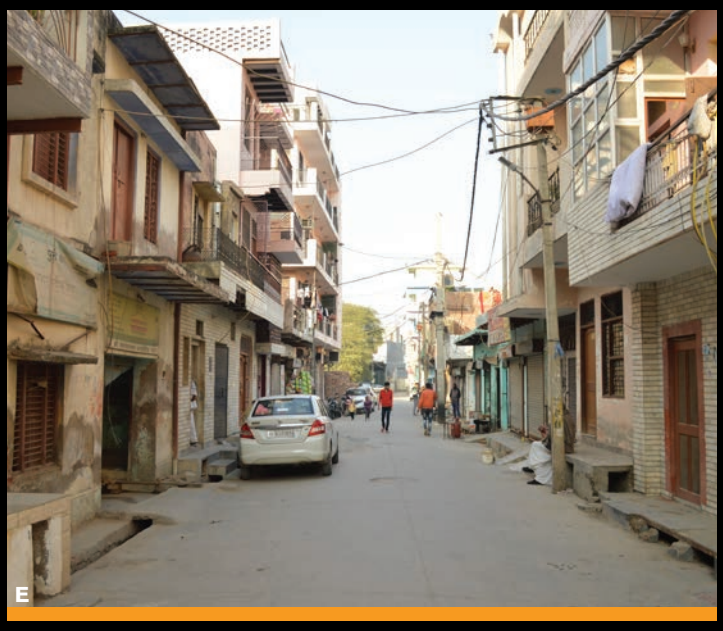
From the old core to the first and second *lal dora* extension and the formal envelopment of Bhartal – there is a gradual increase in the size of plots, in laneway width and in the urban block perimeter. The positioning of a ring road around each extension, allows the subsequent extension to be easily attached to it, thus preventing major barriers to movement. The old core has many narrower laneways that have been incrementally added, increasing the permeability. These processes have occurred much less in the first extension, and even less so in the second extension. Some of the urban blocks in the second extension reach 600m in perimeter. The largest barriers to movement are generated by the formal development which almost entirely blocks access to the north and east of the village.

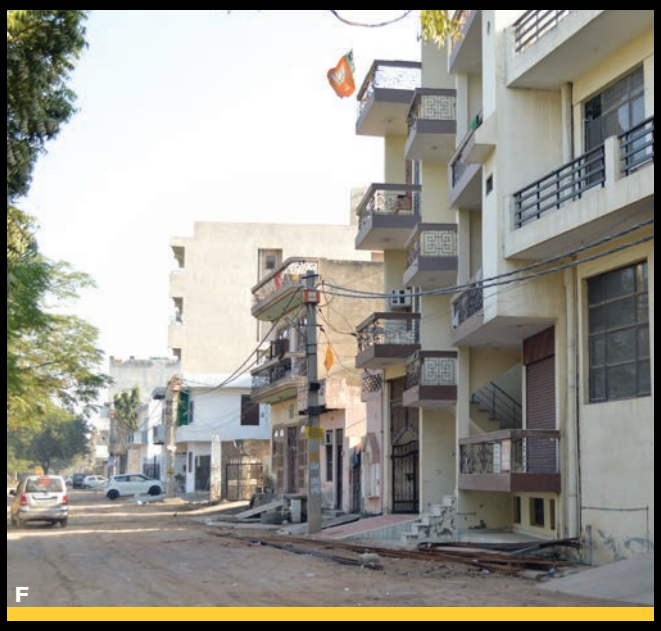
**Architecture**

The lack of a fine-grained laneway network in parts of the *lal dora* extension is reflected in the low build density of these parts. Map 6.32 shows that the architectural infill in Bhartal is mostly constituted by 1 to 3 story buildings. The original public space network and the 30 to 40-metre-deep plots in the village extensions supports low-rise buildings but requires adaptation for higher densities. The plot adaptation happens in one of two primary ways – either through the infill of buildings within the plot or by subdivision of the plot along a new public lane. Infill is the incremental addition of new buildings to the original house of the owner, thereby maintaining private control of the access structure. As the municipal floor area ratio limit is about double on small plots (up to 250m$^2$) compared to plots larger than 750m$^2$, it is advantageous to subdivide the plot to achieve higher densities. Subdivision has generated over 1200 metres of new laneways. These lanes are most often added in the centre of the plot, providing access to plots on either side. The densification process in the *lal dora* extensions thus happens simultaneously with an increase in public space and it is likely that through increased subdivision more laneways will emerge.

These changes in density and public space are geared to socio-economic changes. Densification of the old village core happens primarily in those parts inhabited by lower caste families, while those who can afford prefer newly built structures with car access in the *lal dora* extensions. While






**6.31** Typical set of laneways for old core and new village extensions

several traditional houses remain in the old core (see image 6.31b), funds are generally not available to maintain or reconstruct their former houses in the old core, slowly dilapidating the old core. Those large plots in the *lal dora* extensions that have not densified have capacity for industrial functions, warehouses and other temporary functions. As can be seen in map 6.33 – apart from a few neighbourhood shops these warehouses constitute the main component of the functional mix of Bharthal. Since 2013 there has been an increase in large warehouses on the peripheral road, mostly at the north-western edge. Large undeveloped plots also provide space for temporary housing to migrants. Single-room dwellings linearly arranged along the edges of the plot provide income to the villager, till the time a decision is made to redevelop the site.

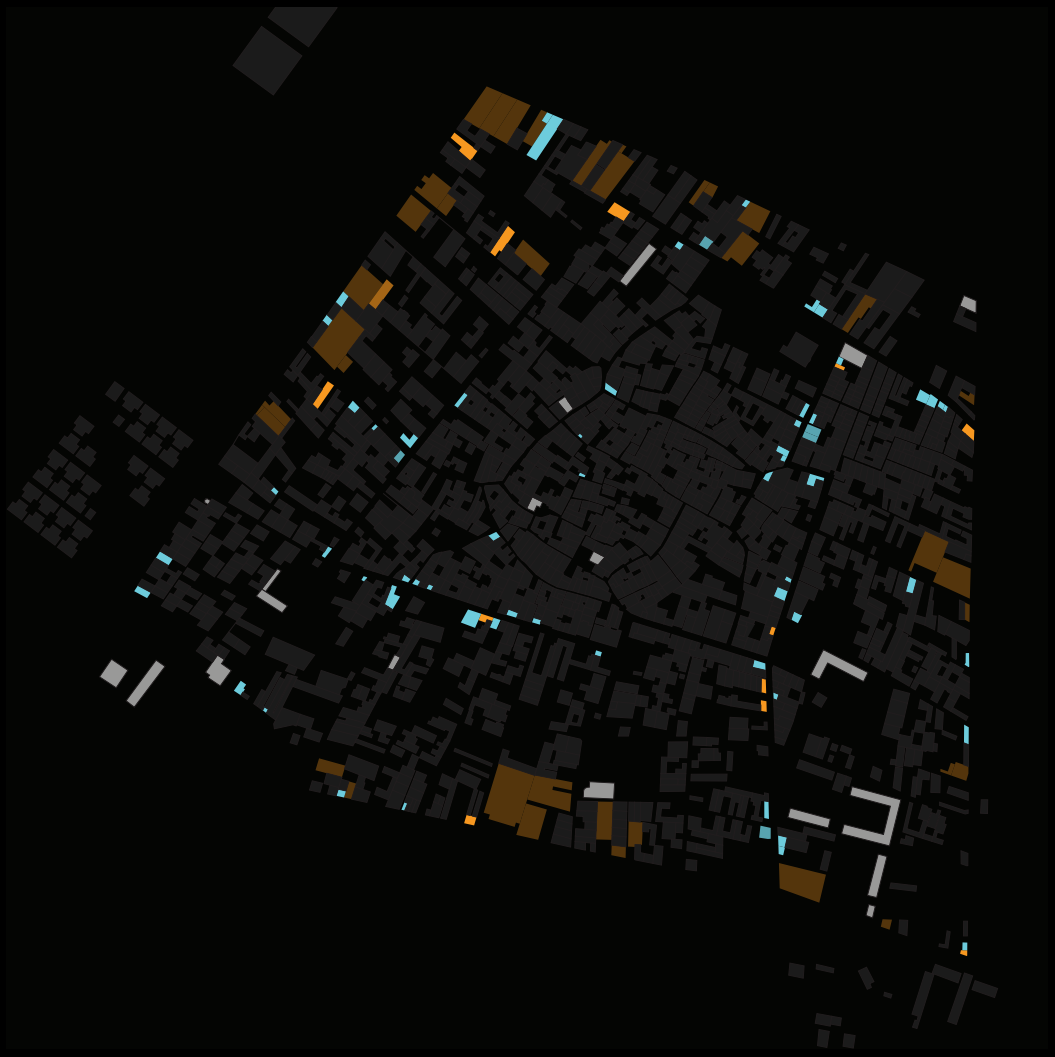
As Bhartal's density is still low, the interfaces have largely remained in their traditional configuration. Most of the lanes in the old core still have open gutters – 40% of all interfaces in the transect. However, of those interfaces that have changed, many are transformed into serrated edges like steps and seating space, providing space for social life (see image 6.31d-e). Map 6.36 shows that almost all serrated edges also cantilever out over public space, a practice that is historically rooted in traditional dwellings, as can be seen in image 6.31a-b. These modifications occur in clusters throughout the village, mostly along the smaller plots in the old core and first *lal dora* extension alongside laneways wider than 2 metre. Map 6.34 and 6.35 shows that the serration ofinterfaces is linked to where public space appropriation occurs and where most stationary activity in the village occurs. While only 70 people were recorded using the public space in the transect, almost all these people were socializing. On the other hand, plots in the second *lal dora* extension that have not subdivided, are frequently surrounded by compound walls, with long inaccessible edges. The smaller plots are more extraverted and oriented towards the street, while bigger plots are more introverted and oriented towards the private open space such as the courtyard.

**Urbanity**

The social use of public space is enabled through the restricted cantilevering of public space which prevented any low-light conditions (see map 6.36). Increasing densification will almost certainly put many such public spaces at risk of low-light conditions. Municipal regulation could limit such cantilevering, but most buildings in the *lal dora* extensions already flaunt municipal regulations on plot coverage and setbacks, challenging the idea that municipal regulation on cantilevering would be effective. While Dwarka has been promoted as a 'compact city' development, in reality population densities are expected to reach just 150-200 persons per hectare (A.

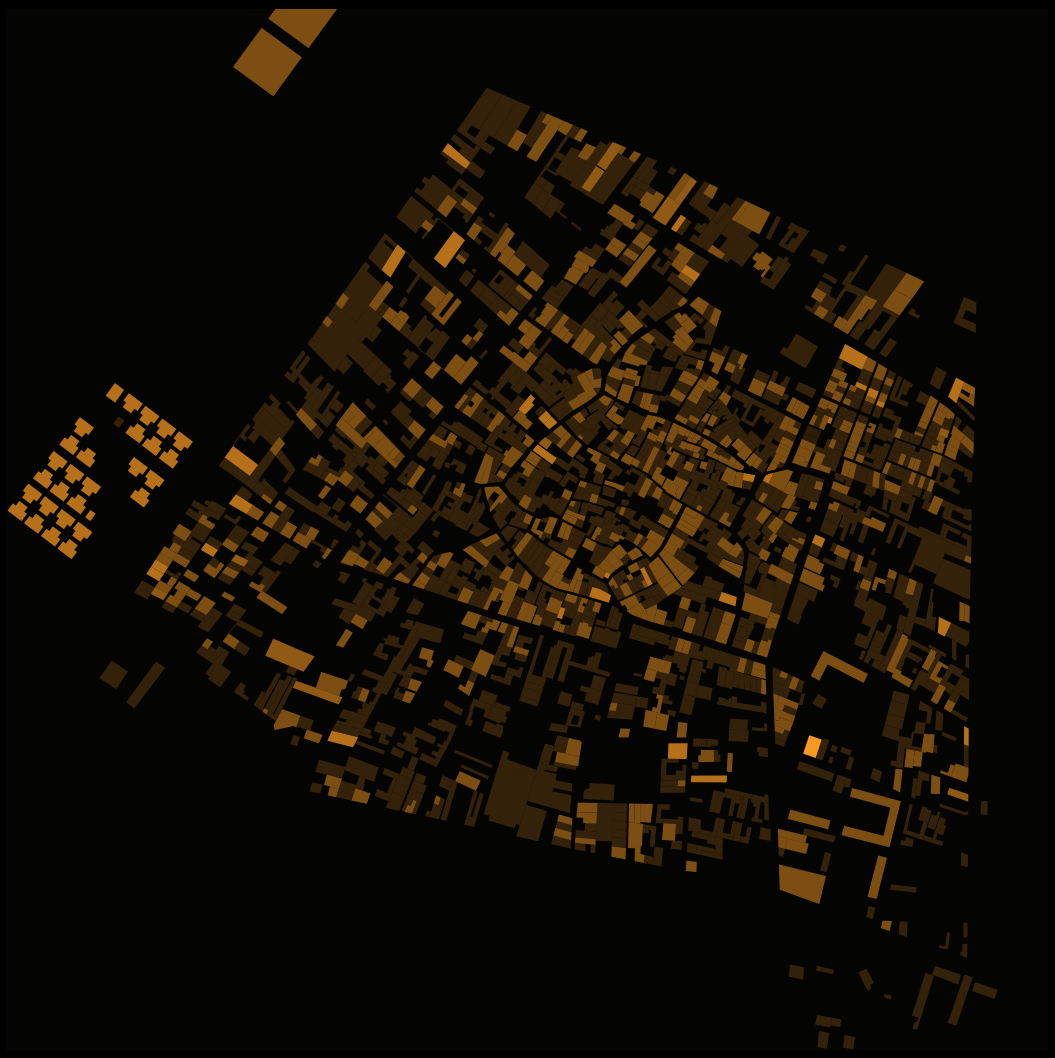
**6.33 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- goods
- production



**6.32 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

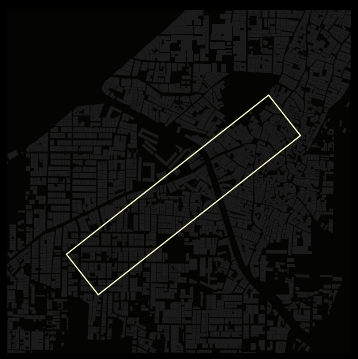
**6.34 appropriation**

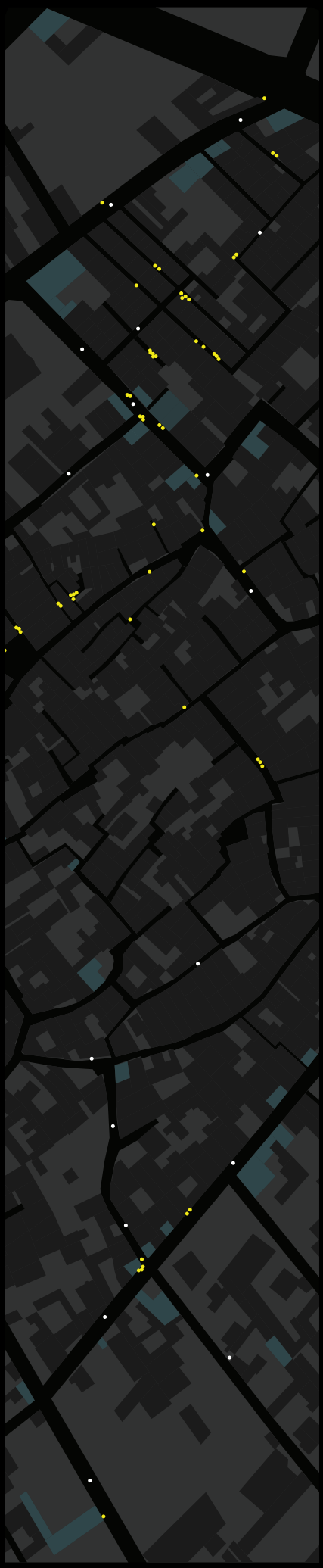
- commercial
- domestic
- vehicular

**6.35 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi





**6.36 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**6.37 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

Kumar, 2000), at an relatively low floor area ratio of 1.5. The entire built-up area of Bharthal falls under *lal dora*, allowing development at double the floor area ratio as the formal city. The low densities of Dwarka's formal development will make most housing unaffordable to the majority of Delhi's population and it is only likely that Bhartal will continue to densify to make up for that shortage. Despite Bhartal's density being equal and soon to overtake formal development, the Lal Dora Expert committee continues to pretend that urban villages are rural spaces. They recommend to "promote traditional crafts" and "find a suitable site (..) for the development of the village *haat* where the craftsmen can display their skills and also own shops to sell their products" (Expert Committee on Lal Dora, 2007, p. 47), while the real challenge to prevent escalating densities is not adequately addressed. Even though the Bhartal is still surrounded by farmland, Bharthal no longer functions as a traditional rural village.

## Comparison

When Jawaharlal Nehru (1963) said that "however well we may deal with the towns, the problems of the villages of India will remain for a long time, and any social standards that we seek to introduce will be judged ultimately not by what happens in Delhi but in the villages of India", he could not have known that Delhi's future would be so intimately linked with that of the village. The political and legal context in which the urbanization of Delhi's urban villages occur has been well documented, but the extension and adaptation process are still conceded to be 'chaotic', 'haphazard' and marked by encroachment. A comparison between Munirka, Mahipalpur and Bharthal reveals three key insights. One, urban villages are not confined to their *lal dora* – the distinction between village and city is blurry and village practices transcend the boundaries of the old village core. Two, the urbanization of villages is characterised by incremental addition of public spaces, which depending on changes in municipal policy affect the permeability and interlinked functional mix that emerges in urban villages. Three, densification induces a process of interface intensification as cantilevering and ground floor appropriations of public space compete for a limited amount of public space.

Comparison of Munirka, Mahipalpur and Bharthal reveals that the formal integration of *lal dora* has shifted considerably over time, which has produced a differentiated legal landscape, but also distinctly different morphologies. The selection of case study villages was made in relation to the 1961 municipal boundary which aligns with shifts in municipal policies

concerning how the *lal dora* is integrated and how *lal dora* extensions are approved. Munirka's agricultural land was state-acquired and the village became highly disconnected through formal envelopment – village extensions were limited and only left a minimum amount of public space. Mahipalpur's agricultural land was incrementally developed through which a partial integration with the formal context emerged – village extensions produced substantial amount of public space. Bhartal's agricultural land was subdivided through municipal mediation and is well integrated – however it has only produced low amounts of public space.

Most research and policy assert a clear distinction between *lal dora*, unauthorized colonies, *JJ clusters* and formal development (Ahmad & Choi, 2011). In Munirka and Bhartal, the *lal dora* does indeed marks a clear boundary between the village and its formal envelopment but in Mahipalpur this boundary is blurry – not only legally and socially as Pati (2019) has pointed out, but also spatially. *Lal dora* is a convenient shorthand in which legal conditions and spatial conditions are collapsed. The agency of the erstwhile villagers transcends *lal dora* boundaries as building practices, functional mix and social bonds link the village extensions to the old core within the *lal dora*. Former farmland is still formally owned by the villagers, even if through the selling of subplots villagers lost de-facto claims to most of that land. Another blurring occurs within 'unauthorized extensions' that are not currently subjected to formal building codes on account of their 'illegality', but which anticipate such codes in expectation of eventual regularization, becoming more similar to formal development over time.

Encroachment of public space is seen as one of the key characteristics of Delhi's urbanization (M. Kumar, 2016; Pati, 2019) – brought on by increasing pressure on land as each village densifies. The spatial development of villages is seen as a lack of or failure of planning. This chapter demonstrates that densification of Delhi's urban villages is an interlinked process in which incremental densification is geared to a process of generating new public spaces. While encroachment of rural commons is evident in all three cases, the encroachment of public space is not. A comparison of the laneway width across the three cases suggests that there is only very limited encroachment of the erstwhile laneways – the laneways in Munirka's old core are similar in width to Bhartal's old core. Moreover, as the village gets more urban, plots are increasingly further subdivided, adding more laneways to the available public space – from a total of 4000m of laneways in the transect of Bharthal to 5000 metres of laneways in Munirka transect. Most of these lanes are dead ends are primarily for plot access and do not contribute to permeability.

This emergent spatial property is the produced differently in the three cases, through different degrees of municipal intervention and

mediated by different degrees of coordination. Permeability in Munirka is emergent through coordination among villagers in relation to pre-existing rural routes, while municipal intervention has severely limited connectivity along the village's edges. Coordination in relation to pre-existing rural routes is complemented in Mahipalpur through coordination between subsequent increments of development – new extensions are informally planned to align with preceding village extensions. Bhartal has the strongest coordination in laying out villages extensions, including coordination between villagers and municipality. The variation in emergent permeability and connectivity affect the flow of people, and thus the functional mix as shops locate in the most integrated parts of the village. Urban villages do not lack planning, nor are they a failure of planning – the extension, densification and functional diversification of Delhi's urban villages are generated through logics of efficiency, connectivity and profitability.

Comparison of Delhi's urban villages reveals an interfaces intensification process that is both linked to traditional spatial practices and affected by increased densification. As the village gets denser, low-intensity open gutters that are still present in Bharthal, become increasingly built-over and multi-functional in Mahipalpur and Munirka. Images 6.38 show laneways of similar width that densification has transformed. This transformation process is critically linked to plot size – where plots are smaller, they are more likely to produce serrated edges that allow social life, while increased plot size most often leads to blank edges or access for parking. The micro-adaptation of serrated edges is thus linked to the historic stratification of villages in Delhi, which produced a larger range of plot sizes depending on a family's social/economic status. Densification of the village increases the amount of people using the public space, but the share of people

**6.38** 3-4 metre laneway in different stages of intensification in Bhartal, Mahipalpur and Munirka

engaged in socializing decreases as cantilevering and parking increasingly restrain other uses of public space. Contemporary cantilevering has informal legitimacy through emulating traditional cantilevering practices, but these practices escalate along the narrower laneways in Munirka and Mahipalpur. Whereas laneways in the old cores are differentiated by degree of publicness, through the densification of its adjacent architectural infill, the laneways are increasingly differentiated by function. Entire laneways become dominated by particular functions or clusters of particular appropriations. Delhi's old village cores that are traditionally introverted and focused on courtyard life, become more extraverted when the village densifies. Buildings become more reliant on the public space for light and parking and increasingly spill out into public space. When densification reaches its highest intensity, such as in Munirka, buildings increasingly reorient back on newly built internal courtyards for access to light and air, and supply parking on their ground floors, rather than the adjacent laneway.

The urbanization of Delhi' villages is thus an adaptative process that responds to increasing density, municipal codes and rural practices – but will they be able to continue to adapt While squatter settlements on public land are often targeted for eviction (Bhan, 2009) eviction and removal of villages and their extensions is rare in contemporary Delhi. The only large scale removal of villages dates back to colonial government, when villagers were relocated in the building of the capitol precinct of New Delhi (Expert Committee on Lal Dora, 2007). The real threat to these urban villages lies in the current municipal policy of normalization. Both government documents and academic literature agree that informally developed neighborhoods will need to be radically changed to allow for large public spaces, parking and building setbacks – to fit in with a 'modern' vision of the city. The 'problems' that the municipality identified in the villages such as access to emergency vehicles, planned commercial space, shortage of parking, light and ventilation, stem from this notion. The only concrete proposal under the Delhi 2021 masterplan that addresses urban villages, incentivizes amalgamation of plots to a minimum of 3000$m^2$ to redevelop at a floor-area ratio of 4. There are three key problems with this proposal. First, based on the current plot sizes in the *lal dora* area, this would require anywhere from 10 to over 30 owners to come together. Second, the existing regulation allows a height limit of 5 floors with 100% ground coverage, providing effective higher FAR than the new incentive. Third and most importantly, this policy of normalization requires a radical change of built form. Whereas the village now have a ground cover of 80%, application of this policy would result in ground coverages of below 40%. Not only will this eliminate the 'problems', it will eliminate all the other benefits that are embedded in the existing morphology of Delhi's urban villages.

# chapter 7 Bangalore

Bangalore is one of the fastest growing cities in the world with now more than 10 million residents. According to the 2031 masterplan (BDA, 2018) Bangalore experienced a 42% population rise between 2001 and 2011, with a further 45% population growth projected for 2021. This growth has been accompanied by a shift from public sector industries that dominated the city in the years after independence, to private tech companies that have earned Bangalore the epithet of India's Silicon Valley (Nair, 2005). Bangalore is not only known as an IT center but also as a 'city of lakes'. The role of these lakes in the city has become a contested topic, as they are increasingly encroached by urban development and many have become sites of environmental degradation – whereas Bangalore still had 280 lakes in 1960, as of 2012, only 17 lakes remain (Pellissery et al., 2016).

In both representations of Bangalore – as a centre for high-tech industry and as a city of lakes – the role and transformation of urban villages has received little attention. It is estimated that between 70% (Mohan & Rajagopal, 2010) and 85% (Benjamin, 2007) of the city does not conform with the masterplan or lacks planning altogether. Compared to other large Indian cities, the conditions of these informal subdivisions are good – with 92% of all households in Bangalore living in permanent houses (Sudarshan, 2011). According to Benjamin (2007) – who estimates Bangalore's slum population at 1,35 million – only some informal subdivisions can be considered slums while the remainder caters to a growing middle class. The majority of this informal urban growth happens as farmland around erstwhile villages gets subdivided, fitted with basic infrastructure and converted to urban use. On account of their morphology, the old village cores at the centre of these subdivisions are often described as slums, even though their socio-economic characteristics are those of a lower-middle class (Krishna et al., 2014, p. 578). A survey in an urbanized village showed ownership rates at only 25%, indicating that many migrants have also settled in the erstwhile villages (Sudarshan, 2011). Bangalore's urban villages have thus grown both in size and population, but no precise data is available on their population. The growth of villages is shaped by more traditional practices that are tied to their rural past, as well as practices that are associated with Bangalore's rapid expansion. What are the municipal practices that shape this process and what are the spatial outcomes of this urbanization process?

## Municipal practices

As one of the first people to systematically study villages in Bangalore's periphery, Beals (1974) pointed out that the villages exist in a delicate ecological relationship with their environment, in which the villages use the lakes for a wide range of purposes from agriculture to potable water supply. While the deterioration of Bangalore's lakes is well recognized, it is often overlooked that each lake was linked with a village. D' Souza and Nagendra (2011) explain in their paper *Changes in Public commons as a consequence of urbanization*, that these lakes are not natural features, but were constructed by the villagers using dams placed in relation to the natural topography. Hence, these lakes are actually tanks, and many villages are named after various parts of this intricate water management system, such as *kunte*, *kere* and *kodi* (CLC, 2007). Historically, the village communities were responsible for the maintenance and management of this water system, but in 1964 – through the Karnataka Land revenue act – the revenue department became the owner of all public open space that was "not the property of individuals or aggregates of persons" (D'Souza & Nagendra, 2011, p. 3). This decision put pressure on other related village practices that were traditionally conducted near the lake. Local village *panchayats* were held under sacred trees such as the Peepul tree, close to the lake. The Peepul tree and its raised platform – known as *katte* – signified the centre of the village as it had an important religious and social role in village life (Keswani, 2017). Over time, many of the lakebeds were encroached upon as traditional economic and social functions of the lake gave way to market demand for buildable land and profitable lake-views (Sundaresan, 2011).

As in other parts of India, these traditional rural practices are structured through caste relations and governed by a village body known as *gram panchayat* (Beals, 1974). While in Northern India, land revenue was organized through village and landlord systems, in the south of India individual cultivar-based systems prevailed (Banerjee & Iyer, 2005). This means that agricultural land was taxed to individuals, without mediation of a landlord or village council. As a consequence, land ownership in Southern India was more distributed, with on average more than half of rural villagers owning a parcel of farmland (Besley et al., 2007). This land-ownership arrangement provided no real incentive for the British to adopt the *lal dora* policy as was implemented in much of Northern India (see chapter on Delhi). While lacking the legal rigour of the *lal dora*, the state of Karnataka did implement a parallel practice through the 1964 Karnataka Land Revenue act, that aimed to control expansion of villages (Sundaresan, 2011). The old

village cores in Karnataka – also known as *gramathana* – would traditionally be surrounded by a circle of vegetation to protect it from intruders and wild animals (Mathur & Da Cunha, 2006). The 1964 act allowed each village to expand within a zone of 100 metre radius around the *gramathana.* The 2015 Revised Masterplan (2007) increased this zone to a radius of 250m – with the extra condition that buildings are limited to a maximum floor area ratio of 1.0 and maximum building height of 2 floors. The expansion of villages was further affected by the Urban land Ceiling act of 1976 that aimed to limit rural-to-urban conversion of land (Nair, 2005). This act limited the amount of vacant land each person could have to 10 *gunta* or 1000m$^2$. Since many rural landowners had holdings larger than 10 gunta and were unsure whether their rural land within city limits would count as 'vacant', the act led to a boom in illegal subdivisions as owners sought to sell of their excess land (Sudarshan, 2011).

These village growth zones were never fully acknowledged and incorporated in any of the masterplans that were prepared by the Bangalore Development Authority (BDA, 2018). As the city grew, the fuzzy village boundaries became even more porous as both public and private parties negotiated with villagers about land acquisition, resulting in a complex patchwork of village, private and government owned land (Benjamin, 2007). In a study on land acquisition near Bangalore's new airport, Benjamin (2007) argues that contemporary urban planning is not practiced via 'policy' or 'masterplans', but rather via collection and manipulation of documents that grant various degrees of control to a land parcel. While a distinction between the planned character of the British cantonment and the informally grown *petta's* (suburbs) had always existed in Bangalore, the establishment of a single municipality in 1949 sought to unify urban planning firmly under state control (Nair, 2005). In a study of Bangalore's urban expansion process, Sudarshan (2011) has shown that over the period from 1970 to 2004, 57% of all sites were developed by the BDA, 23% were initiated and developed by individuals, while only 6% were developed by real estate developers and other private organizations. While these numbers upheld the pretence of state control, Nair (2005) points out that between 1976 and 1991 only 16% of all proposed BDA layouts actually got built – "by the mid-1980s, the BDA was mired in litigation, unable to function well either as the service provider it was intended to be, or effectively develop and implement plans for the city" (Nair, 2005, p. 173). Even within BDA schemes it was very common for land that was notified for government acquisition to be eventually bought and developed by private developers (Nair, 2005). Combined with chronic understaffing (Mohan & Rajagopal, 2010) and financial mismanagement (Joshi, 2017), the BDA gradually lost more control of the urban expansion process. In order to compete with the increasing rates of informal

development, the BDA aimed to reduce costs  by keepingland compensation rates to villagers low. This however, had the unintended effect that as soon as an area was formally notified for acquisition, informal land sales and development spiked as villagers sought ways to increase their earnings prior to formal acquisition (Sudarshan, 2011). Over the course of the last decade of the 20th century, the percentage of publicly developed housing dropped to below a quarter of the total, while informally built housing accounted for more than half of all production of dwellings (Sudarshan, 2011). Recent estimates on the scale of informal development in Bangalore range between 70% (Mohan & Rajagopal, 2010) and 85% (Benjamin, 2007) of the city. Despite, or perhaps in acceptance of, the BDA's budget is still for two thirds dependant on the sale of plots and flats, while property taxes on informal development are negligible  (Revised budget BDA, 2016). The BDA have almost entirely relinquished the development of the city to private parties, framing itself as a competitor to, rather than a regulator of private developments.

As both developer and regulator, the BDA – and similar government bodies before its establishment in 1976 – have an effective monopoly on legal urban development. In this process the BDA acquires vacant farmland through the principle of eminent domain, prepares a masterplan and develops all the infrastructure. While in some cases the BDA also builds housing units, in most cases plots are sold and granted a document which certifies that the property is fully legal and property taxes are paid – the so-called *Khata-A* certificate. As of 2013, Bangalore had 62 BDA layouts, providing around 200,000 sites across the city (Venkataraman, 2014). While initially Bangalore had absolutely no provision for private layouts to be developed legally, in 1952 it became possible for private enterprises to develop housing (Sudarshan, 2011). This practice was reluctantly conceded as way to deal with Bangalore's increasing housing shortages as the government was highly sceptical that private layouts could succeed: *"in order to be able to provide and reserve land for such purposes economically, a lay-out has to be designed to accommodate a population of 5,000 to 10,000 people and the extent of land required for such a comprehensive lay-out is a minimum of 100 acres. Lay-outs proposed by private individual owners are generally on small and often isolated pieces of land and the sole object of forming the lay-outs is profiteering. (..) These lay-outs generally tend to degenerate into slums in course of time."* (BDC 1954 in Sudarshan, 2011, p. 147).

In the late 50's, it also became possible for existing unauthorized developments to apply for regularization – a process that was then extended to urban villages that were incorporated in the city under the expanded

administrative boundaries of the 1963 Outline Development Plan (ODP). After occupying their buildings, the owners establish a de-facto legitimacy by paying the required property tax – after all how can the government consider their building illegal if they accept the tax (Sundaresan, 2017). Drawing upon the paper *Regulation in a crony capitalist state: The case of planning laws in Bangalore* (Pellissery et al., 2016), there are two distinct qualifications that prevent informal land development to be considered legal – a land-use approval and a layout approval. Layouts on former farmland can apply for a land use conversion by paying the deputy commissioner a conversion charge. Layouts can be either approved by the BDA, or by a local body such as a village council which can only issue so-called *Khata-B* certificates. As the BDA holds different – more prescriptive – standards than local bodies, a layout with *Khata-B* title deed has a lower status than one approved by the BDA. *Khata-A* title deeds, entitle the owners access to public amenities like water supply, sewer and electricity, as well as much easier access to bank loans (Pellissery et al., 2016) and plots that receive a *Khata-B* title are hence valued lower on the real-estate market, requiring a so-called 'betterment charge' to be paid to the BDA for *Khata* conversion. Because most villages and their early extensions were built before being incorporated into the city, most still have a *Khata-B* status.

Conversion to *Khata-A* requires compliance with municipal building codes on the level of the layout and the plot, both of which are detailed out in the 2015 Revised Master Plan (BDA, 2007). This was the code that was effective during the fieldwork and the most important codes have been extracted below (the latest 2031 masterplan is still under revision and is similar in most aspects). When the first building codes for the city were formulated under the 1976 ODP, urban villages never featured as a separate category and they have generally been zoned under residential use. The 2015 Bangalore masterplan includes a land-use category called 'traditional areas' which covers many of the villages – but no specific building codes are included, and the 2031 masterplan has removed this distinction again. At the level of the layout, the most important practice is that every layout is required to have a minimum of 15% green open space and 30% of space for roads, with minimum road width of 9.0m. Upon completion of the layout by the developer, these open spaces should be granted to the municipality without compensation. The layout is not allowed to encroach upon waterbodies or storm-water drains (known locally as *Raja Kaluve)*. Between 20% and 30% of the land use is allowed for ancillary uses such as shops, eateries, small offices, schools, and even light industrial uses. There are also codes on a 2ha minimum size of a layout and requirements of a publicly accessible peripheral road in case of large development, but both these codes are negotiable and may not always apply.  Floor space

ratios (FAR) for residential use are determined by a combination of road width and plot size. For plots up to 1000m$^2$ and road widths up to 18m, the FAR ranges from 1,75 to 2,25, with required setbacks determined by the achieved building height. As FAR's are low, the building height generally falls under the 11.5m limit set by the government which requires a 1 metre setback on all sides. Only for plots below 6m width, can this requirement be reduced to two sides. Projections into public space or even in the minimum setback area are not allowed. The only exception concerns balconies which are allowed up to 1/3 of the setback. Additional rules apply to multi-dwelling buildings – they are only allowed on plots bigger than 360m$^2$ and they are required to provide one parking spot for every dwelling unit. Furthermore, multi-dwelling buildings need pay a refundable deposit on submission of a building application.

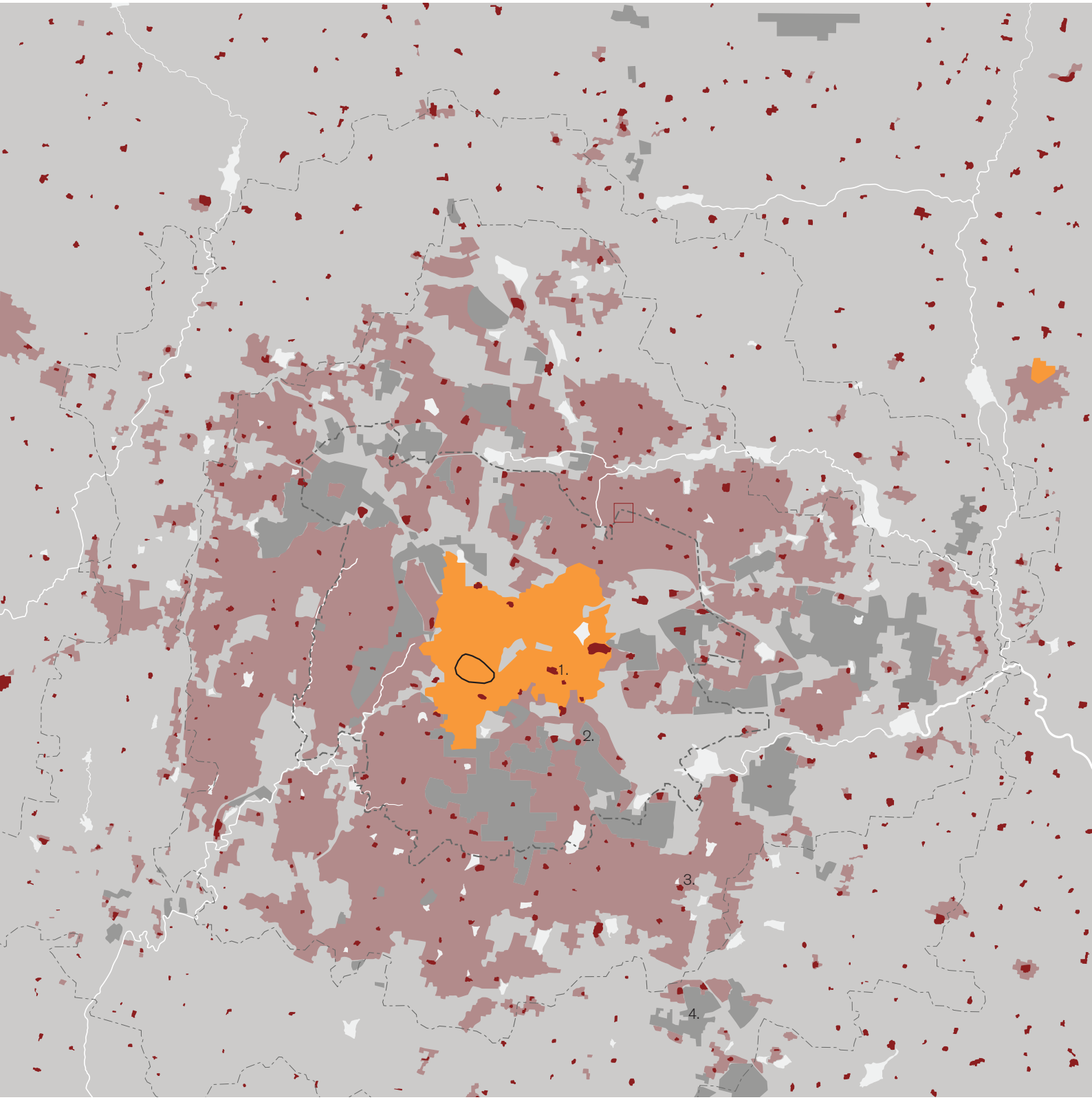
Yet, what is the significance of these urban codes in a city where deviation from formal building codes is the norm (Sundaresan, 2017) and in which "innumerable people have become in some way stakeholders to that order" (2017, p. 3). The control of the regulatory framework is highly profitable venture. A real-estate developer, interviewed by Sundaresan (2017, p. 14) said that "you can't take action against 5 million people. Everyone is part of it". In response to such a sentiment, the Akrama-Sakrama bill which was adopted in 2015 and intended to regularize most forms of unauthorized and illegal violations. Sundaresan (2017) further argues that the inclusion of mix-use categories in the master plan, was intended to legalized a large amount of plan violations. Bangalore's villages are thus faced with the apparent contradictory condition of a highly detailed set of formal building codes, and simultaneously the most widespread transgression of those formal building codes.. Bangalore seems to epitomize the unplanned city in Roy's (Roy, 2009) evocative paper *why India cannot plan its cities?*, yet what are the spatial outcomes of such unplanned process?

**Spatial outcomes**

Bangalore originates as a village from the 12$^{th}$ century (Sudarshan, 2011) sharing the Deccan plateau with other large villages like Begur and Yelahanka, which have since been enveloped by the city. When Bangalore was fortified in 1537 as a base for the region's ruler (Nair, 2005), it slowly gained dominance – and in the process intensified the surrounding hinterland with more rural settlements. As early as the 16$^{th}$ century, a circular line of defensive plantation encompassed 12 villages (Nair, 2005). However, as villages within Bangalore constitute no legal entity, and municipal practices have made their borders increasingly fuzzy, estimates of the number and size of villages vary. According to the 2031 masterplan (BDA,

2018) Bangalore has 251 urban villages, which are defined as those villages that fall within the metropolitan boundary (BMA), but outside the municipal boundary (BBMP). The masterplan does not account for the already 'fully urbanized' villages within the BBMP boundary because in 2007, 110 villages and several municipal councils were merged into the BBMP (Pellissery et al., 2016). According to Sudarshan (2011), 42 villages were incorporated by 1964, while at present a total of 218 villages are within the Bangalore city planning area. Rame Gowda (in Nair, 2005) puts the total number at around 200, with 36 villages incorporated by 1964, a further 36 'engulfed', and more than a 100 'soon to be engulfed'. The 1981 census list that 180 villages had been absorbed into the city at that time (Nair, 2005, p. 147), while by 1985 when the BMA development plan increased from 500km$^2$ to 1279km$^2$, an additional 326 villages were included (Nair, 2005, p. 182). The most comprehensive account of Bangalore's villages, looking merely at a total count rather than distinguishing 'urban' from 'rural' villages, puts the number at 590 villages within the BMA (CLC, 2007).These estimates vary not only because they were made at different times, but also because of different interpretations of what constitutes an urbanized village and what counts as the boundary to the city. Contemporary satellite imagery shows that villages up to 35km away from the city centre show signs of urbanization as layouts are added, far beyond the administrative boundary of the city.

Map 7.1 shows the distribution of villages throughout the Bangalore metropolitan region. Within the 1600km$^2$ study area there are around 610 clearly identifiable separate village settlements. Neither literature nor satellite imagery provides any indication that any villages were removed. The villages are distributed across the territory fairly evenly – with approximately one village every 2.5km$^2$. The comparatively small village size – on average between 1.5 and 3 ha – means that only about 1.5% of the study area is occupied by the old cores of villages. However, if the 250m *gramathana* growth zone from the masterplan is considered, villages account for 15% of all land. The lack of municipal master planning is evinced by map 7.1 as only 20% of the urbanized area of the city shows clear signs of master planning, structured in patchy corridors and forming sharp boundaries with the villages they envelope. Most villages however, are embedded within large unplanned areas that have much blurrier spatial boundaries and where is it difficult to identify where any particular village stops. While 60% of all villages are still surrounded by substantial amounts of farmland, almost all villages in the study area shows signs of extension. How do these counts compare with previous estimates? The map shows 226 villages within the BBMP – which roughly corresponds to the above-mentioned estimates of 180 to 218. The overall estimate that comes closest is the one made through the inventory of




**7.1 Urban villages in Bangalore**

10km

| | | |
|---|---|---|
| 1. Shoolay | 12°58'6.84"N | 77°36'30.70"E |
| 2. Koramangala | 12°56'32.21"N | 77°37'6.84"E |
| 3. Kudlu | 12°53'20.36"N | 77°39'20.92"E |
| 4. Electronics city | | |

urbanization till 1950
formal
urban village
informal
BBMP boundary
BMA boundary
extent of BDA masterplan

water bodies in BMA, which again highlights the importance of the relation between lake and village.

The three villages selected for in-depth morphological analysis are based on the urban to rural transect. Shoolay was integrated long ago under British occupation and sits within an emerging Central Business District. Koramangala was part of the erstwhile city corporation area at a time when the BDA was still actively engaged in urban planning. Kudlu was only incorporated in 2006, when its village council was merged into the new BBMP. The BDA is almost completely absent from the planning process here and the area is characterized by informal subdivisions .

## Shoolay

**Shoolay lies just 2 km east of the old city of Bangalore. The village has existed there for at least 400 years, when it was encompassed by the circular demarcation of vegetation that acted as Bangalore's first line of defence (Mathur & Da Cunha, 2006). When the British cantonment was established in 1809, Shoolay and its neighbour Ulsoor, became embedded in a new urban landscape of broad tree-lined roads, British garrisons, bungalows, schools and other new institutions (Stallmeyer, 2010). As its agricultural land was now built upon, Shoolay's water tank gradually lost its function and in the 1960's was filled in to make way for a football stadium that stands there to this day. Starting in the 1990's, the residential character of central Bangalore increasingly shifted to offices and commercial use, but this development largely bypassed Shoolay as it emerged as one of the few affordable places to live in central Bangalore. Disadvantaged groups were able to move in, adding their small chapels and mosques to the older Hindu temples. Will Shoolay succumb to the pressure of commercialization of the surrounding district, or will it retain its distinct cultural mix and residential character?**

### Urban design

Shoolay's urbanization is not so much the formal envelopment of an informally grown village, as it is the informal urbanization of a rural landscape that has formalized over time. The agricultural land of Shoolay became interspersed with small hamlets such as Yellagondanpalya and Anglo-Indian suburbs such as Richmond – both within the 1km study area (see map 7.2). Many of the rural parcels were subdivided into urban plots and the parcel boundaries gradually transformed into streets. Historic maps (Bartholomew,

**7.2 figure ground**

building footprint

**7.3 public space**

public space

1. old core
2. former lake
3. Yellagondanpalya
4. Richmond

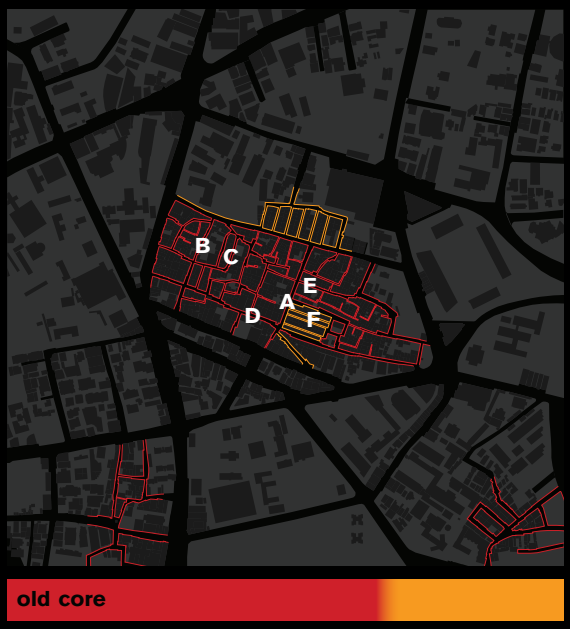
100m

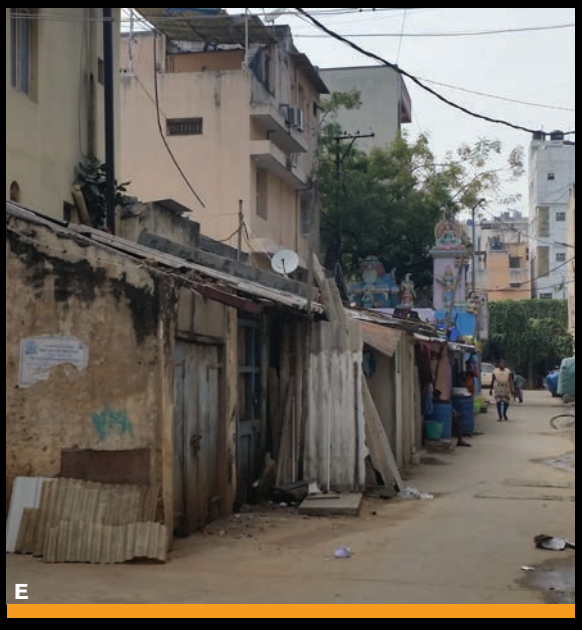
1935; Walker, 1854) reveal that these plots were initially settled with spacious bungalows, but over time were subdivided further, often creating dead-end laneways in the process. Hence, while the village is characterized by very small plots ranging from 40m$^2$ to 100m$^2$ that under pressure of densification are amalgamated into larger plots, the agricultural hinterland started out with very large lots of over 2000m$^2$ which became gradually smaller under the same pressure of densification.

Shoolay is a rare example of a village that had lost its agricultural function entirely by the mid-20$^{th}$ century, brought on by the early urban expansion under British occupation. As such, much of its early transformation in undocumented. Its 10ha size – which is well above the average 2ha size for villages in this region – suggest the original old core must have been much smaller. The western side of the village sits slightly higher and has gently curved lanes of similar width between 2.5 and 4m (see image 7.4b-c). This morphology combined with street names such as bazar street, indicates the old core was likely located here. The northern and eastern sides of the village feature straighter lanes, that very gently descend towards the former lake side (see image 7.4f). There are also more distinct laneway hierarchies here, suggesting these areas were laid out in a village extension. Map 7.3 shows the emergent laneway network of the village and its integration with the surrounding road network. The urban blocks in the village are very small – mostly around 200m perimeter – which sets the village apart from the larger urban blocks outside the village.

**Architecture**

The embedding of Shoolay in the urban fabric has affected its visibility to the formal city. While its northern and southern edge are largely invisible to the formal city, as the former fields have been urbanized, its eastern and western edge are exposed to intense flows of motorized traffic. One of the emergent effects of this urbanization is visualized in the functional mix distribution in map 7.5, which shows how each side of the village has developed differently. The western edge is highly visible and has developed shops that are tied to the functional mix of the rest of the city. Despite similar intensity of flows, this process is absent along the eastern edge of the village. While the waterbody along the eastern edge of the village is gone, it remains a transitional zone where institutions and greenery obscure the view of the village. The northern edge is largely invisible, facing the backsides of institutions and a shopping mall, behind which a range of small shops and eateries has developed catering to the students and low-wage labourers. The southern edge is marked by the urbanization of former agricultural fields, which have generated larger plots of 300 to 500 square metres. These plots, which are much larger than the village old core, has generated





**7.4** Typical set of laneways for old core and new village extensions

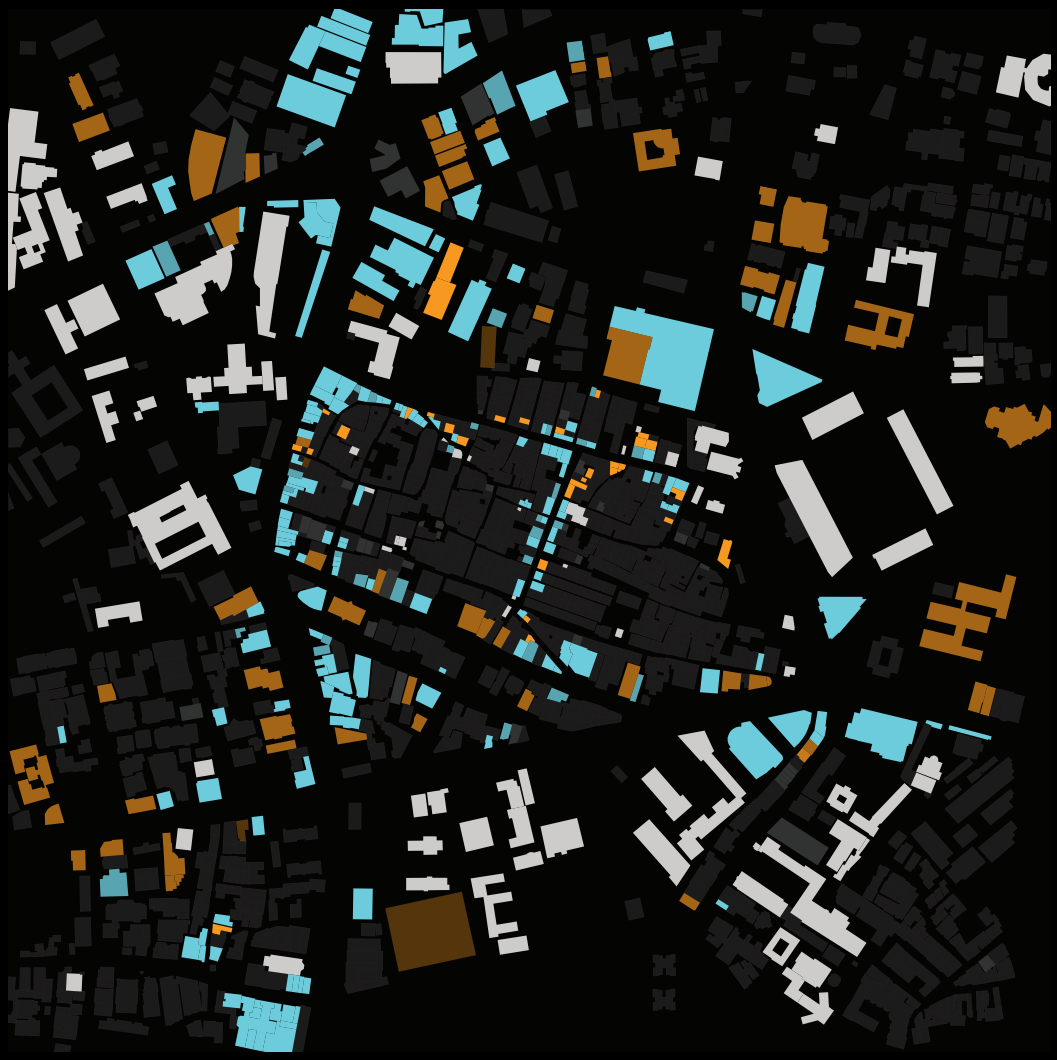
a formalization process in which offices mix with larger retailers and up-market restaurants. The activity along the northern and southern edge is facilitated by one of the few direct north-south laneways through the village, which has in turn developed as busy commercial route too – see image 7.4a.

Shoolay densified as part of a general densification of the district, and its average building height of 3 floors is not distinct from its surroundings (see map 7.6). Based on plot dimensions, buildings within the village are legally allowed up to a height of 11.5 metre. Perhaps surprisingly in a city where deviations have become the norm, most buildings abide by these formal restrictions, and only about a third of buildings in the village are above the legally prescribed limit. One explanation might be that the upgrading started relatively recently – Shoolay simply is not wealthy enough yet to afford illegalities. The most common deviation from the formal building codes lies is the disregard for legally mandated setback zones. In fact, disregard of the setback zones generates an equal amount of extra floorspace as adding an extra-legal floor. The old core has more single-storied buildings with courtyards and other private open spaces, while the remainder of the village generally has buildings with full plot coverage. Based on historical satellite imagery, it can be traced that many smaller plots in the old core of the village have been amalgamated and replaced with multistory apartment buildings. While these larger plots are allowed a higher floor area ratio based on their plot size, the limited laneway width (below 9m) still restricts these buildings to the same floor area ratio. Although these buildings are as (il)legal as other buildings in the village, they tend to adopt the 'appearance of legality'. Photo 7.11a shows how this building on an amalgamated plot has a 1 metre front setback that appears more 'restrained' than the opposite interfaces, but is in fact just as illegal (at least 3 metre setback is required for a plot of that size).

With numerous buildings still under construction, the village is expected to continue to densify. One of the ways to increase the floor area is by cantilevering out over public space and map 7.9 shows that 30% of all interfaces in the village have cantilevers. Only a very small fraction of those lead to low-light conditions and even if densification continues only 10% of all interfaces are at risk of low-light conditions on account of the laneway width. Photo 7.11b shows a practice that some buildings have adopted where balconies or open stairs are added at the front of the building, but still within the plot boundary. The ground floor effect of such retracted interfaces is that the open space in front of the house is often walled off – allowing less interaction between the lane and the building. Municipal building codes explicitly prohibit cantilevering above the set-back zone, suggesting that this practice emerged informally. Indeed, there are no projections along those

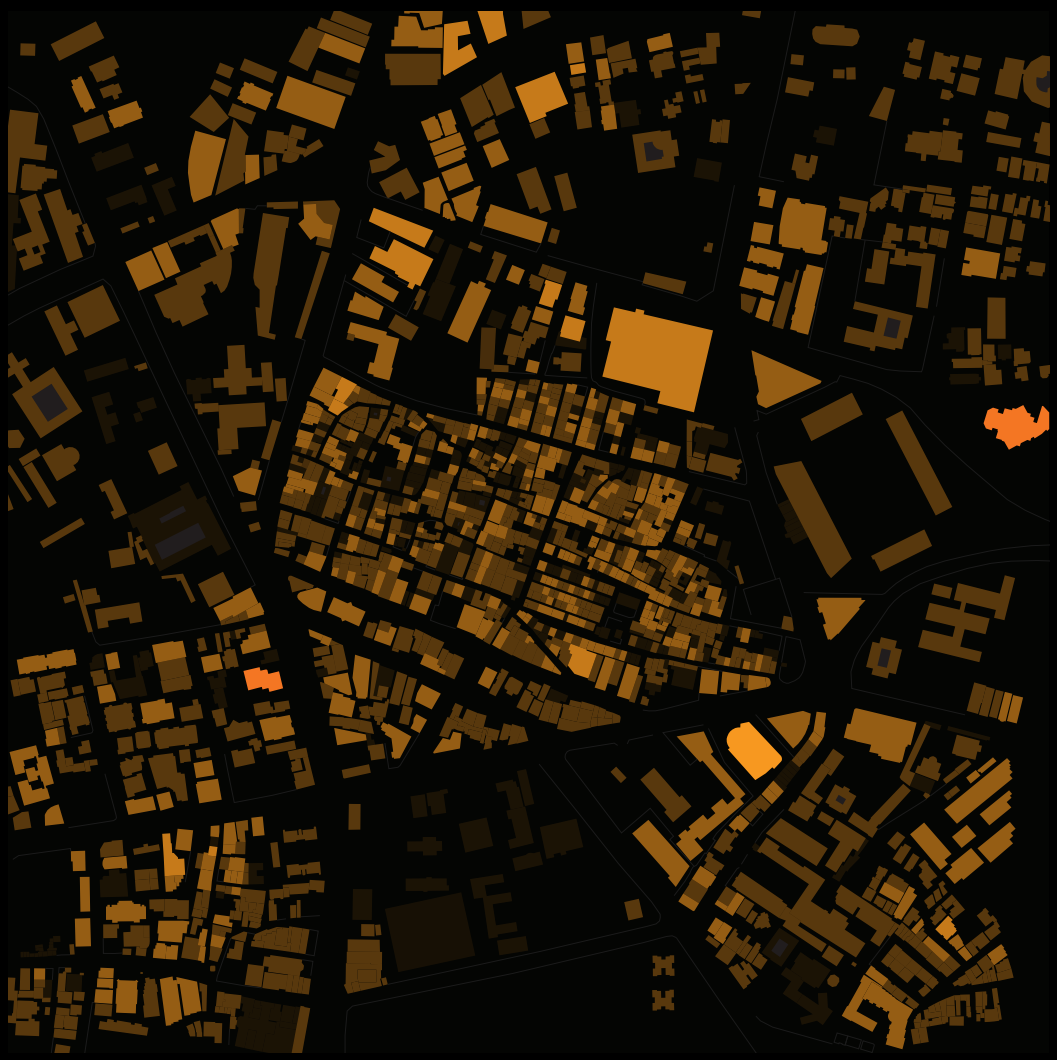
**7.5 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- production
- goods



**7.6 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

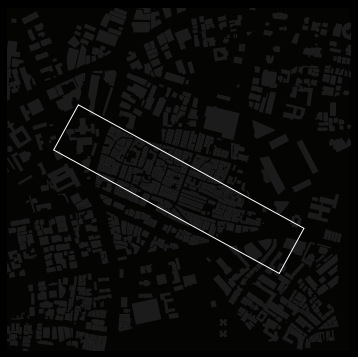
**7.7 appropriation**

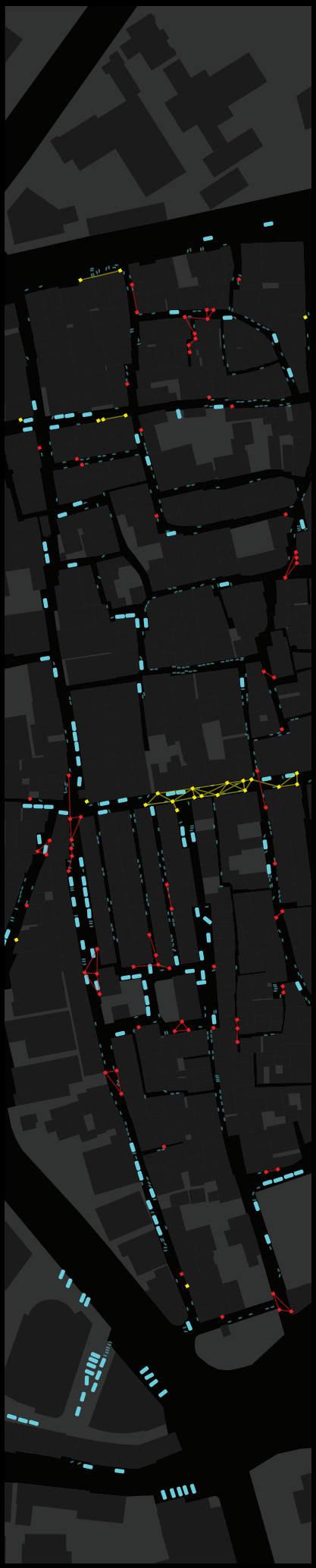
- commercial
- domestic
- vehicular

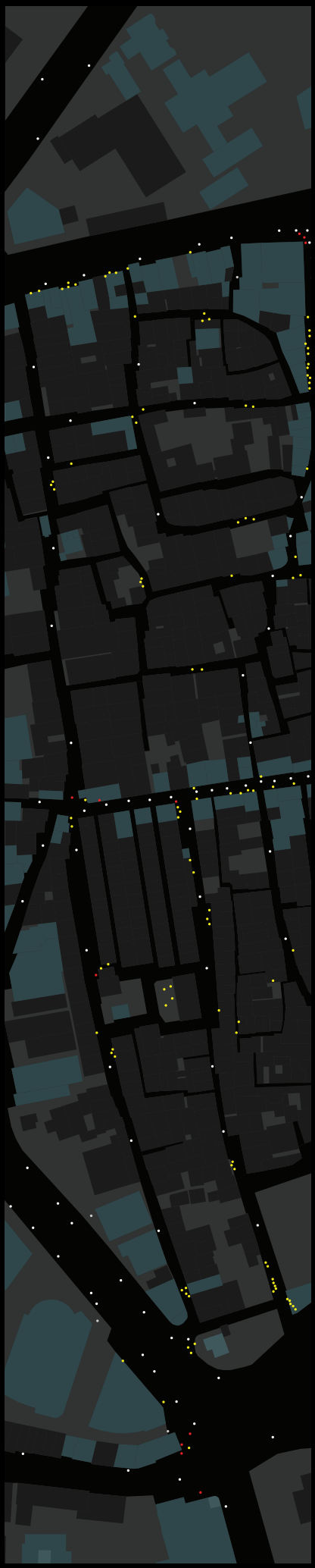
**7.8 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi







**7.9 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**7.10 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

**7.11** Planning violations in building interfaces – yet with the appearance of legality (7.11A) and negotiation of legality (7.11B)

edges of the village facing the main roads of the formal city, suggesting that municipal codes are more rigidly enforced along those highly visible edges.

The negotiation of the setback zone emulates traditional practices. Photo 7.4d shows a common interface adaptation of traditional rural building, where seating space is projected out into the public domain. Photos 7.12a-b shows how the serrated edge of a traditional shophouse, has been emulated in a contemporary version of that typology. A total 30% of all interfaces have serrated edges, about half of which also have cantilevers – see map 7.9 and 7.10. These serrated edges are most likely to emerge in laneways above 3-metre-wide. While laneways below 3 metre account for 35% of all lanes, they only feature 13% of all serrated edges. Many buildings in Shoolay clearly face one side while the backside remains blank. In total, a third of all interfaces remains impermeable. In several wider lanes smaller single-story dwellings have been constructed along these unused impermeable interfaces (see image 7.4e). Impermeable interfaces also occur along apartment buildings that feature hollow plinths for parking. Not only do these buildings follow the municipal code on minimum parking requirements, they also abide by municipal codes on setbacks and cantilevers, suggesting that formal building permission has been sought for these apartment buildings.

### Urbanity

While Shoolay is differentiated from its urban context morphologically, because it was incorporated into the city so long ago, the residents that were interviewed do not see themselves as villagers. Most people have

**7.12** Contemporary buildings (7.13A) emulate serrated edge from traditional buildings (7.13B)

**7.13** Temporary appropriation of entire laneway

moved in longer after its identity as a village was clearly recognizable and only recall its slummy conditions, which persisted till recently. Only in the last 15 years did the area substantially improve and the current architecture is evident of explicit care taken by the people in the appearance and maintenance of their buildings. Partly to avoid the connotation between Shoolay and these slummy conditions, the area's name was changed and is politically fused with the surrounding area (Ashok nagar). The local representative of the municipality still has their office at the northern edge of the village. Notwithstanding the improvement of the architectural infill, Shoolay still retains its urban structure – the narrow laneways and small plots provide a space in the city for affordable housing and small shops that are unable to find a place in this expensive part of the city.

Even though Shoolay's built density is higher than its formal context, the laneways of the village are quiet as opposed to the busy thoroughfares of the surrounding city. Map 7.8 shows the typical activity pattern in the transect between 3 and 5pm on weekdays, in which around 218 people were using the public space in the village. Almost two thirds of people were engaged in stationary activities, socializing in small groups spread out through the village. Some clustering happens along the commercial areas, as well as at the temples, mosques and churches that each generate their own node of activity. Along the commercial edges, the social activity is linked to more intense appropriation as can be seen on map 7.7. Other domestic appropriations are mainly constituted by potted plants and other decorative items – adding to the middle-class aspirations. Occasionally,

entire lanes get temporarily appropriated for events such as seen on photo 7.13. Another feature of the rising socio-economic standards in the village is the large amount of the public space occupied by parked vehicles. While none of the lanes act as major through connections, most lanes are wide enough for motorized traffic (see map 7.3). The aforementioned multi-story apartment buildings that follow all the municipal requirements, showed a distinct absence of social activities, while the impermeable interfaces along their compound walls attracted a high volume of parked vehicles. Apart from the semi-fixed appropriations, there is widespread practice of making *rangoli's* – traditional chalk motifs made on the pavement in front of one's house (Tadvalkar, 2015). While not systematically mapped, these *rangoli's* were observed throughout the village (see photo 7.4b). The making of these motifs is associated with maintaining order in public space – a responsibility that translates in a sense of ownership of the laneway. As these motives are made in front of buildings with a direct access to the street, they were absent from multistorey apartment buildings, adding to the sense that the lanes along these buildings were losing their social role in favour of parking.

## Koramangala

**Koramangala lies just over 4 km south-east from the old city of Bangalore. The village is a few hundred years old, settled at the time when agricultural production around the old city of Bangalore started to intensify. Historical maps (Bartholomew, 1935; Walker, 1854) show Koramangala's old core still existed as a closely-knit cluster surrounded by agricultural fields in the early 20th century. These fields were gradually converted to urban use in a series of informal extensions. However, its growth was abruptly halted when the government acquired most of the remaining land. The agricultural land to the south was acquired for BDA housing schemes, while the rural parcels to the north-east was acquired by the government as a site for housing for the National games of 1997 (Nair, 2005). The Koramangala water tank that used to exist to the north-west of the village, has since been replaced by the National Dairy research institute and other gradual encroachment. In contemporary Bangalore, the name Koramangala has come to signify the affluent suburb that developed in its proximity – but what has happened to the erstwhile village?**

**7.14 figure ground**

building footprint

waterbody

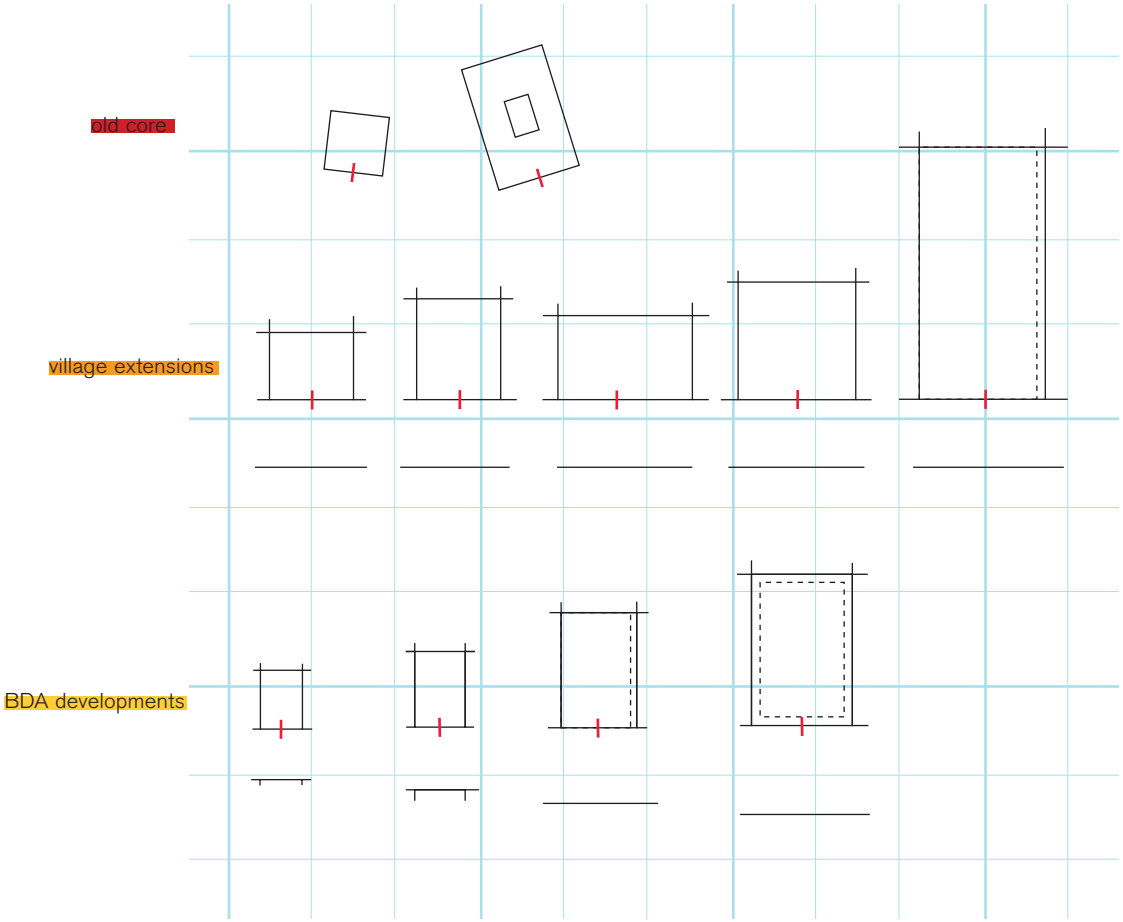
**7.15** public space

public space

rural boundaries

1. old core
2. village extensions
3. slum resettlement
4. BDA layouts

100m




**7.16** variations on plot-level in urban design of new village expansions and BDA developments

## Urban design

Koramangala's old core is clearly delineated by a 6 to 8-metre-wide circular road. From the centre to its edge the old core measures exactly 100m, showing the impact of the 1964 Karnataka Land Revenue Act. The circular road connects at just three main points to the interior of the old core, providing access to all the lots through 4 to 6m-wide-lanes (see image 7.17a). The *katte* and several temples are spread out along the outer edge of old core, while there are no such facilities deeper within the old core. The old core features a wide range of plot sizes, which indicate the heterogenous socio-economic mix that the village used to have. The southern part of the old core is occupied by lower-caste people and stands out from the other parts of the village, as the laneways are much narrower at 2 to 3m and plots are much smaller at around 50m$^2$ – see image 7.17b. The larger plots of up 300m$^2$ would have originally provided space for an internal courtyard, although few of these private open spaces still survive. Some of the larger plots have been subdivided and fitted with narrow lanes to provide access to buildings at the back of the plot – see photo 7.25.

**7.17** Typical set of laneways for old core and new village extensions

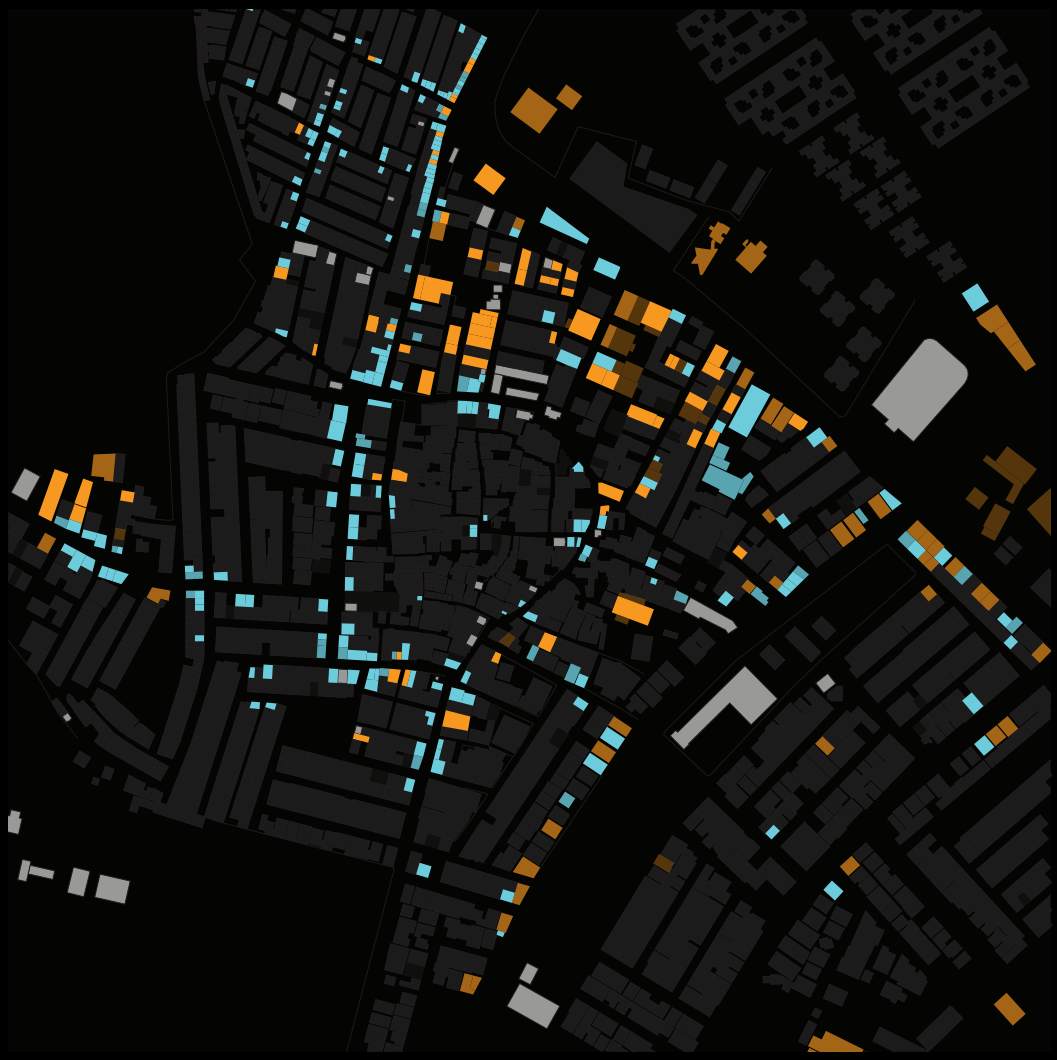
Historical survey maps ("Karnataka revenue maps," 1976) show that the former agricultural land outside Koramangala's old core was divided into fields with an average size of about one ha. These fields were organized along landscape features such as the circular edge of the village, inter-village routes or seasonal creeks that drained towards Koramangala's water tank. As Bangalore grew, villagers initiated the conversion of these parcels to urban use, in some cases encroaching part of the erstwhile drainage zones. Some of the parcels were developed in its entirety, while in others only the part closest to the old village core was developed. In total, 10 parcels were completely developed, while 7 parcels were partly developed, adding up to 14 ha of village extensions, quadrupling the size of the old core.

Diagram 7.16 shows the range of plot sizes that can be found in the old core in relation to those of the 17 former rural parcels that feature informal village extensions. The plots within these subdivisions are generally larger than the old core and exist in a broad range of sizes from 120m$^2$ to 400m$^2$. The informal extensions share a range of urban design features. First, the dimensions of each layout are stretched to fit the available space within a rural parcel, providing a partly explanation for the range in plot sizes. Second, almost without exception, the plots are laid out back to back, minimizing the required laneway length to support access to each plot. While individual plot coverage tends to be close to 100%, the subdivision as a whole has between 80 and 70% ground coverage, leaving the remainder as publicly accessible open space. The owners of the former parcels iterated that they still nominally owned the publicly accessible space, but readily conceded have lost de-facto rights to that public space. As can been in map 7.15, the redeveloped parcels either have a lane in the middle or at the edge of the plot. Most of these lanes are fairly wide at between 4 to 7-metre-wide and provide through connection, although dead-end lanes exist as well. The urban blocks that result from these subdivisions are between 100 and 600m, allowing a moderate degree of permeability. These connections and consistencies in the urban form suggest a degree of coordination between various developments that is the likely result of the fact that these developments were initiated by a close-knit landowning class in the village.

This process of informal, village-led growth was halted in 1965 when the villagers were notified that their land would be acquired and developed by the BDA. The acquired plots were amalgamated and the rural structure subsequently replaced with an urban design rooted in the neighbourhood concept, which at that time had gained ground within India's planning community (Vidyarthi, 2010). As can be seen from map 7.15, these BDA developments were integrated with the existing laneway network of the

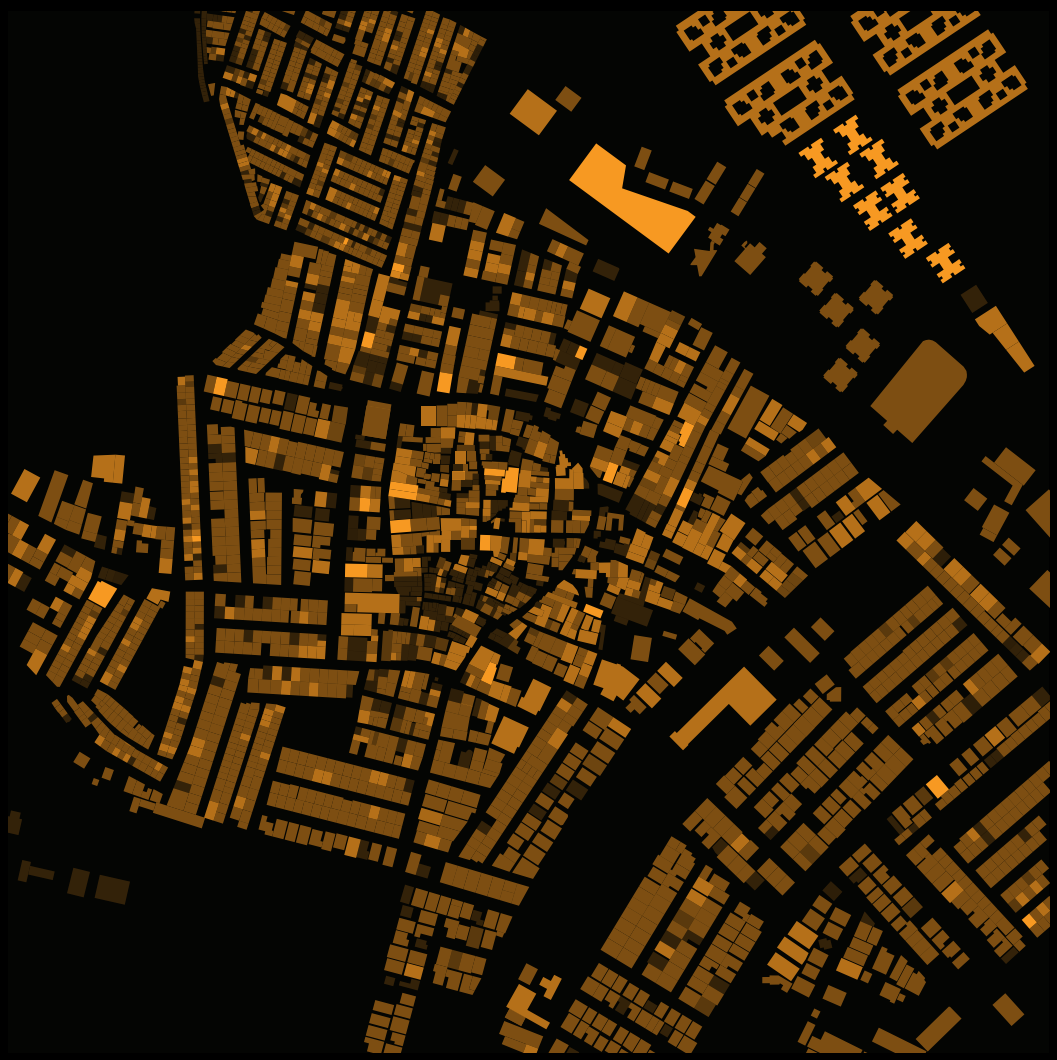
**7.18 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- goods
- production



**7.19 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

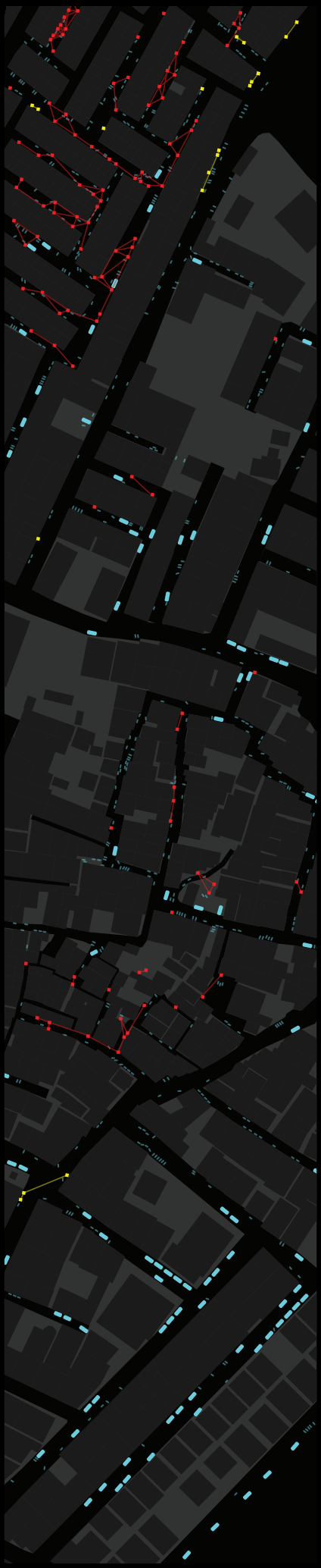
**7.20 appropriation**

- commercial
- domestic
- vehicular

**7.21 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi



**7.22 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**7.23 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

village, without any compound walls or gates. The design included a series of public parks and a 30-metre-wide road that circumvents the village and provides city level accessibility. The urban blocks have an average perimeter of 300m, similar to the block size achieved in the informal extensions. The BDA developments are laid out in three distinct plot sizes of 55m$^2$ ,125m$^2$ and 225m$^2$, providing opportunity for different socio-economic classes, and reflecting the way in which urban planning was viewed as a tool to shape society. Diagram 7.16 shows that increasing plot size is linked to increasing laneway width and the increasing presence of setbacks. The smallest plots are built along the narrowest laneways without setbacks. At a later stage, adjacent to the former lake (or partly in it according to some) a large slum-resettlement colony was established, where a further scaled down version of the neighbourhood concept was applied to the layout of this area. The urban blocks are just 150m in perimeter, while the plots are just 5 by 7m – or 35m$^2$, planned without setbacks. The small plot size restricted the buying in of higher socio-economic groups, while the adequate public space provision together with more recent investments from the national *Jnnurm* urban renewal program enabled densification of the area without slumification.

### Architecture

The coordination evinced in Koramangala's urban design generated a permeable laneway network, which has allowed a subsequent distributed pattern of functional mix as shown on map 7.18. Consumption functions cluster along the busiest pedestrian routes and intensifies at junctions

**7.24** BDA development with setbacks, no encroachment, no appropriation and no people

**7.25** Incrementally added laneways

in the public space network. Most production of services concentrate along the BDA-built 80-feet main road that circumvents the village. While there is less foot traffic here, these services benefit from the generated visibility. The interior of old core of the village has very little functional mix – small plots without major pedestrian flows have resisted the spread of functional mix into this part of the village. It is only at the edge of the old core, along the former inter-village routes that many temples and other village institutions are located. The production and storage of goods is restricted to the informally developed village extensions, where larger plot sizes allow such light industries to operate efficiently. While a formal zoning plan exist, functional mix tend to cluster in relation to the flows, visibility and plot size embedded in the urban design. Paradoxically, the only transgression of functional zoning occasionally occurs in the formally planned BDA layouts, where multi-dwelling apartment buildings are built on plots smaller than 360m$^2$ – a practice deemed illegal by the masterplan. In 2005, several residents raised a petition against illegal land uses within their neighbourhood, to which the local government responded by inspecting all buildings in the area (Ramesh, 2009). The result of that survey revealed that the planning violations were so widespread that the petitioner's own property now faced demolition, and the entire investigation was left unresolved.

The variation in urban design does not translate in large differences in building height and map 7.19 shows that most buildings are close to the average building height of three floors. The old village core traditionally had single-storied buildings, but according to the residents this started changing two decades ago, when they were gradually replaced by new apartment buildings. The same landowning class who had developed their own farmland and had been forced to sell the undeveloped land to the BDA, now began to densify their holdings, including those in the old core. This transformation occurred primarily in the village extensions and the edge of the old core – both of which have slightly larger plots that are more easily densified. This densification process then shifted to the interior of the old core, as demonstrated by ongoing construction mapped in the survey. This densification is formally controlled by municipal codes that relate plot size and laneway width to a permissible density, but violation of these codes is rampant. Based on the formal codes most parts of the village are allowed up to 11.5m or a maximum of 3 floors, but map 7.19 makes it evident that many height transgressions exist.

Despite increasing densification, map 7.22 shows that only 15% of all interfaces in the transect have cantilevers – with only a fraction of those leading to low-light conditions. Cantilevering happens predominantly in the old core and slum rehabilitation site (see photo 7.17d and 7.25). Even

if densification continues, only 13% of all interfaces face potential low-light conditions on account of their laneway width. It thus seems that the municipal rules – which prohibit any kind of cantilevers – are successfully enforced in the village extensions and BDA layouts. However, again the question is raised whether this a result of the municipal rules, or whether this is more likely the result of a locally enforced practice. While cantilevers into public space are largely avoided, a quarter of all interfaces have negotiated the municipally mandated set-back zone through cantilevering within the plot. While this practice is formally prohibited as all buildings require at least one metre of front setback – by placing staircases at the front of the building, the extra space could be counted as movement space rather than habitable space, thus allowing villagers maximum use of the land, while still purporting compliance with regulations. Despite its contested nature, the adaptation has spread through all parts of the village, including the formally built BDA developments (see photo 7.24).

The two cantilevered interfaces types represent two fifths of all interfaces in the transect and they correlate with two thirds of all serrated edges. Ground-level serrations are a testing ground for cantilevering and vice versa. Map 7.23 shows that serrated edges are predominantly found in the slum rehabilitation site and along commercial uses in other parts of the transect. They are almost absent from the village extensions and other BDA developments, except for several shops. Along several of the main lanes, municipally built sidewalks have appeared, and serrated edges are very uncommon along these. Only a fraction of all interfaces have an an impermeable non-serrated edge. These occur predominantly in the village extensions and BDA developments. In the village extensions, the blank interfaces are linked to differences in orientation – most blank interfaces are on the edge of a former rural boundary and they are oriented towards another laneway that was part of its own layout. In the BDA developments it is rather linked to mandatory setback and parking requirements, which often lead to compound walls.

**Urbanity**

The interface adaptations structure the use and appropriation of public space. Map 7.19 shows the typical activity patterns in the transect between 3 and 5pm on weekdays. In total, 174 people were observed using the space – out of which 50% were engaged in social activity. The BDA layouts evince almost no use, while the village core and extensions have moderate use of public space. The most intense use is observed in the slum rehabilitation site, where people are spread out in little groups, often along small shops with serrated edges. A similar pattern is revealed in the

appropriations seen in map 7.20. While there are no appropriations in the BDA layouts or in the village extensions (see image 7.24 and 7.17c), the slum-rehabilitation site (image 7.17d) and the southern part of the old village core (image 7.17b) have many appropriations. These appropriations are mostly geared to domestic tasks such as storage of potable water or the drying of laundry and mix easily with 2-wheeler parking. The intense use of public space for car parking in the BDA layouts and village extensions, crowds out any other possible uses. Even though the various parts of the village have similar built densities, the activity mapping reveals strong differences that are related to plot size and interface types. The village extensions were informally planned, but show few informal appropriations, while in the formally planned slum rehabilitation site has plentiful informal appropriations. The morphological element that most closely associated with informal use is plot size – much informal use happens along small plots, while big plots show little use.

The name Koramangala has long ceased to indicate the village's old core and now refers to the entire locality, which is mostly constituted by BDA sites on its former farmland and has little to do with the erstwhile village. Many land-owning villagers have moved to these adjacent BDA sites, while redeveloping their former houses in the old core. Even though the *gram panchayat* in Koramangala was abolished in 1984, the erstwhile landowning class still has an important position as they own most land in the old core and village extensions. While all the various developments have been incorporated administratively and regulatory, differences in plot size, height and functional mix continue to set the village apart decades after being formally incorporated. The village's morphology provides distinct space for vastly different socio-economic groups, while the morphology continues to allow them to mingle.

# Kudlu

**Kudlu lies 11km south from the old city of Bangalore. The tank that used to sustain its agricultural production is still present, directly adjacent to the village's old core.. Agriculture has ceased to operate here, and only fragments of its rural economy survive – such as in the quarries and brick kilns that feature on the eastern edge of the village. Its urban transformation started in the early 2000's, when its land became attractive as the nearby 'Electronics city' started booming. The village was part of a proposed IT corridor to connect Electronics city with an upper-class office and residential district called Whitefield in eastern Bangalore (Walcott & Heitzman, 2006). The plan was proposed in 2003 but never implemented, partly because of excessive development costs. Instead, the periphery of Kudlu was merely zoned as high-tech land-use in the hope of attracting private investors. In absence of any government planning, what kind of urbanity has the private urbanization of Kudlu generated and what has been the role of the village in this urbanization process?**

### Urban design

Kudlu's 3ha old core lies directly south of the lake, slightly elevated above the surrounding land, nestled around the crossing of two inter-villages routes – see photo 7.28c. Most other lanes through the village (see photo 7.28a) end up going towards this junction which is marked by the presence of the traditional *katte*. These lanes meander to form highly amorphous blocks, having within them a mix of plots ranging from 35m$^2$ to 200m$^2$. The larger plots are organized along the main inter-village routes and often contain several buildings clustered around a shared open space, while the smaller plots are concentrated at the back, higher up the ridge that defines the eastern edge of the old core. According to the villagers, in the 1980's a state representative came to Kudlu and was shocked to see the appalling living conditions of many of its lower caste inhabitants. At his request, the government acquired a piece of land south of the old core and laid out a village extension (2 on map 7.27) with plots of 40 by 20 feet (12m by 6m), arranged back-to-back along 5-metre-wide laneways. Simple mud-brick houses were provided on each plot – although most of these have since then been replaced (see photo 7.35 for one of the last remaining). Meanwhile, to the east of the old core, villagers were incrementally adding houses on former rural land in much the same way as the incremental growth that had formed the original old core. These early village extensions tripled Kudlu' size to 10 ha, well before it was incorporated in the city of Bangalore.

**7.26** figure ground

building footprint

waterbody

**7.27** public space

urban blocks

rural boundaries

1. old core
2. first extension
3. village extensions
4. gated subdivisions

100m

Historic revenue maps of the village ("Karnataka revenue maps," 1976) reveal that there were originally 68 rural plots within the 1km study area – with an average size of 1 ha. These rural plots which are shown in map 7.27, form the basis of subsequent informal subdivision. By the early 2000's a range of private parties had acquired village land and were laying out lanes and plots, which were slowly filled in withbuildings and continues to this day. Some of these extensions were organized by wealthy villagers who thus retained ownership of their rural parcels, while in other cases groups of individuals from outside the village pooled their resources to invest in a parcel. An example of this latter arrangement can be found in a group of employees from the central silk board, who bought a rural parcel, laid out lanes 7-metre-wide, divided it in plots of 30 by 40feet (110$m^2$) and distributed them among its members (see photo 7.28e). These layouts often seek formal approval retrospectively and the developers ensure that the spatial dimensions align with those formally required by the BDA in anticipation of eventual regularization. These layouts meet the legal requirement of 30% in public space and have opened these spaces up to the public and granted responsibility for its maintenance to the BBMP. Satellite imagery indicates that starting from 2007, several gated apartment complexes were initiated on the village periphery that are quite different from the earlier developments. The gated apartment complexes are all built with low ground coverages ranging from 35 to 60%, yet seek to retain the privacy of their open space by surrounding their parcel by a compound wall. Whereas all preceding village extensions had granted their open spaces to the BBMP, here the exclusive use and responsibility for its maintenance was retained with the private owner.

These village extensions and their relationship with each other have affected the urban permeability of the study area. Map 7.27 shows that new layouts are connected to the existing laneway structure in different ways and throughcounting the number of connections they make to each other, something about the coordination of urban design decisions is revealed. A third of the original rural parcels only have a single connection to the public space network which means that it is organized around a dead-end lane which lacks through connectivity. A third of the plots have two connections – allowing through connectivity – while a final third of the original plots has more than two connections. Comparison with the historical revenue maps reveal that the former drainage lines are generally incorporated into the laneway structure by simply paving them over, while the erstwhile rural parcel boundaries often coincide with the end points of many dead-end laneways. When the rural parcel is subdivided, the new public space is designed in *the middle* of the plot – and almost never at the edge of plot, which would potentially allow more connectivity with neighbouring

**7.28** Typical set of laneways for old core and new village extensions

development. While amalgamation of rural parcels might transcend these boundaries and increase permeability, only a small number of parcels have actually done so. Even then, based on this small sample, amalgamation tends to only increase internal permeability within the amalgamation, while having little positive effect on the study area as a whole. The rural parcels that are the best integrated in the new urban configuration are those that were initiated by villagers and this suggest close coordination between plot owners to form a continuous laneway network. The urban blocks in these extensions are generally under 400m in perimeter, when by contrast, the emergent laneways network in other parts of the study area generates urban blocks extending up to 1400m. The village and its extensions thus play an important role in providing common access, while other developments – most notably the gated compounds – profit from the commons created by the village. While such coordination is effective for connectivity at the neighbourhood level, space for city level connections is largely absent from the village. Unlike Koramangala, where the BDA coordinated space for city level connections, no such connectivity was produced by the informal urbanization around Kudlu.

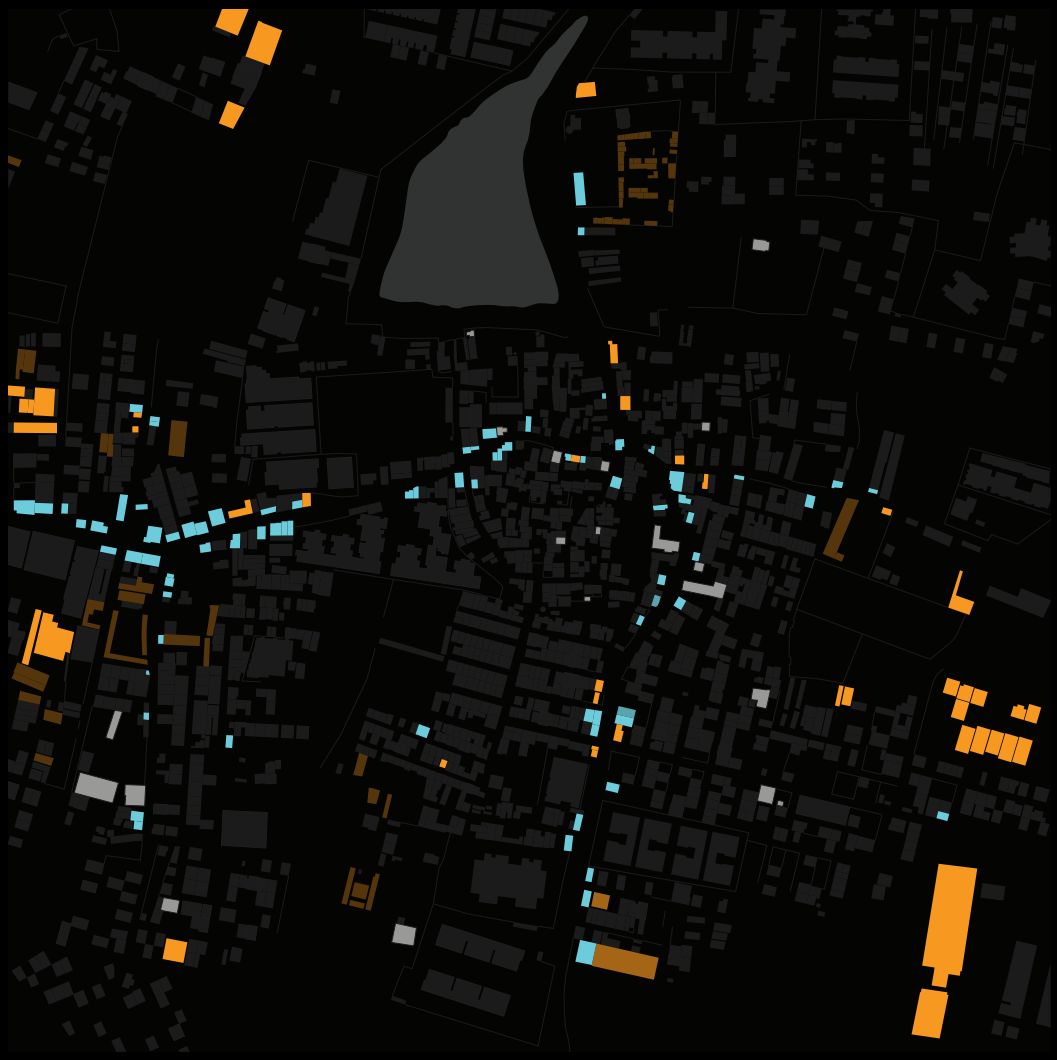
**Architecture**

The distinctions between the old core, informal subdivisions and gated communities are also clearly visible in the architectural infill. Map 7.30 shows that the old village core still has a low average building height at just one and half stories, with many traditional houses still present. These houses, such as described by Beals (1974), are constructed from mud-brick with tile roofs, often with a courtyard or some other open space to keep cattle.
By contrast, the informal subdivisions feature more spread in height, including many undeveloped plots, single storied houses, and multi-story apartment buildings up to 4 floors – averaging out at 2,5 floors. These are most often built at 100% net ground coverage, which the ample public space within the informal subdivisions allows for. Map 7.33 shows that 20% of all interfaces has cantilevered, but mostly within their own plot boundaries and property boundaries are rarely transgressed.
The large-scale apartment complexes that are built as a single development are upwards of 5 floors, extending to 20 floors. These developments are without exception along the inter-village routes, because the higher road width allows them to legally develop more floor space. On account of their plot size, municipal rules mandate that they have a maximum ground coverage of 50%. These open spaces are prescribed at the edge of the plot via setbacks, precluding any cantilevering.

Map 7.29 shows how most functional mix is organized alongside the two erstwhile inter-village routes. The eastern part of the study area

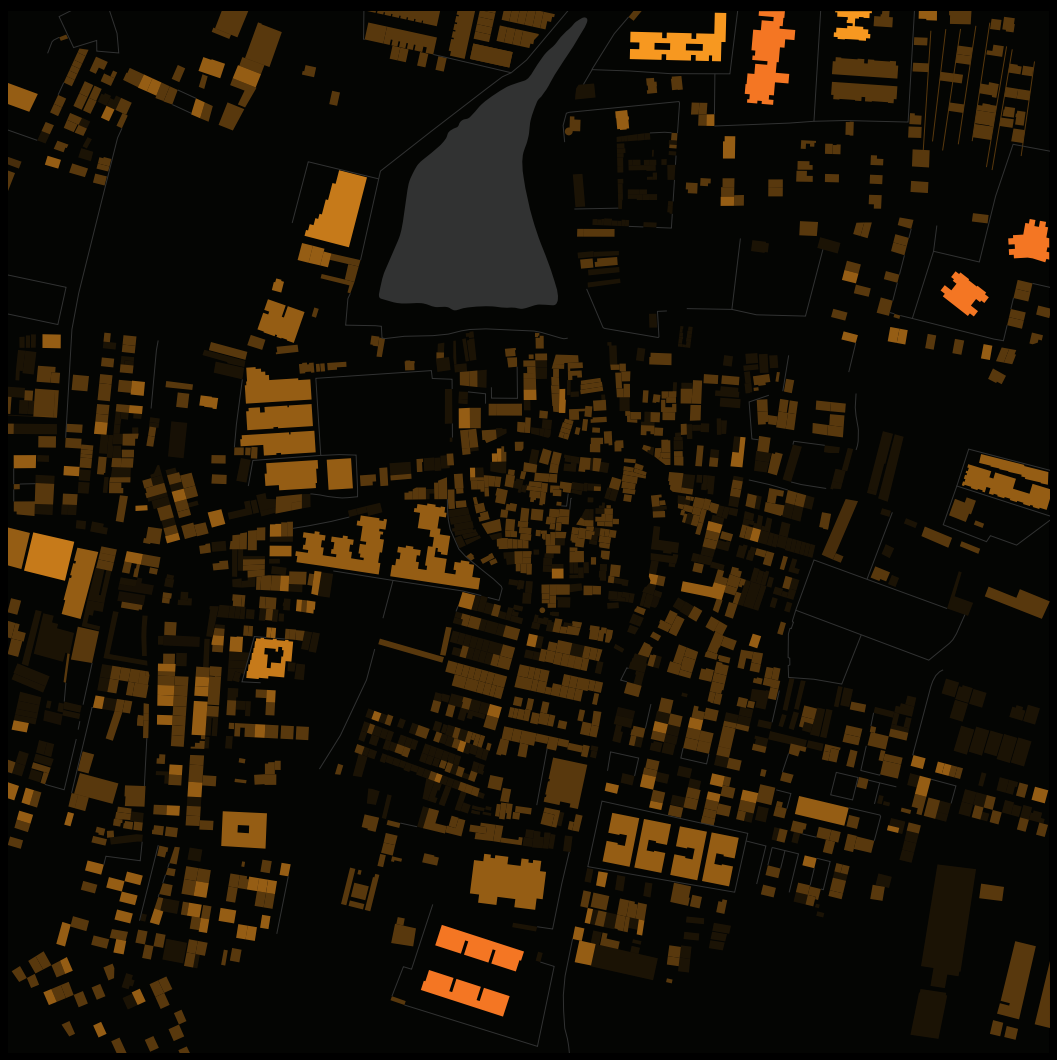
**7.29 functional mix**

- residential
- other
- food
- consumption
- community
- storage
- services
- production
- goods



**7.30 building height**

- unbuilt
- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors



100m

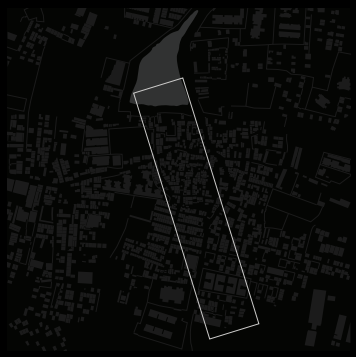
**7.31 appropriation**

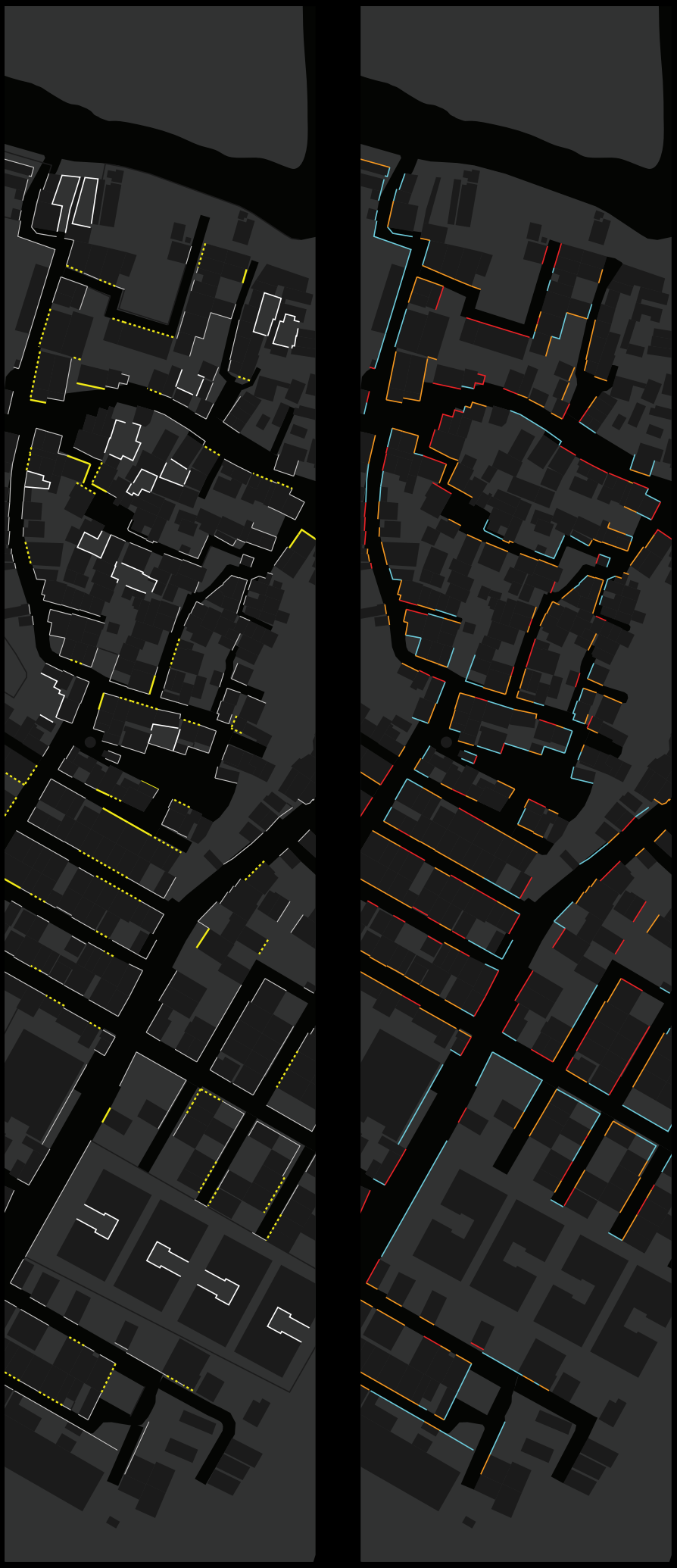
- commercial
- domestic
- vehicular

**7.32 activities**

(3pm-5pm weekdays)

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi





**7.33 cantilevers**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard

**7.34 interfaces**

- inpermeable
- permeable
- permeable & serrated

150m

750m

**7.35** traditional mud-brick and roof-tiled houses in first village extension

still has some land extensive brick kilns but increasing land prices have already pushed several further out to the periphery. Other light industries and warehouses appear in small clusters along the secondary lanes of the informal subdivisions, which fall within the municipal regulated allowance for ancillary use. Despite Kudlu's land-use zoning as 'high-tech', no such industries have developed here. The spread of functional mix is closely related to the spread of serrated edges as shown on map 7.34. A quarter of all interfaces have serrated edges, which most often occur along the commercial edges. Many informal subdivisions were initially developed without proper road paving, drainage or sidewalks. The water was drained away along ditches on both sides of the lane which meant that any owner had to build their own transition from their building to the lower-lying level of the public space (see image 7.28d). In the informal subdivisions this is often a ramp, so that vehicles can enter the parking on the ground floor – see image 7.28e. In the old core extension, it is more often an edge that is used for domestic storage. Blank interfaces account for a third of all interfaces in the transect, mainly the result of compound walls around the large apartment developments. Even though these developments can extend for several hectares, they are not built as subdivisions with publicly accessible open space. Following all the municipal codes on setbacks, ground coverage and parking, much of the private open space is designated directly adjacent to public space and compound walls are erected to re-establish the public-private boundary.

**Urbanity**

Map 7.32 shows that in a typical pattern of use between 3 and 5pm on a weekday, 93 people used the public space in the village. Three quarters of people were engaged in stationary activities, socializing in small groups. The old village core and the earliest village extension are the busiest, while the later layouts show much less activity. This is reflected in the appropriations as can be seen in map 7.31. These are mostly appropriations related to domestic tasks along the erstwhile gutter zone which has been upgraded. Where the gutter zone has been adapted into a car-ramp, appropriations are absent. The use of public space for parking is not high, partly because many plots are undeveloped or still at low density, but also because many developments in the later layouts have their own parking facilities on the ground floor of the building. While parking demand is still low, the public space faces pressure during peak hour, as traffic clogs up the few routes that provide continuous through movement. The government's absence from the planning process and the relaxed site planning rules for formal development, means that the only way for new public spaces to emerge is through informal subdivisions. The municipality inherits whatever public open space structure is designed for them, including the lake that used to be in common ownership by the village. Rather than integrating the lake into the public space structure, the BBMP has fenced the lake off and transformed it from a seasonal lake into a pleasant view for adjoining apartment buildings.

In Kudlu, like many other villages in Bangalore's periphery, the government has had little to no role in its urban planning. Kudlu's urbanization is a mix of village-initiated extensions and development initiated by outsiders. From an administrative point of view, the village is fully incorporated into the city as the *gram panchayat* has been replaced by the BBMP. Despite the nominal authority of the BBMP, the local government office is housed in the same building that the *gram panchayat* previously operated from and it became clear from interviews that it is run by many of the same people. Residents in Kudlu's old core still lack access to many municipal services. While municipal services should be granted free of charge on account of its administrative urban status, the unclarity among local villagers about which agency is responsible for such services, sets up a context in which the villager are easily financially exploited. The ambiguity that is embedded in the difference between Kuldu as a rural village or an urban neighbourhood, has become a political and financial asset.

## Comparison

Bangalore is not well known for its urban villages. The narrative of Bangalore as an IT-centre or city of lakes, brushes over the role of villages in the urbanization process. Metropolitan scale mapping showed that Bangalore's villages are small and thus easy to go unnoticed, but also very numerous. Informal urban expansion and municipal zoning practices have made the boundaries between village and the rest of the city increasingly blurry. While the villages have been incorporated into the city from an administrative and regulatory point of view, morphologically they remain distinct from formally planned parts of the city. Villages are often identified as low income settlements, inhabited by "slum dwellers [who] have lived in Bangalore for four or more generations" (Krishna et al., 2014, p. 570). But many village inhabitants have not migrated to Bangalore at all,rather, Bangalore emerged out of the in-situ urbanization of these villages. Rather than to define urban villages narrowly as just a denser version of the old village core, the three cases in this chapter elicits a broader definition that includes the continuing relations of villagers to their former agricultural land. .

The centre-periphery differences in Bangalore's urban villages cannot simply be put down to increasing densification closer to the city centre under market pressure. At least as important are the ways in which different government regimes have treated the villages – from colonial rule, to state-led urbanization and laissez-faire policy. These shifts in municipal practices have affected how urban villages are spatially integrated and generated distinct variation in permeability. Shoolay's public space is integrated but sits within an urban structure of low permeability – Koramangala's public space is well integrated with small urban blocks – and Kudlu is poorly integrated with very low permeability. Wider infrastructure that provide city-level connectivity was built by the British in Shoolay, by the BDA in Koramangala, while it is absent in Kudlu. The informal subdivision of the village's former agricultural land produces public space in similar quantity as formal development, but differ in the extent the integration of the public space network. Without a masterplan that guides the permeability, informal development relies on coordination between the various developer to to overcome the inherent insularity of parcel by parcel development of agricultural land. This coordination is evident in the village extensions of Koramangala were the social bonds of the original owners ensured connectivity between parcels. Kudlu's plurality of agents engaged in village extensions on the other hand, generated a highly fragmented urban structure.

Bangalore's urban villages have a convoluted relation with the regulatory framework. Most of the surveyed buildings in Shoolay, Koramangala and Kudlu transgress one or more municipal building codes. The estimated 70 to 85% (Benjamin, 2007; Mohan & Rajagopal, 2010) of the city that has informally urbanized on former agricultural land, is legally contested in terms of building codes, not in terms of tenure. The question remains whether the residents fail to follow the 'proper' building codes, or whether the government has failed to codify the urban form that had already been built. Two examples illustrate how formalization induces illegality and generates a market for gaining and maintaining legality through both financial and political transactions. The first example concerns the recently released masterplan for 2031 which proposes tightening restrictions on floor area ratios on plots below 360m$^2$ from 1,75 to 1,5. This change makes a large share of buildings in urban villages non-conforming with regulations – why would an owner abide by the new regulations if it results in less floor space. The second example concerns site-planning codes for *gramathana* extensions in the periphery of Bangalore that are enforced by *gram panchayat's* and which generally apply a looser set of standards. Once these village extensions are built, it is very difficult to apply stricter, more prescriptive codes, that they would have to follow to obtain Khata-A certification once they are incorporated in Bangalore.

While the narrative of Bangalore as a city of lakes has emphasized the encroachment of lakebeds and other green open spaces, such a narrative cannot simply be extended to public space within the village. Comparison of the laneway widths in the three old cores indicates a decreasing width from Kudlu to Shoolay, suggesting that fuzzy property boundaries lead to an incremental encroachment of public space. In the new extensions however, the property boundaries that are laid out by the people who inhabit these spaces are generally respected. Urban villages in Bangalore are better characterized by a negotiation of set-back zones that intensifies with smaller plot sizes. While larger plots allow various interface functions alongside each other, small plots require interfaces that are increasingly multifunctional. A lack of private open space further encouraged more spill-out, both in terms of appropriation as well as socializing. Negotiation of the set-back zone and of other kinds of (induced) deviation from formal codes do not necessarily lower the quality of public commons that the municipal codes supposedly guard against. In fact, it can be argued that exact application of municipal codes would lower the quality of the urban commons. The codes on cantilevering, parking and setbacks are promoting an urban form of walled-off enclaves that is characterized by the complete internalization of commons. Buildings are disassociated from the public realm. These gated communities internalize parking

requirements through hollow plinths, lighting requirements through setbacks, and socializing through designated leisure grounds. This internalization of commons production limits other qualities that emerge from a relational commons – shadow to keep the street cool, serrated edges to ensure socializing and walkability through the site. This is directly opposite to the urbanity of the villages, where both positive and negative effects of the built form are externalized – and evaluated – by neighbours and people using the public open space.

Despite Bangalore's prevalence of informal development, it has a relatively low percentage of slum population compared to other large Indian cities (5th National Indian census survey, 2011). The urban village – conceptualized as the old village core and the informal subdivisions that were coordinated around it – has a positive role in lowering the slum population, by providing a large supply of housing, which on account of the small grainsize provides space for various income groups. The urban villages supply affordable housing in some of most expensive pockets of the city – protected from gentrification and large developers partly on account of their morphology. So far, Bangalore's villages lack extreme densities or cantilevering that induces low-light conditions, maintaining a highly liveable public space network. Bangalore's current laissez-faire approach to urban planning enables ample production of public space and affordable housing but restricts city-level connectivity which has exacerbated the city's traffic problems. The landowning villagers have profited immensely from the informal development of their land through extracting rental money from migrants, but their close ties to the land also allowed them to maintain the quality of public space. Formalization and regularization would need to strengthen, not dismantle and replace, the coordination that currently takes place in the informal urbanization of Bangalore's villages.

# chapter 8 Comparison

**An urban village is the process by which an erstwhile rural village becomes part of the city and goes through a socio-spatial transformation that makes it distinctly different from rural villages on the one hand, and the surrounding urban fabric on the other. The introductory chapter of this study detailed how they play a critical role in housing the urban poor, migrants and other disadvantaged groups. This research focused on the spatial aspects of the urban commons that are generated in the urbanization process and which facilitate this socio-economic integration through their capacity to allow incremental upgradation. The narrative that urban villages are merely forms of in-situ densification and are gradually being displaced from their land is only a partial and selective part of the story – the inhabitants of urban villages have the capacity to organize, expand and improve the village, sometimes in spite of, sometimes with aid from municipal governments. This is an adaptive urbanization that responds to, and experiments with different spatial practices, co-producing the urban commons through the interplay of multiple agents and a multitude of formal and informal practices. If urban villages have a permanent place in the city, knowledge about how this productive assemblage comes into being and how its productive qualities as spaces of integration and upgradation emerge from negotiation between its co-producers is key. Four key interrelated processes were identified in the introduction – the ways in which public space is produced, the ways in which architecture infill densifies and diversifies, the ways in which the interface between public open space and the architectural infill is adapted, and finally the urban codes that mediate these processes. This research investigated these processes in three villages in each of four cities: Beijing, Guangzhou, Delhi and Bangalore. In this chapter, the three villages in each city will be referred to as inner, middle and outer villages, focusing on the main criteria for their selection – their relation to the city centre and the interlinked length of time since they started urbanizing. By comparing these urbanization processes between cities, villages, and specific spatial configurations, this research aims to give a meaningful answer to the key research questions.**

## Village extension & subdivision

Urbanization is the spatial transformation from rural densities and tenure structures, towards denser forms of habitation and more fine-grained tenure structures. Urban design as an activity is simply making accessible these new urban forms through the planning and building of infrastructures. In her analysis of informal settlement, Foster (2009) argued that builders externalize the cost of infrastructure development to the local government and tax payers – a tragedy of the commons as an undersupply of infrastructure crumbles under intensifying pressure of its use. On the other hand, the financial drain of too much public space has been identified as one of the key contributors to the failure of many government-built affordable housing projects (Owens, Gulyani, & Rizvi, 2018). Informal settlement is perceived to be haphazard and unplanned, transgressing by-laws and other legal restrictions, thereby draining the capacities of the formally built infrastructure. This section addresses these considerations by the answering the research question – what are the ways in which public space produced and what emergent outcomes are generated in this process? Public space production in urban villages is characterized by four key features. One, public space is consciously integrated in the design of the village – not a left-over space that emerges at the fringes in between buildings. Two, the urban design is co-produced through a three-tiered process – encrusting of inter-village routes, infill of rural parcels, and incremental addition and removal of laneways. Three, the public space design of new village extensions emulates the features of the old core, while anticipating municipal regulatory frameworks. Four, the emergent public space network has a fine-grained structure, but one that mixes very high and very low permeability, especially at the transition zones between old core, new extensions and the formally planned city.

The UN-Habitat report *Streets as public space and drivers of urban prosperity* (Mboup, 2013) stresses the importance of adequate public space . Map 8.1 shows the public space network of all twelve villages, distinguished between old core and newly planned village extensions. Comparison suggests that the amount of public space in urban villages is not the result of a restricted capacity, but a negotiated balance that produces public space in comparable percentage to well-known grids in Western cities, such as the *Eixample* grid (Barcelona), the *Manhattan* grid (New York) or the *Hoddle* grid (Melbourne), which each create about 30% of public space at the neighborhood level (Mboup, 2013). The most marked difference in the amount of produced public space does not lie in differences between villages, but within villages within villages. On average,

**8.1 village development comparison**

old core

new extensions

Delhi

Bangalore

500m

old cores have 15% of their land as public space, with relatively little variation between villages in different cities. Public space in new extensions is much higher at an average of 40% and with larger differences between villages. For example, the outer village in Guangzhou has 55% of its new extensions as public space, while the outer village in Delhi only has 20%.

**Old core**

The urban fabric of nucleated villages  was traditionally geared towards pedestrian movement through a concentrated built-up area, aimed at preserving farmland, yet maintaining household privacy and providing private open space for domestic activities. The old cores of the outer villages still have a high share of private open space, often in the form of courtyards or other enclosed spaces. Old cores are produced through the incremental addition of buildings and associated open space through a 'cognitive schema' (Rapoport, 1988), which guides how new parts are added to the whole. Traditionally, this schema was structured through a topological system of 'graduated privacy' (Bracken, 2017), that is constituted by four principal elements organized in decreasing publicness – an inter-village route, a larger public space, residential laneways, and finally the house. In a morphology of graduated privacy, width of space indicates its degree of publicness, and the distribution of open space regulates the intensity of use. These four public space elements are present in all villages but differ in their hierarchy and configuration.

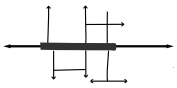
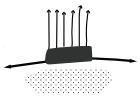
The laneway structure of a village is intimately connected to its plot size configuration, which in turn is structured through cultural differences in distribution of land – see table 8.2. More equally sized plots emerge in more egalitarian socio-economic conditions, while villages with a historic societal stratification demonstrate a larger variety of plot sizes. These socio-economic differences have a direct bearing on the spatial structure of its laneways. For example, the fine-grained fabric of parallel laneways in Guangzhou is enabled through matching plot sizes that originate from its egalitarian land distribution. On the other hand, the meandering nature of laneways in Delhi is augmented by the differences in plot sizes that originate from a more stratified society.

Differences in hierarchy also structure the relation between the four principal public space elements. In Guangzhou and Delhi, public space is more hierarchically organized, with access to and from the village regulated through its main public space, emphasizing its social importance. Inter-village routes pass at the edge of the old core and connection to its narrow residential laneways pass through a larger main public space. The main public space has a distinct character and is related to a permanently filled waterbody and temple buildings that further reinforces its importance.

The public space in Beijing and Bangalore is more equally distributed with less distinction between laneways and larger public spaces. The laneway width of the old cores in Beijing and Bangalore rarely reaches below 3 metres, while laneways below 2 metres are commonly found in the old cores of Guangzhou and Delhi. Beijing and Bangalore rely more on rainfed agriculture and they do not have a very strong relation to the waterbody – the main public space is the inter-village route that has been widened and is otherwise not spatially distinct from other lanes in the village.

### Changing increments

As villages become more enveloped by the city, increments are no longer added to meet local demand for housing, but increasingly to attract migrants and compensate for lower returns on farming. New functions such as warehouses prefer larger, more orthogonal plots that are often not available in the old core, while increased income and changing aspirations are reflected in residents' concern with space for more traffic and parking. Village extension both consumes and produces commons. Some rural commons are privatized and sold off, but simultaneously privately-owned rural land is made accessible through new public spaces, which become a de-facto urban commons through the expenses associated with its maintenance. These new village extensions are co-produced through a three-tiered urban design process: the encrusting of rural routes, the subdivision of rural parcels and the addition of laneways. These three forms of extension each follow a distinct logic parallel to Marshall's (2009, p. 194) distinction between footprint formation, plot subdivision and route propagation. These different urban design logics are not mutually exclusive processes but occur simultaneously and are nested within the same area.

| | | Plotsize variation | Residential laneways | Inter-village route | Water body | Typical size |
|---|---|---|---|---|---|---|
| Beijing |  | **some** | **orthogonal** | **through** | **incidental** | **large** |
| Guangzhou |  | **equal** | **orthogonal** | **in front** | **permanent** | **middle** |
| Delhi | | **high** | **meandering** | **in front** | **permanent** | **middle** |
| Bangalore | | **some** | **mixed** | **through** | **seasonal** | **small** |

**8.2** old cores have similar component parts that differ primarely in their configuration

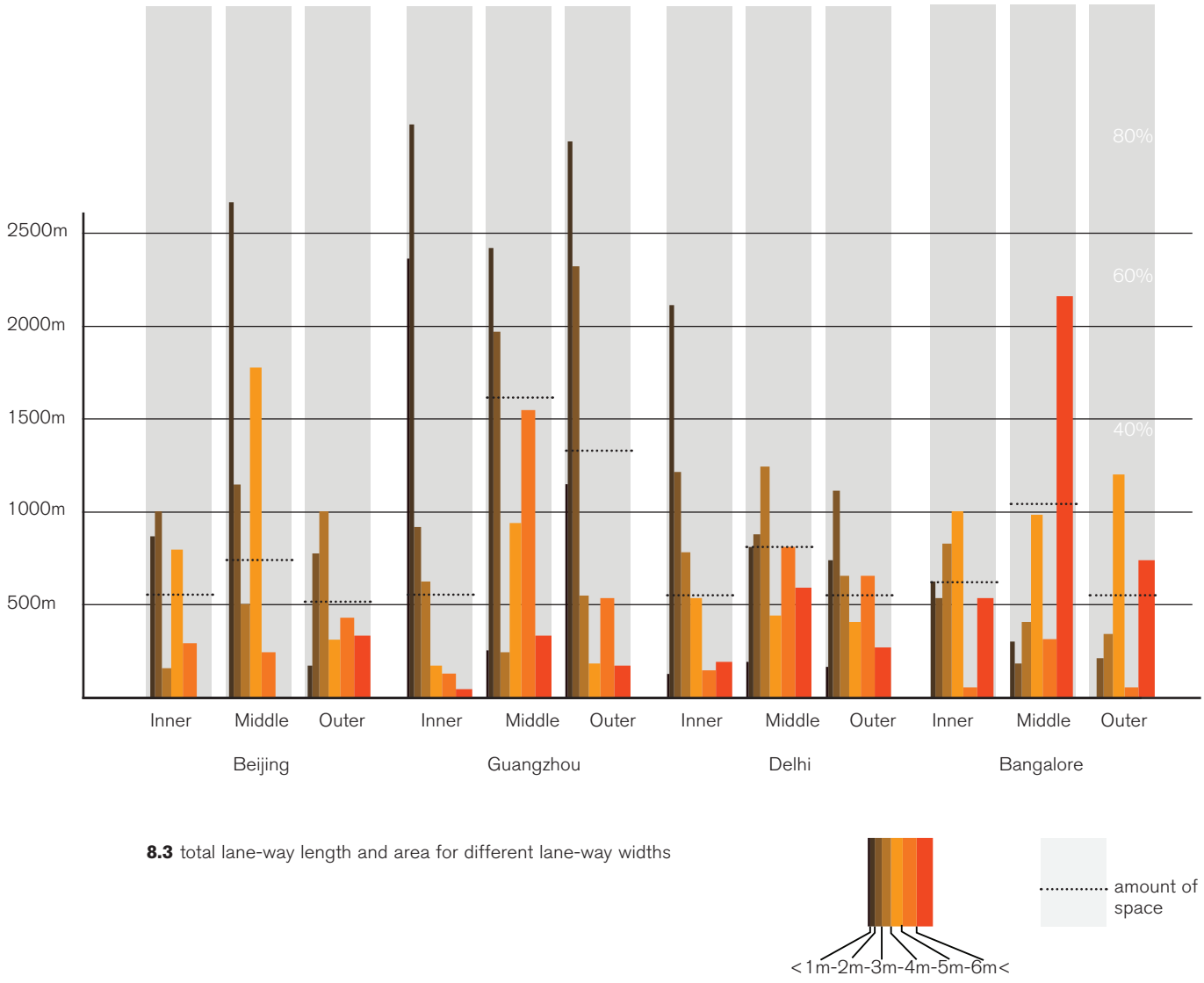
The first tier of urbanization are rural routes that are urbanized over time as land alongside the route is incrementally developed. Such rural routes connect villages to each other and their hinterland cutting through fields along a curvilinear course that charts the shortest route (Caniggia & Maffei, 2001). These routes promote connectivity over accessibility and they emerge without the anticipation that buildings would one day align it, and plots along its course have to conform (Caniggia & Maffei, 2001). This encrusting also occurs along the edges of rural waterbodies or when small streams dry up or are filled in over time to become incorporated into the public space structure. This urban design formation is most clearly evident in the middle and outer villages, while in the inner villages formal development has erased most pre-urban routes.

The second tier of urbanization is the most common, in which an area typically between 0.8ha and 2ha is subdivided and made accessible to about 50 to 180 plots. The dimensions of these plots within a single extension are often similar and geared to a specific socio-economic profile or particular functional mix intended for that extension. The plots and public space structure within an extension are planned as a cohesive whole, even though additional transformation or incremental change might happen subsequently. These increments exist in the minds of the builders before the act of building. While affordability might be a contributing factor to limiting the size of new extensions, the most important reason for the 0.8ha to 2ha increment size is related to the rural subdivision of land. In Guangzhou, the agricultural land allocated to each of the former production teams is directly linked to the increments of new extensions. In Delhi and Bangalore, former rural plot boundaries persist as borders in the new urban layout.
Land pooling schemes facilitate this mode of extension in villages with strong local institutions, as they can bring together diverse owners within a single rural parcel, or to combine smaller rural parcels in a single scheme. For example, the orthogonal and well-integrated public space structure of final village extension in Delhi's outer village was only possible through land-pooling.

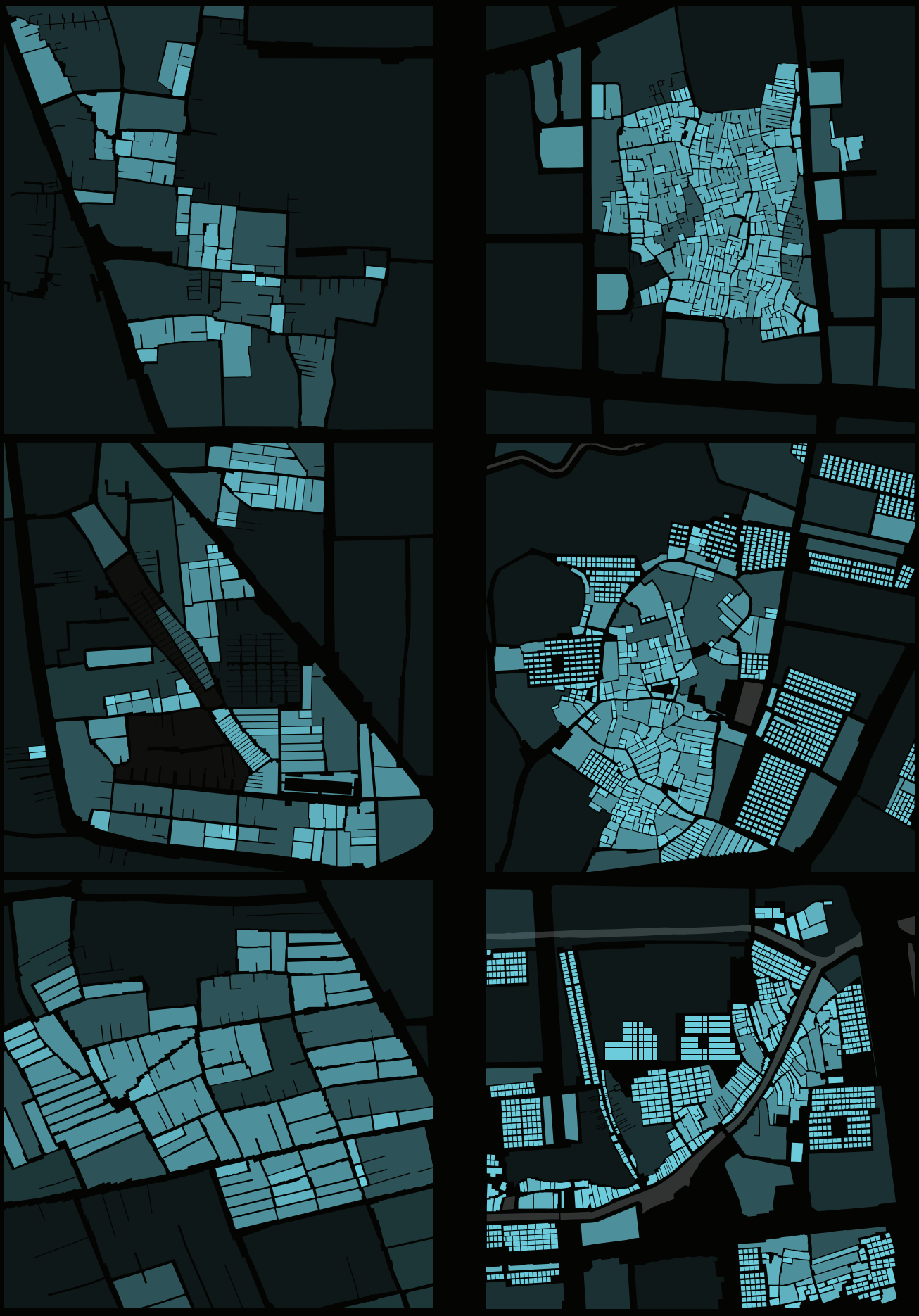
The third tier are the incremental changes to the original configuration of public space. Villages in Delhi and Bangalore are characterized by minimum public space provision that is incrementally added to, while villages in Beijing and Guangzhou tend to oversupply public space, from which excess public space is subtracted. Comparison of the laneway density in Delhi and Bangalore, shows that laneway density is higher in the old cores of inner villages and lower in the outer villages. Larger plots (usually above 200m$^2$) are subdivided into smaller subplots and new laneways are added to provide access to those new subplots. The process

can be understood as a smaller version of the production of a new tissue but is distinct in that this happens mostly within an existing urban design, filling in rather than extending the public space network. Additional public spaces can also be organized by a village committee or municipality, when they insert a larger open space, often associated with public buildings such as schools or a religious building. Incremental change can also lead to the removal of excess public space as it is re-appropriated by individuals. This happens mostly in dead-end laneways and routes that are not required for through access.

Whereas the primary intent of the old core's urban design was to regulate privacy, the urban design of the new extensions is primarily intended to make accessible (re)distributed land. It was already noted that the amount of public space in these new extensions across all four cities is higher than the old cores and comparable with formal development. Figure 8.3 shows the distribution of laneway widths in the transects sampled for

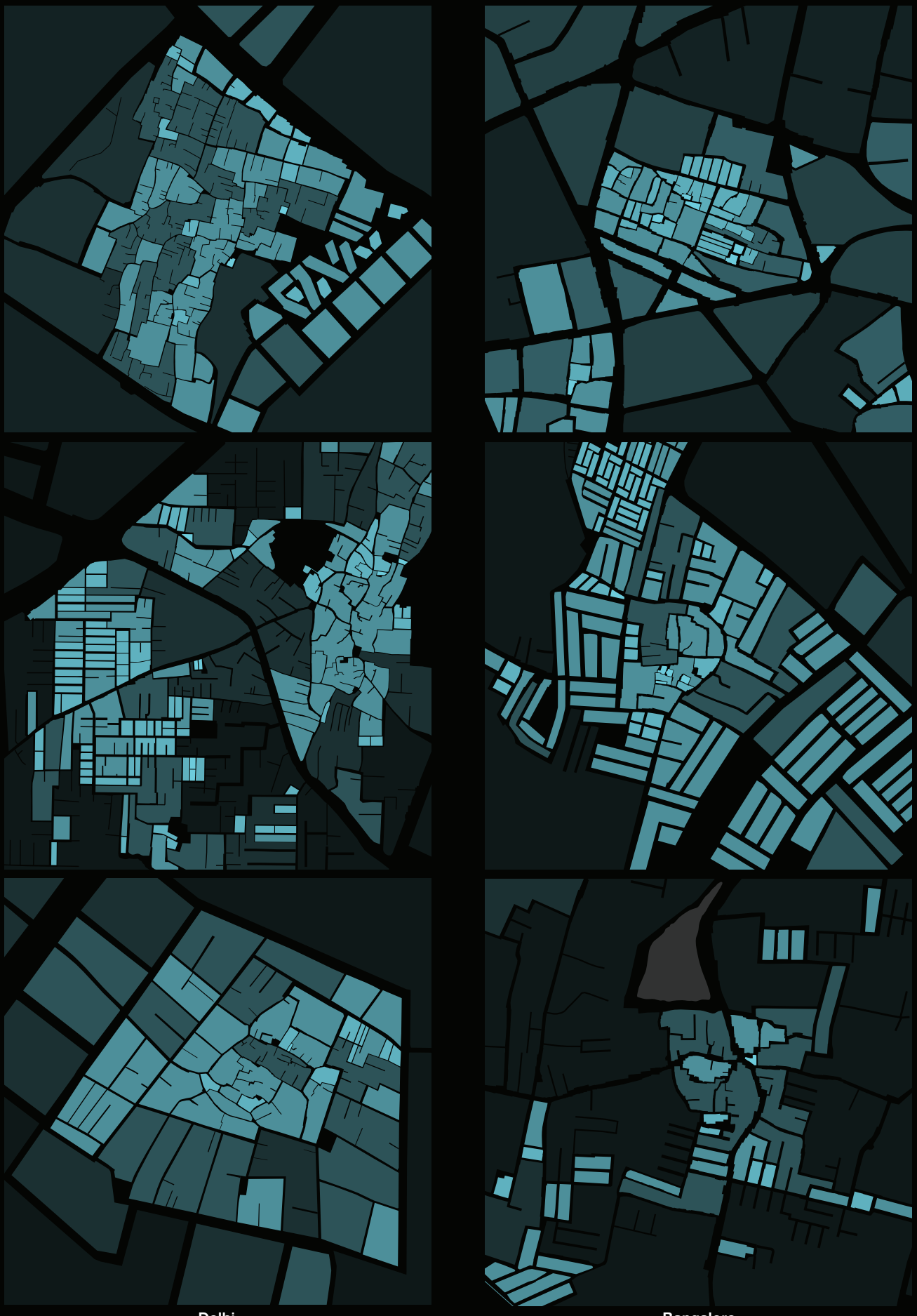



**8.3** total lane-way length and area for different lane-way widths




**8.4 emergent outcomes of urbanization – permeability and visiblity**

- <100m
- 100-200m
- 200-400m
- 400-600m
- 600-800m
- >800m


Delhi
Bangalore
500m

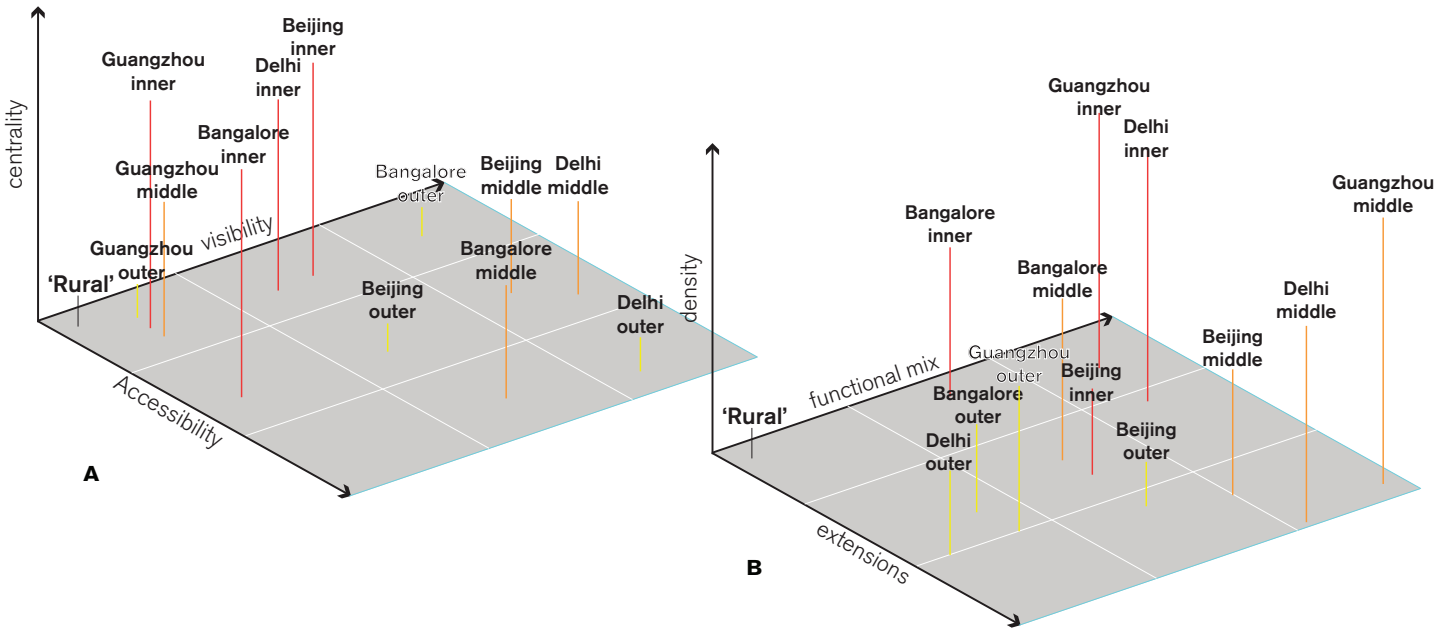
each village. Villages with limited planned extensions such as Guangzhou-inner and Delhi-inner, feature a profile characteristic for the system of graduated privacy in which laneway length is highest for lanes of decreasing width – the total area of public space produced by each laneway width is equally distributed. Villages with extensions show a hump-backed profile with a dip in laneway widths of 3-5m – the length of laneways with different width equals out but becomes skewed in terms of area of public space produced. The new extension morphologies shift from graduated privacy, to a public space network that is more integrated and where width no longer indicates the laneway's publicness. This shift is accompanied with an increase in the plot coverage, which makes the buildings more dependent on the public space network for provision of light. This averaging out across villages in all cities seems to be largely the result of morphological adaptations to increased build density and motorized vehicles.

**Changing permeability**

Traditionally, villages were built as highly walkable urban environments. Despite an increased role for vehicles, village extensions remain geared to pedestrians. This pedestrian connectivity is a common good, that allows people to easily use and gain access to the functional mix that is generated in the village. The size, configuration and distribution of urban blocks determines the permeability of the urban fabric. Maps 8.4 show that most urban blocks within the village are small at 200 to 400 metres in perimeter, while within the old village core they are even smaller at are between 150 and 300 metres in perimeter. This is much smaller compared with the formal examples of New York, Barcelona and Melbourne mentioned earlier, which have urban blocks of between 400 to 600m and are generally regarded as having a permeability conducive to walking. While public space in urban villages has often been characterized as deficient, these maps show that urban villages outperform the formally planned city in terms of permeability. The maps show that while villages have a high average permeability, large variation exists in the size of blocks throughout the village. This diversity is one of the morphological features shared by all villages, which set it apart from other informal settlement. Especially the urban block size of new extensions is highly varied – some exists as 'single-plot' blocks of just 40m perimeter, while in other cases they can go up to 600m. These large blocks are never within a single tissue, but rather emerge out of the incremental addition of village extensions and formal envelopment.

It is in the transition zones between the old core, new extensions and formal city where the largest barriers to movement emerge – as various modes of public space production are unattuned. The largest

urban blocks can extent up to a kilometre in perimeter, seriously harming the cities urbanity. Within the old core various caste and clan distinctions coincide with barriers to movement, while in village extensions, distinctions between village-owned and developer-owned land often translate into barriers to movement. As it is in the financial interest for each developer to minimize public space and maximize the area of sellable plots, most urban tissues are therefore developed without public space at its edges. Even in Bangalore's outer village, where there is a formal public space requirement, the development of the public space network by different agents without coordination has resulted in very low permeability. Permeability is ensured when such urban tissues are directly adjacent to an inter-village route, but otherwise are dependent on coordination with adjacent tissues to generate permeability. Such inter-village routes can become easily encrusted with development that provides no through access. The meeting of different modes of public space production can also generate larger public open spaces. The tangent nature of inter-village routes enables larger public space to emerge at the intersection of other lanes. Most public space in the old cores of Delhi's and Bangalore's villages was co-produced in this way and this process continues to generate larger public spaces in village extensions. For example, larger public spaces in Guangzhou's villages often emerge where the north-sough alignment of village extensions meets an inter-village route that radiates out at a different alignment.




**8.5** urban villages differ in their relation with the formal city (a) and their morphological mix (b)

Another emergent effect of the three-tiered urbanization of villages is the relationship with the formal city that can be understood along two aspects – visibility and accessibility of the village to the formal city. The outer edge of the village can be organized in one of two ways – either the village faces a formal road, or the village is sheltered behind a formal development. The metaphor of 'envelopment' collapses two distinct spatial aspects – its ability to surround and integrate, and its ability to surround and hide. Most villages exhibit a mixed envelopment which are shown in figure 8.5a. The inner villages are both the least visible and the least integrated with the formal city. Although physically close to formal city, access points are limited and on average just 15% of their built fabric is exposed to formally built infrastructure. Comparison with the outer villages suggest that as villages becomes more embedded in the city, they tend to become less integrated until only a few access points remain. Lower visibility is often coupled with low accessibility, but the lack of permeability pronounces the few access points, enabling the monitoring of these entrances and increased visibility of its inhabitants. This tendency towards lower visibility and accessibility can be contrasted to the active municipal involvement in Delhi outer and Bangalore middle, which has generated a well-integrated public space network. In general, the Indian cases are more visible to the formal city than the Chinese cases. While Beijing's villages are also visible, they are largely a peripheral phenomenon – a contrast that the next chapter elaborates on.

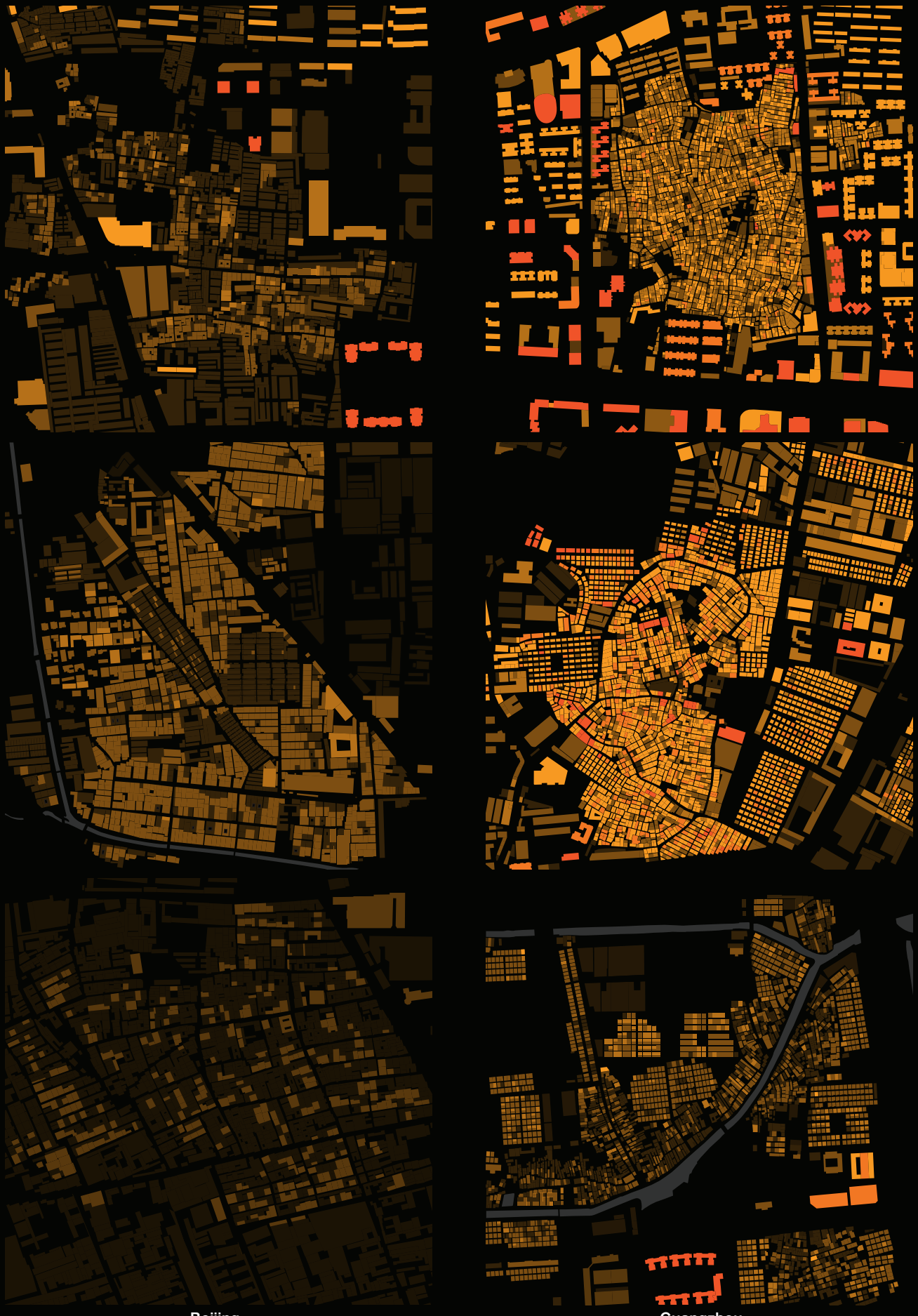
## Architectural densification & diversification

Urban villages are  generally acknowledged to be denser and more mixed that the formal city that envelops them. This densification and diversification of urban villages are characterized as disorganized and haphazard – transgressing building codes indiscriminately. When the architectural infill transgresses the capacity of the urban design, a tragedy of the commons ensues. This research demonstrates that the architectural infill in urban villages follows certain informal logics in relation to the urban design in which their build. One, new extensions densify first and feature more functional mix than village old cores. Two, building heights eventually plateau just above the legal limit, while consumption gradually pushes out production functions. Three, differences in density and functional mix self-organize in clusters that related to the capacities generated by the urban design – most significantly in relation to accessibility, plot size and visibility. Four, public space usage intensifies in parallel to densification and diversification but critically shifts from stationary uses of public space to movement through public space.

**Changing density**

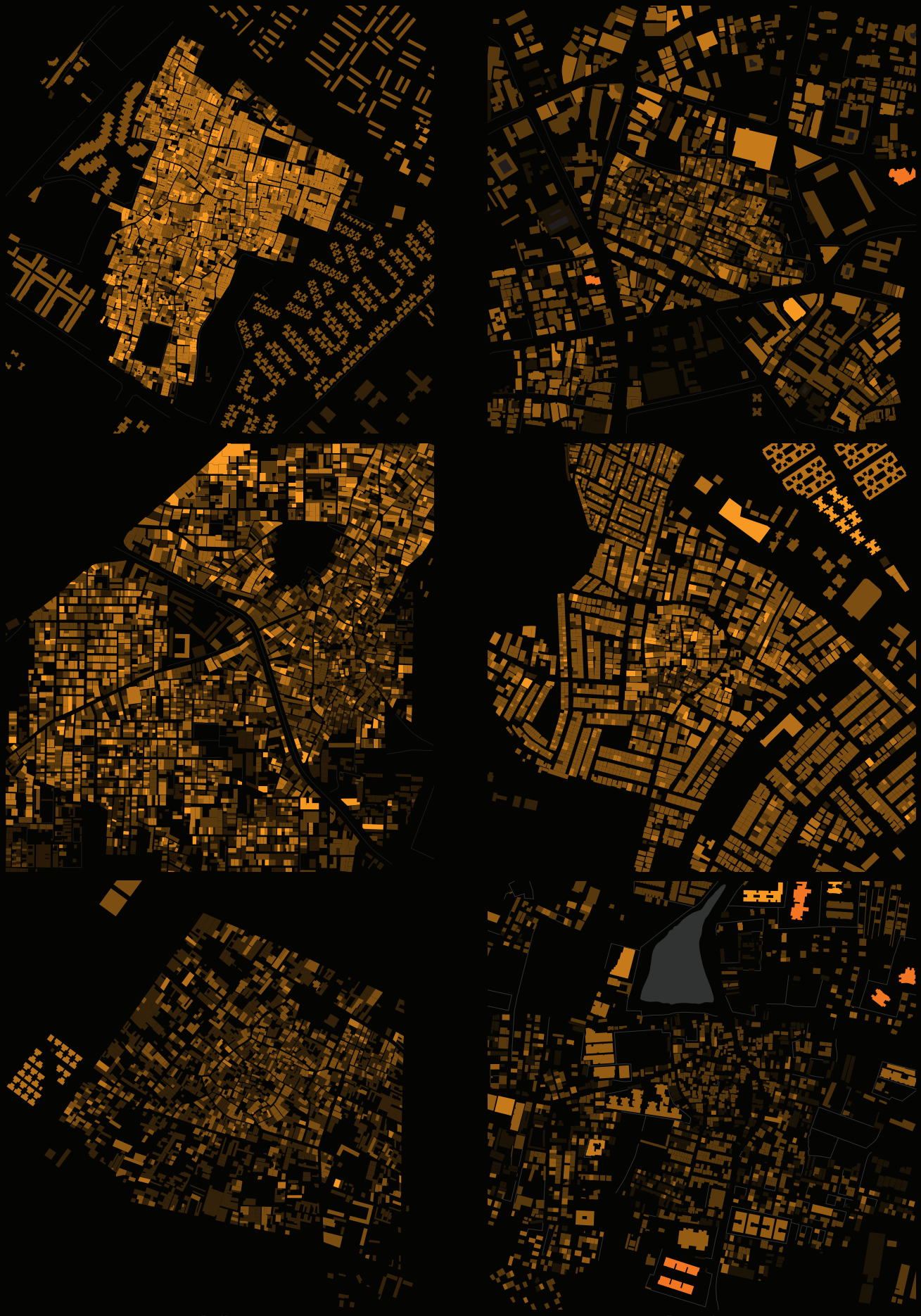
Built density of urban villages increases with proximity to the city center, as shown in maps 8.6. While increased floor space allows for more migrants to more easily find an affordable home, it is in the public interest to restrict density to a level that prevents a disproportionate relation between total floorspace and the available public space. The legal limit is 2 floors (~6m) in Beijing, up to 6 floors (~18m) in Guangzhou, 15m in Delhi and a relational limit to laneway width in Bangalore which commonly arrives at 12m. While the average building height in any village never transgresses the legal limit, buildings tend to approach and nudge this limit to its maximum extend. There is thus no wholesale disregard for building codes, but rather a negotiation that requires both interpretation of the codes on behalf of the villagers, as well as interpretation of the heights or floor count on behalf of municipal officers who inspect the buildings. In Delhi for example, major height transgressions can result in demolition while small transgressions can involve monetary transactions (i.e. fines, bribes). Building height transgressions are common in all villages but tend to occur away from the main roads where they are less visible to scrutiny. There is thus a direct relation between the formal envelopment of the village and its densification. Building height transgression most often happens in the old core – which likely results from its low visibility rather than its age or morphology characteristics. The built environment thus mediates enforcement of building codes – a critical point which the next chapter will return to.

Market forces and government control – capital and state – are not the only aspects contributing to the densification of urban villages – the specific socio-spatiality of villages is critical too. The first tendency is that new extensions tend to densify first, before the old core does – the outer villages in Guangzhou, Delhi and Bangalore all have taller buildings in their extensions rather than in their old cores (see diagram 8.5b). Local land-owning families move out of the old core into the new extensions, where they have access to larger houses and more public space. The old core tends to degenerate and becomes geared to rental for low-income migrants. However, over time, these differences tend to even out as scarcity of land makes the underdeveloped plots in the old core increasingly likely to be replaced. In Guangzhou's and Bangalore's middle villages this latter stage is reached, which is reflected in a uniform building height between the old cores and new extensions. Despite intense pressures on land prices, average building height remains below the legal limit because even in the densest villages, occasional low-rise structures remain in existence. These low-rise buildings are inhabited either by poorer households who do not no money to invest in redevelopment, or by better-off families that value the private open space and have less incentive to maximize rental profit.




**8.6 building height comparison**

- 1 floor
- 2-3 floors
- 4-5 floors
- 6-7 floors
- 8-9 floors
- ≥10 floors


Delhi
Bangalore
500m

The second tendency is that incremental densification is linked to the ability to incrementally change the urban design. While village extensions are laid out specifically to allow for increased density, the village core depends on the erstwhile morphology to which only incremental changes can be made. The higher density of inner urban villages results primarily from less public space, as their building heights are in most cases less than the middle urban villages. In Delhi, densification of the architectural infill is linked to the incremental growth of the open space network – new laneways are added into plots only when pressure on density is high enough. In Guangzhou, the laneway network is already fine-grained, so much so that in the new village extensions they impose no restriction on increasing building height, which result in the tallest village buildings observed in this research – 14 stories in Guangzhou middle. While Bangalore's and Beijing's villages have not reached a density high enough to generate an observable public space increase, the urban fabric of their old cores is not yet fine-grained enough to support buildings above four stories without loss of light. Legal limits can amplify the incremental nature of densification. When a plot has capacity for many extra floors, full reconstruction is financially attractive, but when the building is already near its limit, owners are incentivized to add floors incrementally.

**Changing use of public space**

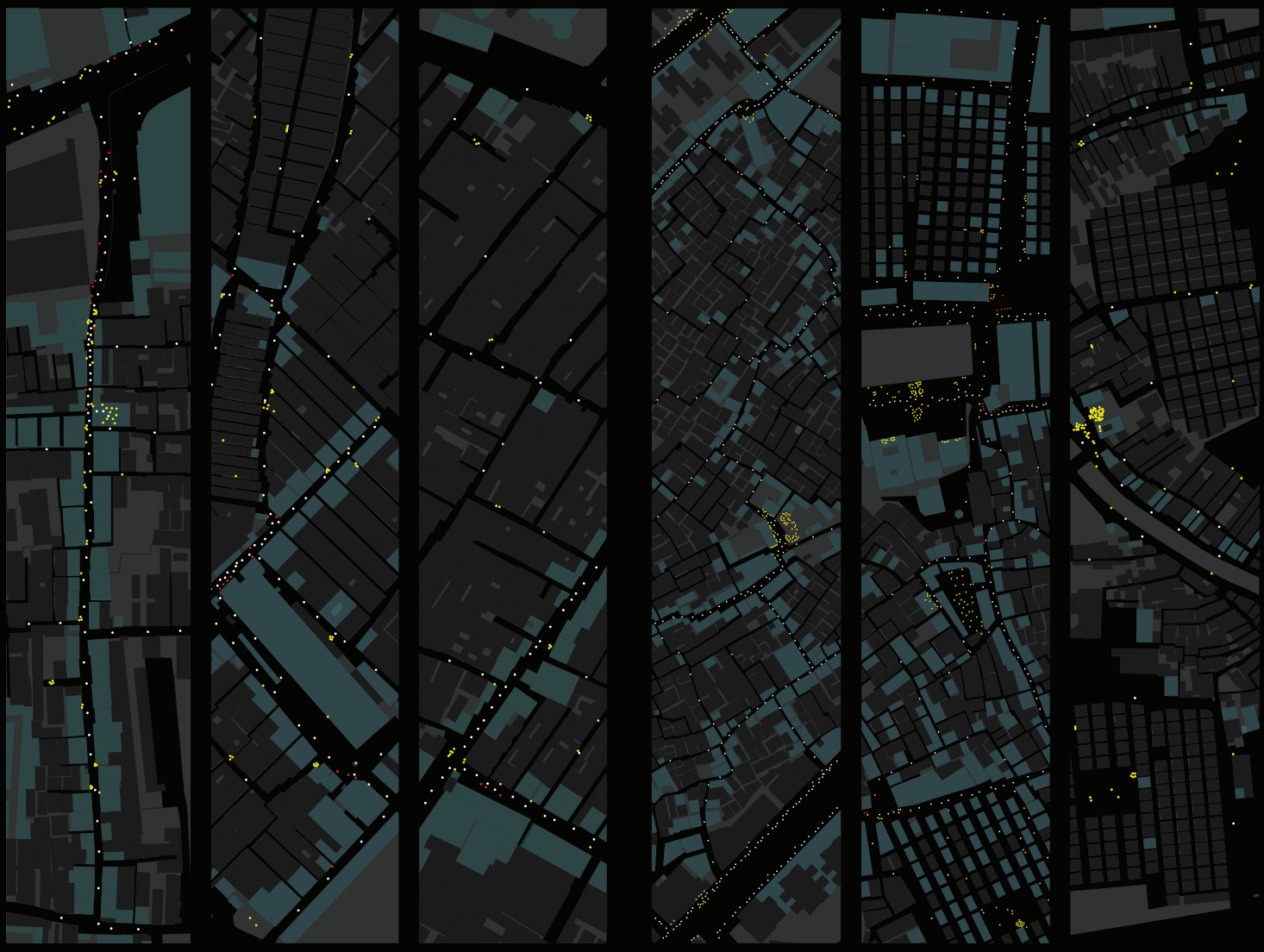
As the villages gain density, life intensifies. Figure 8.7 shows the average amount of people observed in the transect during 3 and 5pm increases as the village is located closer to the city center. This increase should be read as the combined effect of increased accessibility (i.e. closer to public transport, jobs, etc) and increased density (attracting and accommodating more people). It is notable that the intensity of use in the outer urban villages starts off at a very similar level of about 100 people in the transect, or 9 people/ha. This suggest that the increased intensity of use is the outcome of urbanization and densification, and not the result of cultural factors. The maximum level of activity increases in all cities but is sharpest in Guangzhou and Delhi – which is also where the highest built densities were observed. While the amount of people using public space tends to go up as the village urbanizes, the percentage of people using the space for stationary activities decreases. The outer urban villages have a high share of people using the public space for stationary activities, primarily for socializing. It is characterized by 'discursive walking' (Matos Wunderlich, 2008), where the experiences along the walk are of equal or greater importance than the destination. Of those people using the space for movement, a quarter uses motorized vehicles. In the middle villages the share of people using the public space for social activities drops to about 50% of the users. In the inner villages with high built densities, the total use of public space has

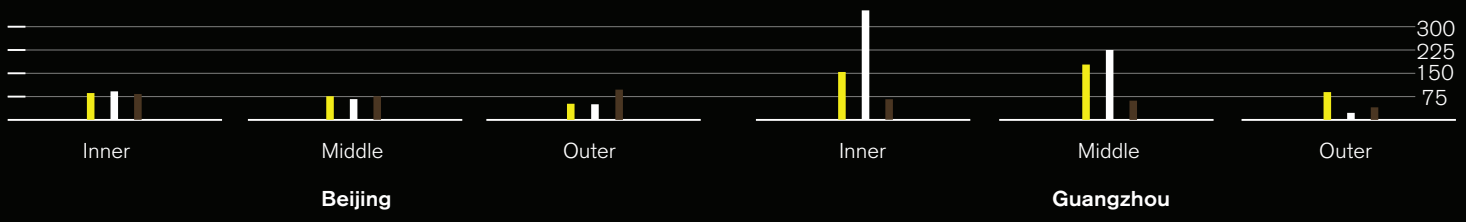
the sharpest increase, but also the sharpest decrease in the percentage of people using the public open space for stationary activities. Most people are engaged in 'purposive walking' (Gehl, 1987), or simply getting to their destination. While in the outer villages about a quarter of people used motorized vehicles for movement, in the inner villages motorized traffic is almost entirely eliminated as the narrowness of the lanes creates a conflict between different modes of transport that leads to an overall decrease of motorized traffic.

These consistencies suggest that, for all their differences, villages in both India and China have a tradition of street life that has more in common with each other, than they have with the formal public spaces surrounding these villages. The most distinct difference between public space use in China and India lies in the distribution of people within the village. Villages with a more distributed network of differently sized public spaces, also have a more distributed pattern of use, while villages with only a few larger open spaces have a more concentrated pattern of use. Guangzhou and to a lesser extend Beijing, have this latter distribution. The concentration of people in several larger open spaces is reinforced by the presence of community buildings or market buildings, which attract high flows of people. These public spaces are often in the geographical center of the village, generating a tendency for Chinese urban villages to be busier at the centre rather than the formal edge with the city. Delhi and Bangalore have a more distributed system of public open space and public buildings, which leads to people being distributed through the village in smaller groups. In these villages, the busiest place in the village is often towards the edge of the village, where it meets the formal city.

**Functional clustering**

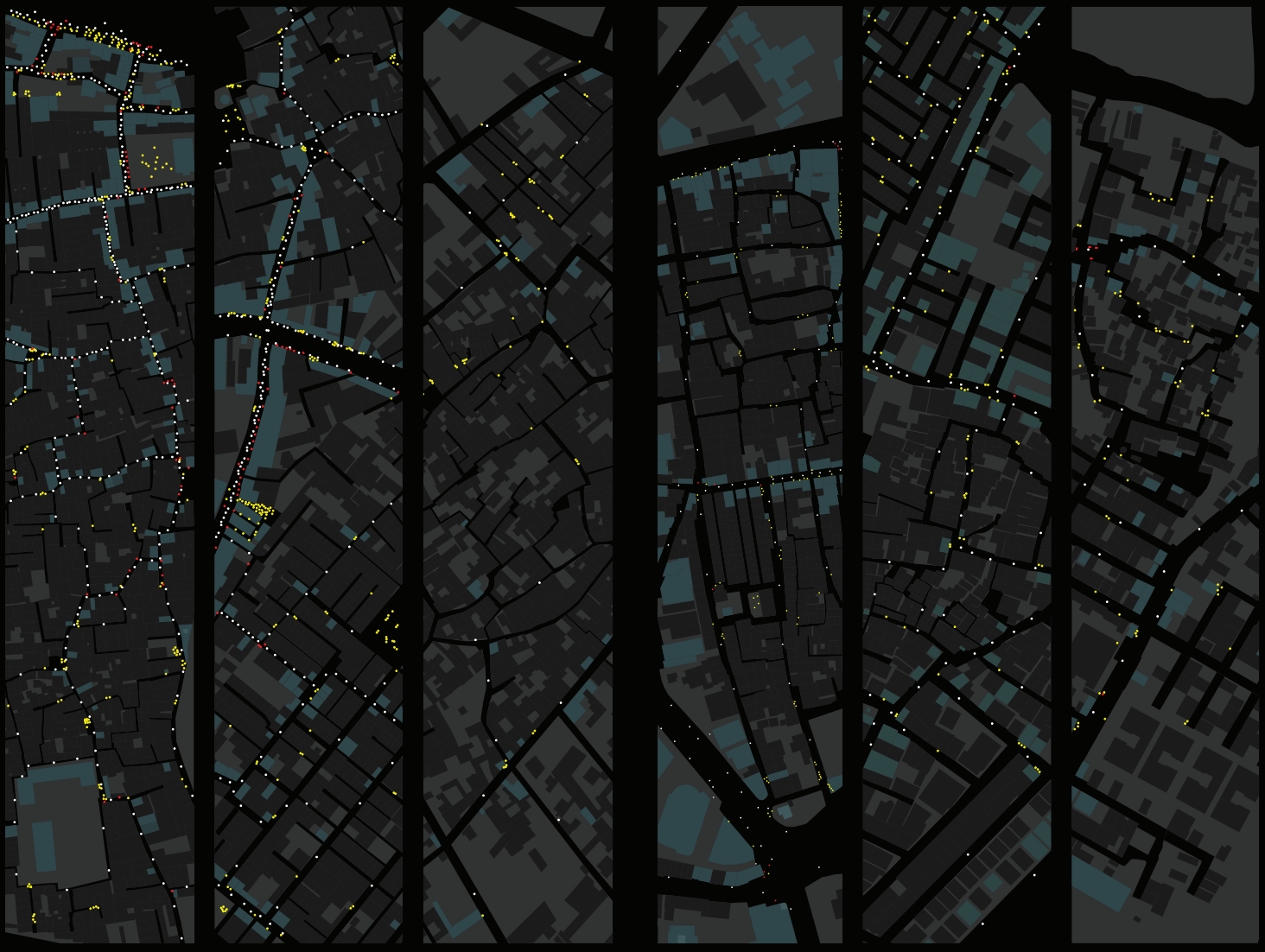
Urban villages can be described as mixed-use urban environments that allow residences to coexist with places of consumption and production. Maps 8.8 shows that residential use remains predominant in all cases, even in those villages with the most intense functional mix. Increasing density and intensity of public space use parallels an increasing share of the ground floor to become non-residential. Land-intensive uses like factories and warehouses are more common in the outer villages, where land is more affordable, yet which access to a pool of labor that resides in the village. The middle urban villages generally have the most mixed functions, combining production and consumption of goods within the same neighborhood. New extensions are often planned with the specific intent to allow more functional mix, enabled through larger plots and wider lanes. The inner urban villages have almost no production of goods and are geared towards consumption of goods and production of services. The specific mix of the inner most urban villages is

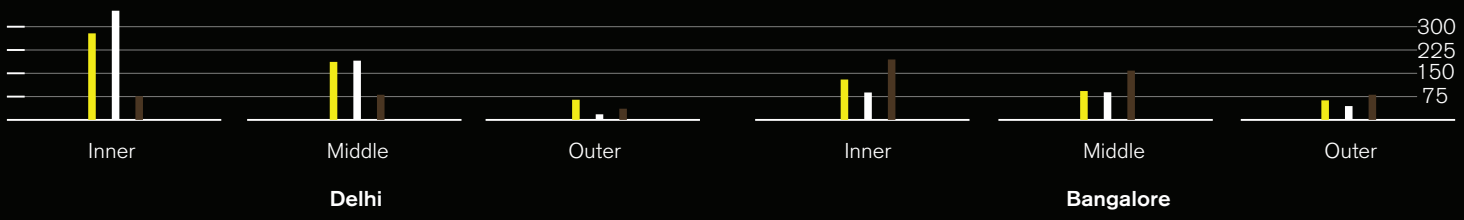





**8.7 activies comparison**

- commercial space
- stationary person
- moving person
- hawker/rickshaw/taxi




300
225
150
75
Inner
Middle
Outer
Inner
Middle
Outer
Delhi
Bangalore

**8.8 functional mix comparison**

- residential
- other | consumption
- food | consumption
- community | consumption
- storage | production
- services | production
- goods | production

Delhi
Bangalore
500m

increasingly related on providing space to functions that are not permitted, or not financially feasible in the formal city.

While the overall functional mix is closely related to the village's location within the city, the specific spatial arrangement of functions within the village is more closely related to its morphology – functions tend to cluster and self-organize in particular parts of the village's morphology. Consumption concentrates primarily along the most intensely used pedestrian routes, which often coincides with the erstwhile inter-village routes that run along the edge of the old core. The inner urban villages see a deeper infiltration of consumption functions into the old core, even in very narrow lanes. Lanes adjacent to the most intensely used routes, provide space for secondary functions, such as storage of the goods sold along those intensely used routes. The production of services, such as in offices and hotels, caters primarily to outsiders and thus cluster at the village's periphery, where they can ensure easy visibility and accessibility. These producers of services also benefit from the larger plot sizes at the edge of the village – allowing economies of scale and in the case of India to conform with formal regulations that mandate a minimum plot size for these more specialized functions. A system of graduated functional mix emerges where niches exist for different functions, reminiscent of the system of graduated privacy that operated in the traditional village cores. As stationary use of public space decreases and buildings densify, the role of the laneway network to regulate privacy increasingly gives way to regulate functional mix.

The stationary activities discussed earlier, gear into this system of graduated functional mix. Exchange of goods in public space features prominently in the literature on urban informality, but in these urban villages, street vending is limited compared to the amount of permanent shops. The outer urban villages feature almost no street vendors, but as density and functional mix increases, more traders appear. In parallel to the distribution of people in public space, street vending in Beijing and Guangzhou mostly concentrates around village markets at the centre of the village, while in Delhi and Bangalore the pattern is more distributed with more trading at the formal edge of the village. Another edge activity is the exchange of transport modes – required where the walkable environment of the village connects to the motorized environment of the city. In the inner and middle villages, a steady flow of people generates a holding pattern for motorcycle taxi's or rickshaws at the busiest routes out of the village. In some villages this extends to the transportation of goods too. The edge between the village and formal city are also places where people wait for public transport that passes by the village. In one exceptional case, this system is formalized through the introduction of a village-owned battery-operated bus service.

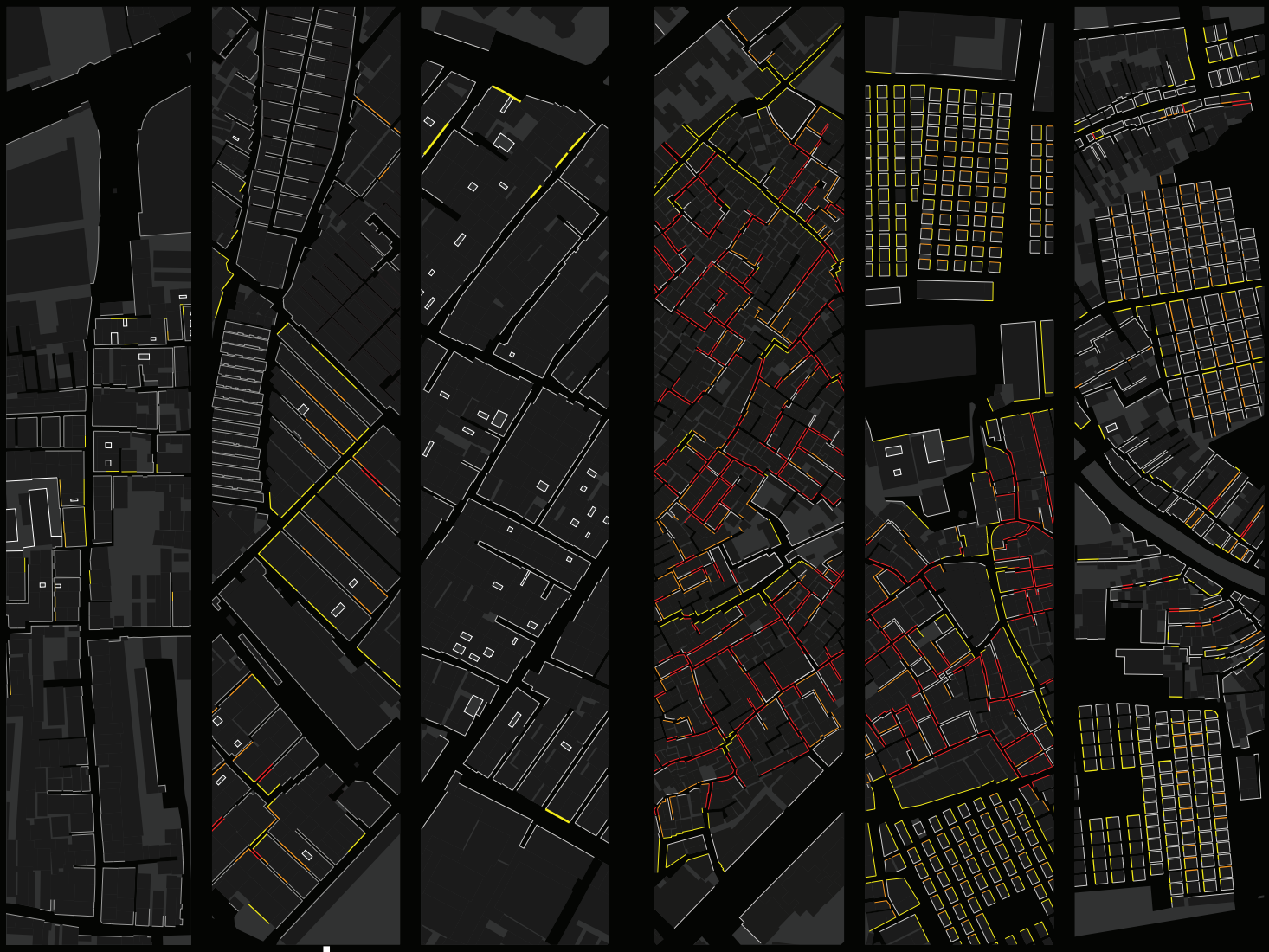
When people move into the village, this exchange is accompanied by an exchange of information  as outsiders learn about the location of rental accommodation or particular businesses within the village. In the busiest villages, real-estate agents congregate at village entrances, while advertisements with telephone numbers compete for space. In Guangzhou, this exchange of information extends to a network of village-operated security guards, security gates and CCTV cameras that monitors entry into the village – something made possible by the restricted permeability of Guangzhou's villages.

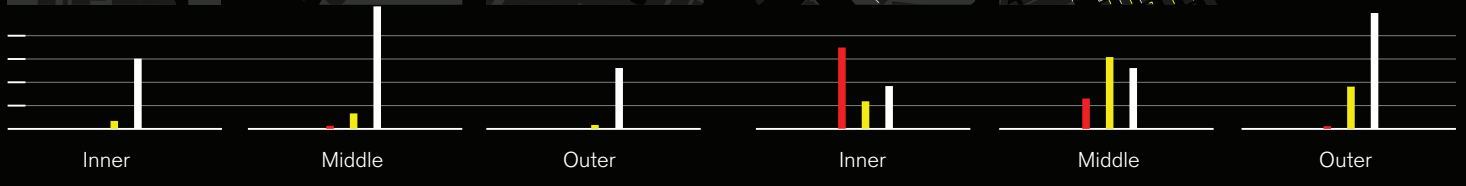
## Interface intensification

While public space generates access to plots, the entry to those plots is regulated through public/private interfaces. The public/private interface is a zone that mediates the privacy of residence and the publicness of social life in public space. Increased built density generates more floor space for people to live, more opportunities for businesses to open and an intensification of flows of people through the public space – all of which put more pressure on the public/private interface that subsequently undergoes a transformation process that is characterized by four key features. One, cantilevering, serration and appropriation are mediated by social codes and the spatial capacities of the erstwhile urban design. Two, traditional aspects of village life such as the erstwhile waste-and storm water gutters and traditional architectural orientation play a key role in the incremental transformation of interfaces. Three, the presence of cantilevering and serration has an important role in subsequent appropriations of public space and social life. Four, temporary territorial claims over limited public space lead to a crowding process that pushes out other uses.

### Interface cantilevering

Public/private interfaces increasingly cantilever their upper floors out over public space. This tendency is strongest in those villages with higher densities, such as in Guangzhou and Delhi, and far less so in Beijing and Bangalore. Cantilevering across public space allows an increase in useable floorspace without additional land acquisition or height limit transgressions. Cantilevers are generally between 0.50 and 1.50m, which depending on plot size generates between 10 to 15% more floorspace. However, many buildings have cantilevered even when still below the legally regulated maximum building height, suggesting other motives to the practice of cantilevering exist. Besides generating increased density, cantilevers afford

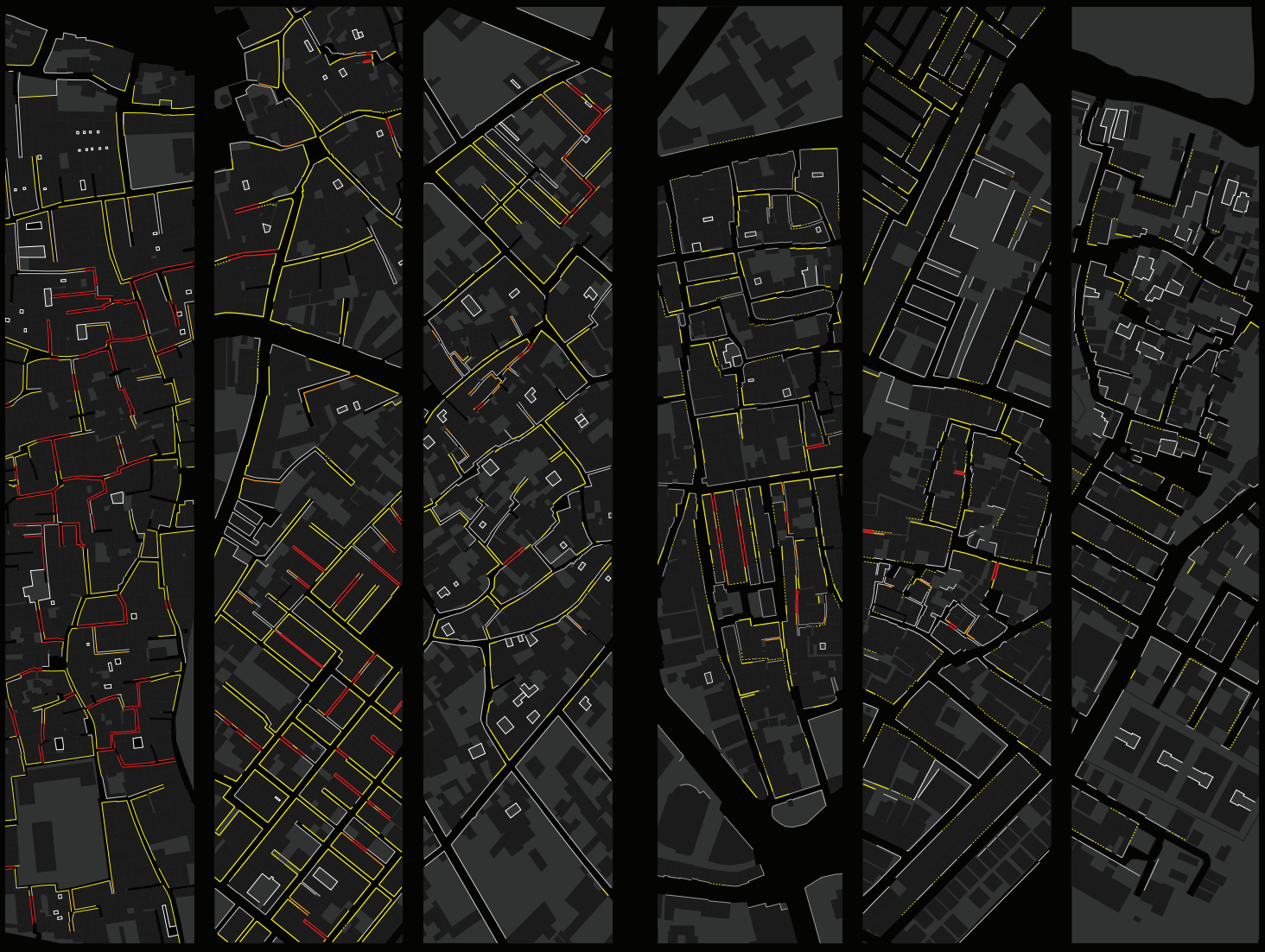





**Beijing** **Guangzhou**

**8.9 cantilevers comparison**

- low-light conditions
- potential low-light
- no risk
- inward cantilever
- no cantilever
- courtyard



**Delhi** **Bangalore**

a range of other uses that benefit from the shelter below the cantilever. Critically, the provision of cantilevers is linked to increased appropriation and social use of the spaces below cantilevers – on which more later. While not likely causally linked, the provision of shelter to these uses is related to climatic conditions. Guangzhou has more than double the average yearly rainfall than any other city in the research, and this corresponds with the highest occurrence of cantilevers. On the other hand, the cold winters in Beijing make access to direct sunlight an important consideration that runs counter to the desire to cantilever out over public space.

While cantilevering provides additional floor space and other social benefits, cantilevers also have the potential to induce low-light conditions, compromising the social role of the public space and lowering the quality of adjacent buildings. Indiscriminate cantilevering for the pursuit of maximum floorspace is therefore problematic. The mapping demonstrates that in the old cores of the inner village in Delhi, and both old cores of the inner and middle villages in Guangzhou, about 30 to 40 percent of the laneway network is cast in permanent darkness. Whether a cantilever induces low light conditions is primarily geared to laneway width – laneways wider than 4 metre never generate low-light conditions. New village extensions are often consciously built with increased laneway width that anticipates densification and cantilevering, allowing buildings up to 8-10 floors before these morphologies become prone to low-light conditions. If all laneways below 4 metre are considered a potential space for low-light conditions, the old cores of all villages have potential low-light conditions if densification continues. This issue is most pertinent in Delhi where municipal and village practices preventing low-light conditions have not been effective. Most village extensions have sufficient laneway width to prevent low-light conditions, yet here a different issue emerges as many large plots are currently dependent on adjacent low-rise buildings for access to light. It is hence important to understand how escalation of cantilevering can be prevented. Villagers generally agreed that the low-light conditions were detrimental, but also something considered difficult to avoid. Bangalore is the only city that has explicit legal restrictions on cantilevering. In absence of formal regulations, this research identified three emergent spatial practices that limit low-light conditions; limitations to the size of cantilevers, coordination of building orientation, and variation in height.

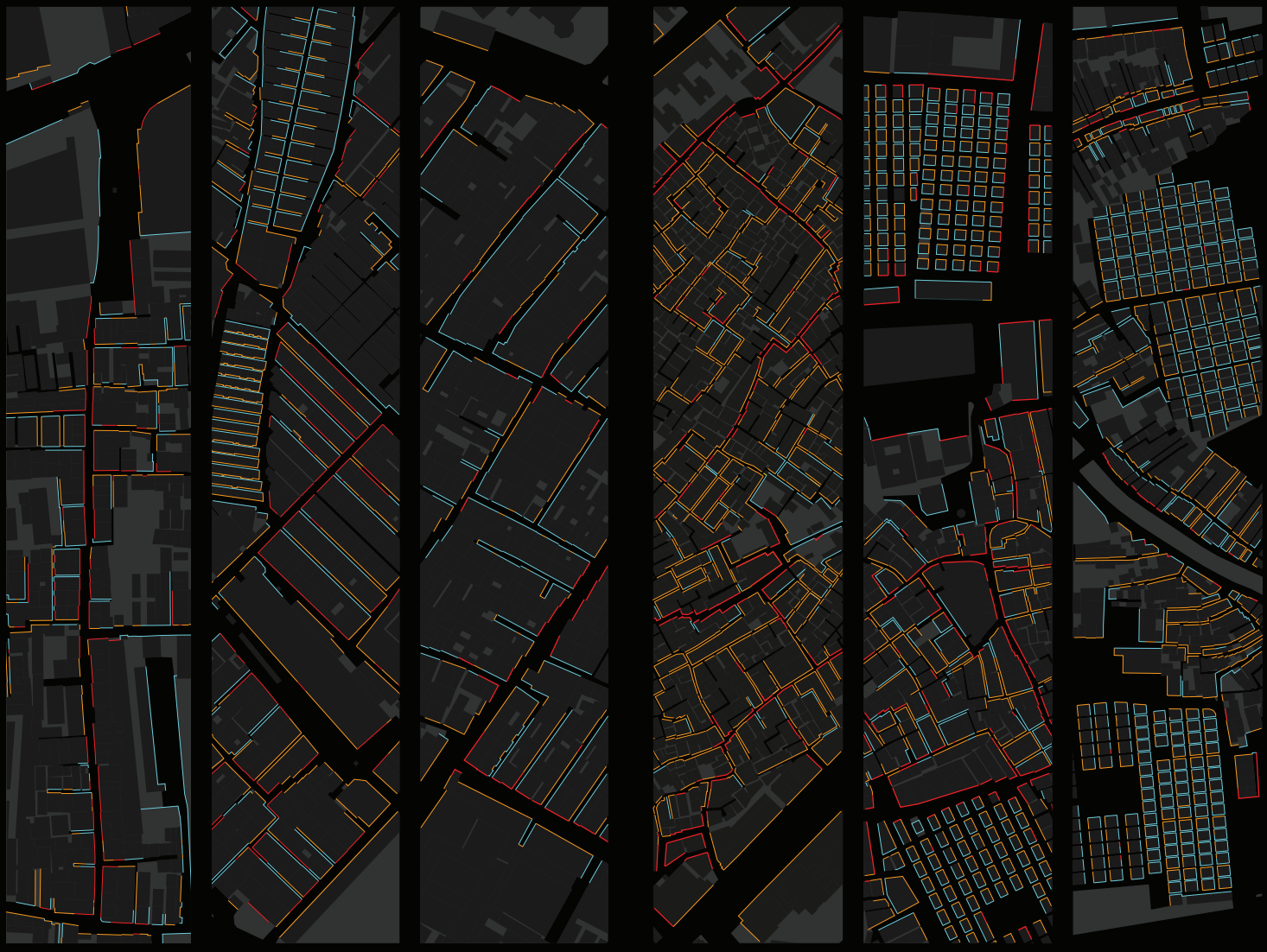
Most villages demonstrated the existence of social rules that limit cantilevering. Firstly, interviews with villagers indicated that while cantilevers wider than 1.50m would be technically possible, actually building these would be considered inappropriate. In India, cantilevering of older buildings is often constrained by technical limitations, but these limitations

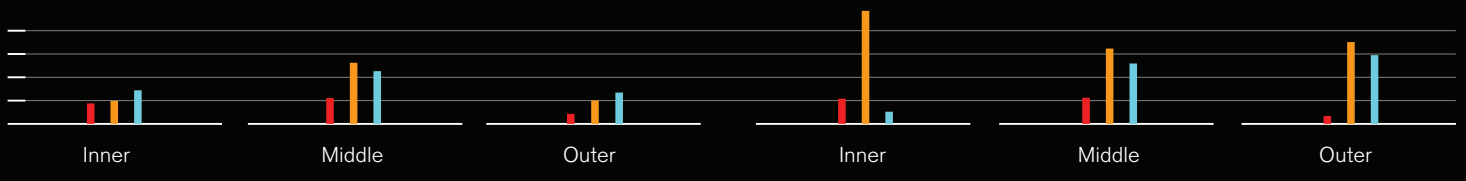
will disappear as they are replaced by reinforced concrete cantilevers. Secondly, cantilevering is often restricted to particular building orientations – a highly relational practice that will be discussed at length below. This practice is especially prevalent in Guangzhou and to a lesser extent in Delhi and Beijing. In Delhi this practice was intermediated by ownership – laneways that are under the control of a single agent such as when a family subdivides their own parcel, also tended to generate less low-light condition s. Finally, low-light conditions are much less likely to happen when there is more variation in building height. A lane with uniform building height has less light than a lane of equal density but with alternating building heights. Map 8.6 discussed in the previous section suggests that old cores initially generate a large diversity of building heights, but that over time this tends to even out.

**Interface serration**

Densification also increases pressure on the available public/private interface at the ground floor level – additional entrances are added to provide access to different functions, dwelling units, or entrance levels. On average, the length of interfaces without entrances reduces from 45% in the outer urban villages to just 20% in the inner urban villages. New village extensions  often start with a high proportion of interfaces without entrances, but as undeveloped plots and low-rise buildings are gradually replaced, a larger share of the interfaces gains entrances. Intensification of use necessitates spatial adaptations that increase flexibility, incorporate drainage and continue to allow social functions. A serrated edge affords a multiplicity of uses that allows a more productive use of limited space. In China, serrated edges are primarily an adaptation to accommodate functional mix on the ground floor, while in India, there is a stronger social tradition to the serrated edge. A serration generates a space outside the flow of pedestrians and vehicles, providing space for stationary activities and appropriations. Along laneways below 2-metres-wide it is uncommon to find serrated edges, as the space is simply too constrained to provide a benefit. These adaptations have been mapped in 8.10 as serrated edges and they make up about a quarter of all interfaces in the inner urban villages across the four cities. Serrated edges increase most pronounced from the outer to middle villages, while serration remains at a similar level in inner villages. Narrower laneway width and higher intensity of use gradually impede interface serrations.

A critical aspect to the emergence of serrated edges is in the transformation of waste-and storm water gutters. Drains formed in the informal settlement of land get covered up as residents aim to maximize the utility of their land (Parkinson, Tayler, & Mark, 2007). Rural villages typically

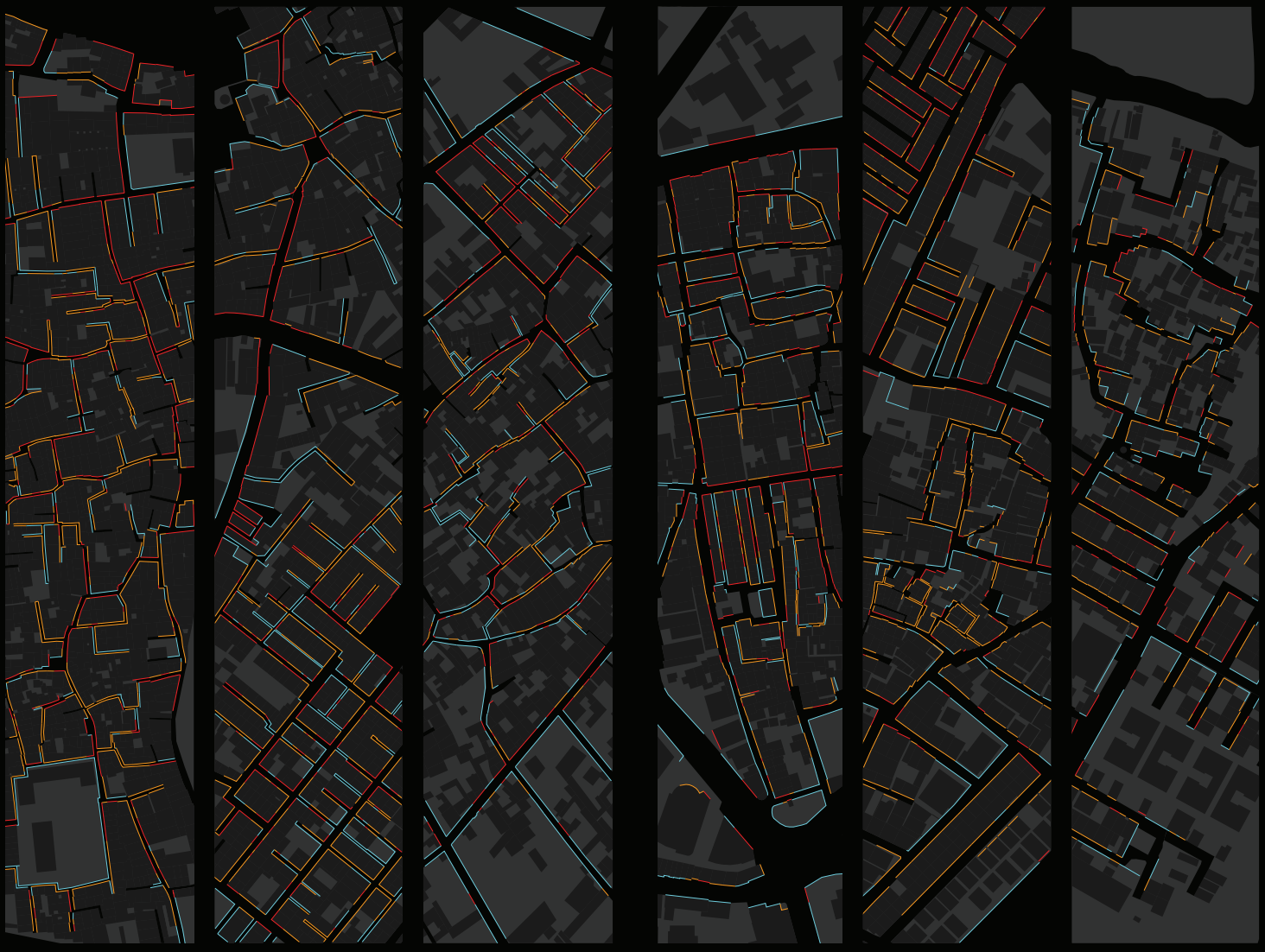


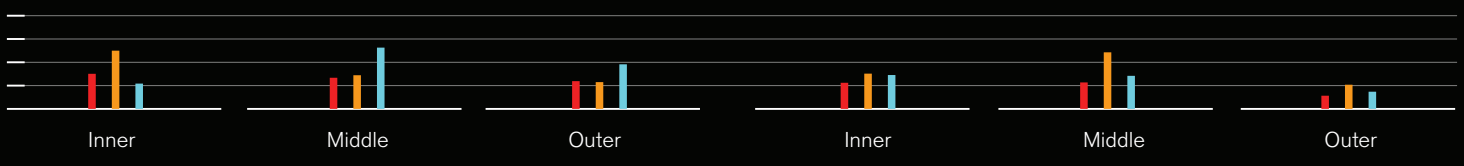



**Beijing** **Guangzhou**

**8.10 interfaces comparison**

inpermeable
permeable
permeable & serrated






**Delhi** **Bangalore**

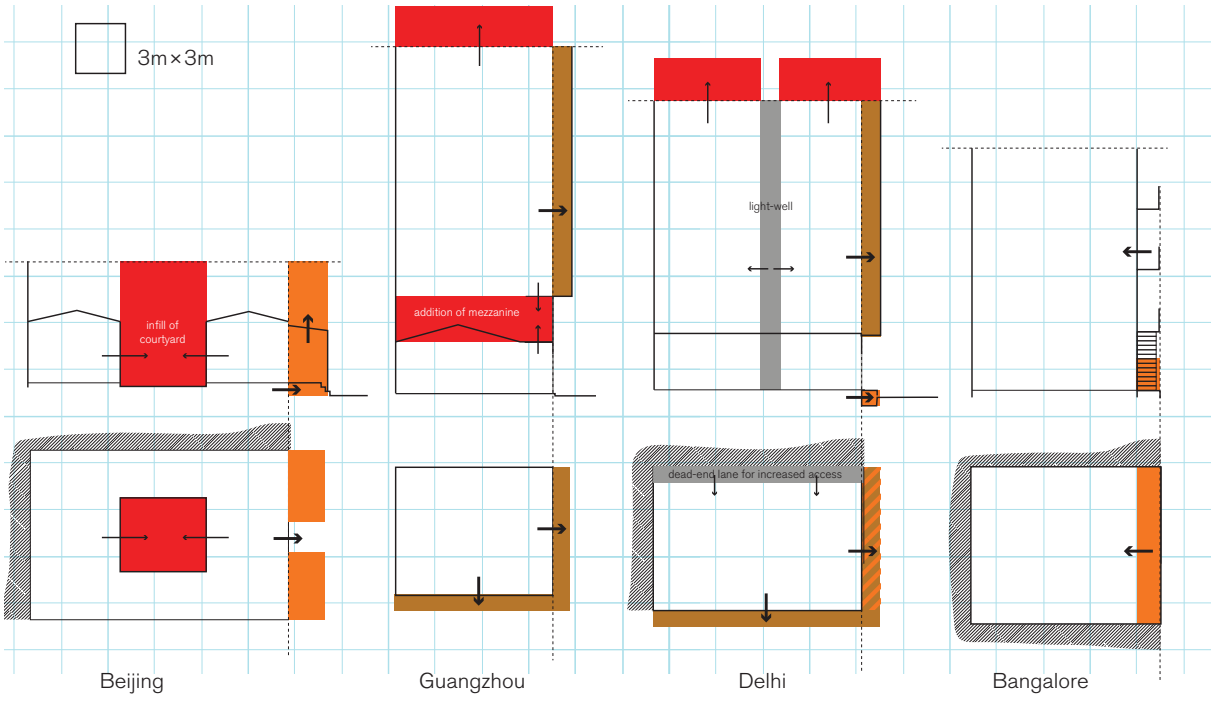
use the same drainage system for carrying both waste and storm water. Gutters run alongside laneway's edge so not to hinder any movement and are open to save costs and allow easy maintenance such as for removing any blockage. As interfaces become more permeable and the paving of public space in the village becomes critical to support more intense urban life, this open gutter is transformed. Traditional dwelling entrances are elevated above the laneway to prevent rain draining into the house. Serrated edges emerge as the gutter is covered yet retains the height difference between laneway and entrance – an effect that is amplified in undulating terrain. The narrow laneway width precludes the most typical solution to this problem that emerges in the formal city – the sidewalk. Gutters in narrower village lanes can be improved in two distinct ways, which are directly related to the presence of serrated edges. Gutters can either be incrementally improved as each household upgrades their own side of a stretch of laneway, or they can be improved through collective action as a centralized sewage through the middle of the laneway. What is at stake here is not the particular engineering qualities of either approach, but that the incremental approach is much more likely to generate serrated edges. The prevalence of serrated edges in Delhi cannot be reduced to distinct cultural treats, but is intimately tied to the incremental upgrading process.

**Interface orientation**

Serration and cantilevering are interface adaptations to urbanization, responding to changes in density, intensity and multiplicity of use, but they do not occur uniformly in the village. In Mediterranean cities, the concept that regulates where fixed and semi-fixed appropriations happen is the *fina* (Hakim, 2014). The *fina* is a 1.0 to 1.5m zone where the owner is permitted to use space as an extension of the house, as long as it does not interfere with other functions of the laneway. Unlike the *fina* – which applies alongside all exterior walls – the urban villages in this research demonstrate a relation between the zone of appropriation and the orientation of the architecture. Especially in laneways that are narrower than 3m, the available public space is often not equally distributed between adjacent buildings, but priority is given to the building frontages which face that laneway. In aggregations where every plot only has a single side facing public space, the house is oriented towards this side by necessity, but in aggregations of plots where multiple sides face public space, one specific side is usually assigned the role of frontage. The recurring orientation of this frontage strongly suggests that it is embedded in the cognitive schema that villagers hold.

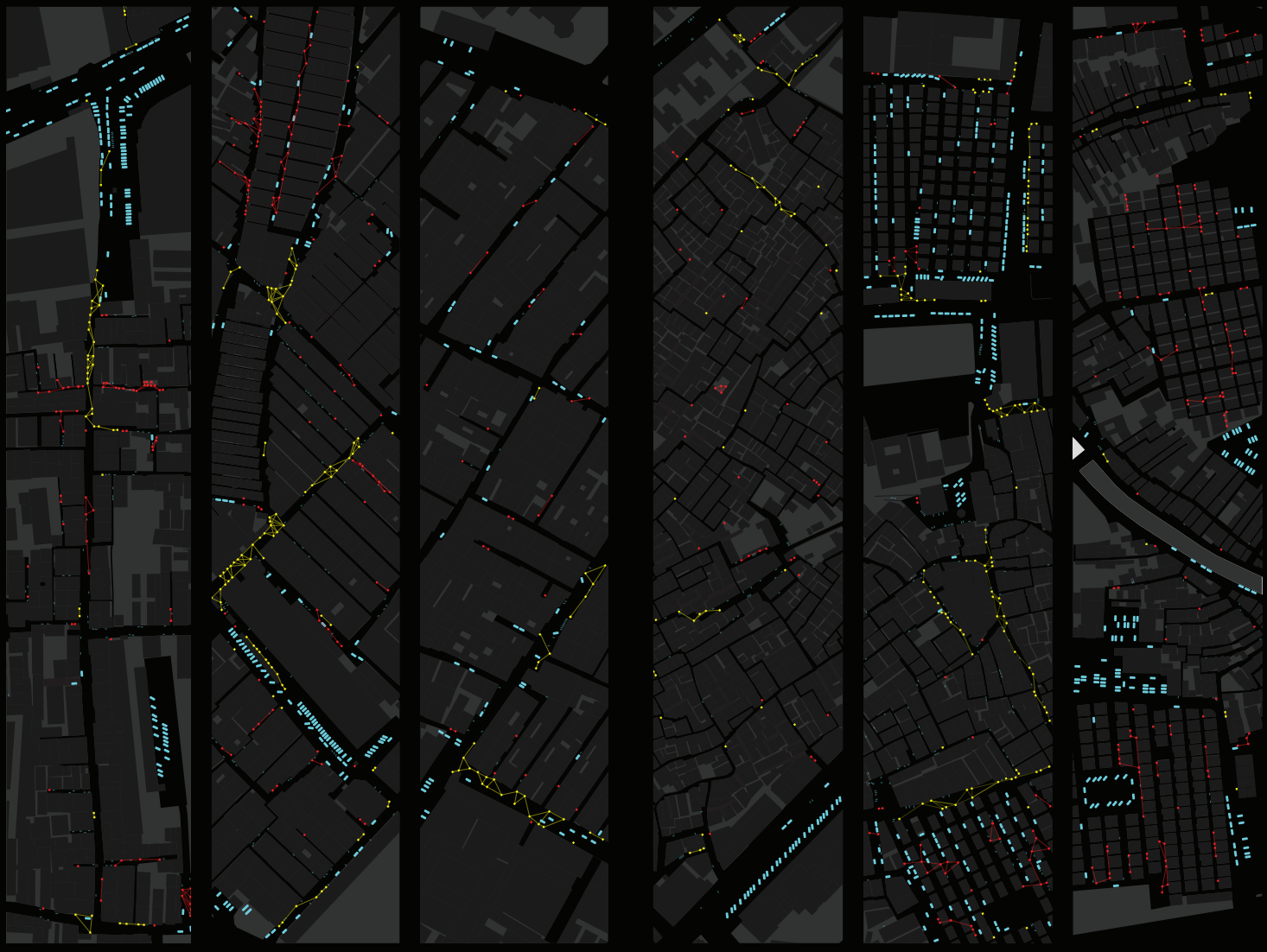
This cognitive schema can be diagrammed to show the most recurring orientation and its relation to cantilevering and serration – see diagram 8.11. Whether an interface provides entry is critical for other

emergence of other adaptations – only 1 in 30 non-permeable interfaces surveyed had cantilevers, while only 1 in 50 had serrated edges. In the Indian cases, ground floor serration is closely entangled with upper floor cantilevering. Comparison of maps 8.9 and 8.10 show that both adaptations tend to occur together. In the Chinese cases serrations and cantilevers are largely disconnected – Beijing has ground floor serration without much cantilevering, while Guangzhou has cantilevering without much serration. In Beijing's and Guangzhou's villages, most plots face public space on multiple sides, and entrance orientation guides which sides may be adapted. These differences are most pronounced in the new extensions and are less apparent in the old cores. Orientation also plays a key role in the negotiations of these adaptations. In Guangzhou and Bangalore, the primary negotiation is between the plot-owner and the regulatory body – orientation has been codified. Orientation is not codified in Beijing and Delhi, yet negotiation on orientation happens among neighbors as limited public space is claimed. The inward orientation of courtyard-housing that characterizes the villages in these cities become more oriented on the public space as buildings lose their courtyards. Progressive densification however can revert the orientation again as new courtyards and lightwells are added to compensate for the loss of light.



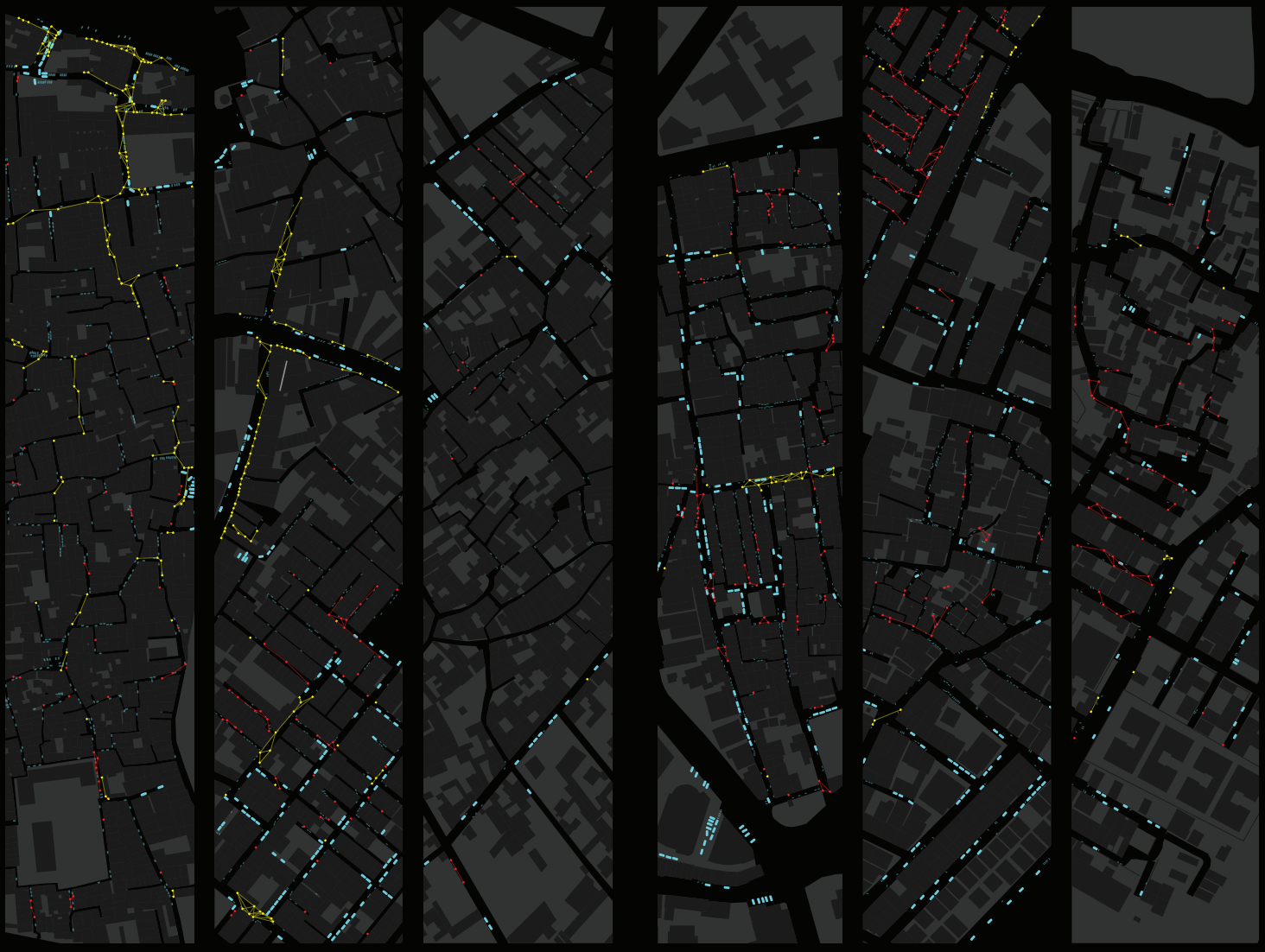

**8.11** diagram of most common adaptations in relation to orientation

- infill and extension above legal height limit
- cantilever
- serrated edges
- additions of new public open space




**8.12 appropriation comparison**

- commercial
- domestic
- vehicular


Inner
Middle
Outer
Inner
Middle
Outer
Delhi
Bangalore

## Appropriating public space

Interface adaptations provide a stage for the ways in which less permanent semi-fixed adaptations are added. This spill-out into public space is seen as a key feature of informal urbanism, ever increasing as densities rise. However, while the amount of people using public space increases from outer to inner villages, appropriations of public space do not follow such a trend. Figure 8.12 shows that the presence of different kinds of appropriations varies considerably from village to village. Most village laneways are shared space without segregation between different modes of transport and without formal regulation as to the use that space. Domestic, commercial and parking appropriations of public space are highly segregated – not imposed through regulation but emergent through the crowding out of appropriations in an informal hierarchy: intense flow of people crowds out any other use of public space, commercial appropriations crowd out parking and parking crowds out domestic appropriations. New appropriations happen in reference to earlier ones, creating a form of informal legitimacy that pushes 'inappropriate' appropriations out. This hierarchy of appropriations is mediated by three key features – laneway width, intensity of flows and interface type.

When the laneway is below 2m, appropriations are unlikely to happen, no matter what flows or interface types. Low flows along dead-end lanes create space for all kinds of storage. The content varies from construction material, to excess goods intended for sale, local produce waiting to be transported, or more permanent forms of parking. More permanent storage requires that their presence is not contested by the temporal requirements of building access. When non-permeable interfaces along low intensity flow laneways give way to permeable interfaces, laneways become less used for storage and more for domestic appropriation as well as short term parking by the residents. As density increases, parking tends to become dominant use of public space. The lack of intense flows allows the laneway to become an extension of the adjacent house or business, without the need for serrated edges that demarcate a space for appropriation. Domestic appropriations are directly related to small plots – a lack of private open space increases the need for residents to extend into the public space. Especially since many of these are 'wet' appropriations such as drying of laundry, washing and storage of potable water. Appropriations related to manufacturing are rare and only constitute a significant share in Guangzhou's middle village.

Intense flows attract shops. The busiest lanes negotiate between display of the goods and the movement of people past those goods. In the jostle for space, parking is often pushed out. The serration of the interface

is a key mediating spatial adaptation, generating a designated space outside the flow of people used for commercial appropriations. The need for serrated edges to display goods becomes stronger in narrower lanes in the range of 2m to 4m, where even a relatively low amount of people can create an intense flow. Intense flows along non-permeable interfaces are rare in urban villages, but if they do occur, this is where hawkers most often appropriate space. In Guangzhou and Delhi this appropriation zone is usually sheltered from rain and intense sun by a cantilevering part of the building. Variation of laneway width generates an irregular profile that provides a literal niche for appropriations outside the flow of people and vehicles. This effect is noticeable in both Indian and Chinese cases, although more pronounced in India.

## Conclusion

As stated at the outset, the aim of this research is not normative, but merely to describe the ways in which urban villages urbanize through comparison between villages in different cities and in different stages of urbanization. Informal urbanism was conceived as a 'new way of life' (AlSayyad & Roy, 2004), but very little research has been done to substantiate what this might mean spatially. In his classic work on urbanism, Wirth (1938) defined urbanity into social terms – the living together of a heterogenous group of people in high densities. The urbanization of villages can indeed be cast into those terms, but this research demonstrates how this process is interlinked to the production of public space, functional diversification, interface intensification and appropriation of public space. Abu-Lughod (1975) argued to focus on the common mechanism of process as a means to illuminate similarities and differences, while Robinson (2016, p. 14) argued for the "tracing the interconnected genesis of repeated, related but distinctive, urban outcomes". Through the comparison of twelve cases this chapter highlighted the ways in which built form is encrusted, subdivided, extended, densified, diversified, cantilevered, serrated, appropriated and used. An understanding of village urbanization as a series of interconnected and multi-scalar processes is critical because it opens up two key points. First, while urban villages might appear chaotic when perceived as static objects, by emphasizing the processes this study argues that urban villages abide by structuring logics. Second, by emphasizing tendencies in the village's transformation, this study argues that it is unhelpful to conceive of village as being in certain states – such as rural, peri-urban, urban – which implicitly conceives of final outcomes.

Urban informality and urbanization in general have become understood through the opposing notions of formal/informal, bottom-up/top-down and planned/unplanned. This chapter demonstrates that urban villages are co-produced through multiple scales and in multiple increments over time, exhibiting various levels of order that do not belong on a singular point on the formal-informal spectrum, but change their role depending on the scale. Apart from the imposed order of a masterplan (formal, top-down, planned) and the characteristic order that emerges (informal, bottom-up, unplanned), there is the systematic order in the ways morphological levels relate (Habraken, 1998; Marshall, 2009). Imposed order was evident through the ways in villagers conceived of urban designs a priori of their execution, while characteristic order was evident in the way consumption functions concentrate around the busiest lanes. The systematic order reveals itself through the multi-scalar approach of this study. Higher scales have a structuring relation on lower scales – more permanent structures afford other elements to be attached in an emergent process. The old core morphology, agricultural parcels and rural governance *structures* the way public spaces emerge. The public space subsequently *structures* the architectural infill and functional mix that emerged within. The available public space and adjacent architectural infill *structures* the interface adaptations, which in turn *structures* the public life within villages. What is ultimately at stake here is that a failure to understand these spatial dynamics can lead to degradation of the urban commons and potential demolition of its urban environment. This study urges interventions in urban villages and informal settlement more broadly to pay close attention to the capacities and limitations of spatial configurations (laneway width, plot size, etc) and to inhabitant's capabilities to self-regulate when such capacities are transgressed.

The attentive reader may have noted that although this chapter is about informal urbanism and looks at processes that are strongly associated with urban informality (appropriation, hawking, etc.), the phrase 'informal' has been avoided. Urban informality is the lens of a range of processes but has no explanatory power – urban village do not transform the way they do *because* of informality. The dominant theories that seek to explain informal urbanization, often described as the legalist and structuralist perspectives, either stress the narrative of 'informality as illegality' or of 'informality as marginalization'. These perspectives emphasize encroachment of land, deviance of regulation, haphazard development and exploitative socio-economic relations. This study rejects a deterministic view of the spatial transformation of village, nor does it aim to reduce their transformation to a cultural, political, economic, social or environmental explanatory framework. It highlighted the structuring role of spatial relations and the entanglement

of such relations with changes in people's behavior. For example, the social shift from stationary use to transitory use is co-produced through laneway width, density, cantilevers and appropriation, each contributing an aspect to the social shift.

This study highlights shared tendencies among urban villages but challenges the idea that a village's urbanization can be comprehensively understood through stage theory – the framework which argues that gradual envelopment of villages induces change that leads to a progression of fixed development stages. The comparison reveals villager's ability to control the urbanization process and to deviate from the fixed set of stages. While conceptualizing urban villages as a set of stage can be a useful methodological tool for selecting cases, stage-thinking can easily transgress into a conception of urban villages as 'transitional places' (Yuting Liu, He, Wu, & Webster, 2010), that will gradually be normalized into the formal city. Such stage thinking presupposes an agenda of development, in which urban villages remain conceptuall underdeveloped. The final stage for urban villages is often conceived as the normalization or demolition of the village. In all cities, urban villages replacement takes a similar spatial form – a modernist tower typology with compound walls and extensive parking. While in India this process is more piecemeal than in China, municipalities in both countries strive towards an urban morphology that is the antithesis of its current urban form. The most pronounced differences are not between urban villages in different cities, or between villages in different stages, but between the village and their formal envelopment. Even among scholars who are concerned with the village inhabitants and their often troubled relationship with their government, there seem to be an implicit notion that urban villages are a temporary refuge for repressive state and market forces and cannot possibly be considered a model for future development of the city – this thesis asks why not?

# chapter 9 Co-production

**The introductory chapter of this research conceptualized urban villages as a form of informal urbanism – a lens on a range of processes that are characterized by co-production , or the ways in which different scales, increments, agents and methods contribute parts to the whole. Chapter two used Habraken's (1998) distinction between the processes of building, using and regulating to understand how productive qualities emerge from co-production. Through comparison of the four case study cities, the previous chapter focused on the ways in which urban villages are co-produced through multiple scales and in multiple increments over time. Comparative techniques on a synchronous dataset has allowed this study to go beyond a static view of urban villages and to interpret the urbanization of urban villages as set of interconnected processes. This chapter turns to other components of co-production – the multiple agents and multiple tools used by those agents. Crucially, it explores how consistencies in built form emerge without an overarching masterplan and without an embedded storage device like DNA in biological processes. Emergent patterns in the built environment can arise from individual decisions (2009), but a theory of change in the built environment not only requires detailed morphological data, but also its 'mirror theory' (Gauthier, 2005) of the related social, economic and cultural practices of the built environment. This is a more speculative endeavour than the previous chapter, that uses the conception of building cultures (Davis, 2006) and an evolutionary conception of the built environment (Kropf, 2013, 2014), to explore how urban villages transform and respond to urbanization. The main contribution here lies in describing how urban villages respond to formal regulation (primarily a top-down process), how rural practices are transformed and experimented with to suit new urban needs (primarily a bottom-up process) and how built form mediates the transmission of ideas that allows these transformations (primarily a sideways process). These three aspects of the co-production correspond with the three parts of this chapter – formalization, experimentation and mediation.**

# Formalization

Urbanization as formalization has become the primary policy alignment in the four cities documented in this research – the belief is that more regularity, more regulation and more regularization will eventually 'resolve' the city. How does this drive to formalize effect the urban village? This section draws upon the municipal practices discussed for each city and aims to synthesis the relation between formalization and its spatial impact in urban villages through four interlocking ideas. First, formal codes regulate three distinct processes – the village's self-governance, the building approval mechanism and the procedures to allow new village extensions. Second, the degree to which these codes are applied differ from city to city and have a profound impact along the key dynamics of density/governance, village/city and centre/periphery. Third, municipal codification is not only an effort in formalization, but is usually also aimed at normalizing the village . Finally, municipal regulation can induce illegality through standards that are set too strictly.

The common narrative is that villages are enveloped, even engulfed by the formal city and have little agency to determine their future. This research suggests another complementary thesis, namely that the city itself can be conceptualized as an aggregate of urban villages, into which the formal city inserts itself . Critical to this thesis is to conceptualize the rural village not merely as a collection of dwellings, but to understand the entire rural landscape as constituent of the village. Prior to urbanization, the rural land of villages constitutes a continuous area that covers the entire periphery-to-be of the city that will initiate its urbanization. What have been called village *extensions* in this research might be more aptly referred to as village *conversions*. Qadeer (2004) has referred to this process as the 'implosion' of cities – the in-situ urbanization of land. This metaphor however is limited because it conceptualizes urbanization from a formal perspective in which implosion implies an out-of-control process, the violent collapse of an existing structure and the loss of order. The urbanization of rural landscapes into urban villages is better understood as an urban crystallization – a process in which existing spatial and governance structure become more structured, more fine-grained and more permanent. Municipalities seeks control of this agglomerate through the fracturing of those socio-spatial relations through regulatory frameworks, acquisition or even dispossession of this land.

### Formalization tools

Prior to the administrative incorporation into the city, villages grow in absence of formal codes (Davis, 2006; Rapoport, 1988) – subsequent

formalization takes three distinct forms. First, the former village governance structures and their related territories are formalized as they are incorporated into the legal structure of the municipality. At first glance the primary difference here appears to be between Indian and Chinese modes of urbanization – *gram panchayats* are abolished in Delhi and Bangalore, while in Beijing and Guangzhou village committees continue to operate. However, this research revealed that village communities in Guangzhou and Delhi retain most effective self-governance. While Beijing retains village committees, there is little effective authority to act independently without government approval. Contrastingly, villages in Delhi retain effective authority through the institute of *lal dora*, despite the abolition of the village governance. Villages in Guangzhou and Delhi thus have nominal legal boundaries, are largely exempt from municipal taxation and are responsible for the maintenance of their public space – whereas villages in Beijing and Bangalore have blurrier boundaries, less financial independence and significantly less control over their public space.

Second, formalization differs in the ways in which building approval systems allow villagers to add and modify their buildings within a codified set of regulations. The building approval system consists of a set of spatial requirements, but also the procedures and financial costs associated with attaining such approval. A distinction between Indian and Chinese modes of urbanization again seems tempting – formal building codes that negotiate public-private interests are present for Delhi and Bangalore, while in Beijing and Guangzhou such public-private negotiation and related codes are absent. However, this research reveals that formal building codes are operative in Guangzhou and Bangalore. While Delhi has a formal set of building codes, an effective enforcement mechanism is lacking. Contrastingly, Guangzhou has a simple set of spatial requirements which are enforced through a formally designed neighbor-approval system. Villages in Guangzhou and Bangalore are thus subject to a formal building approval system – whereas villages in Delhi and Beijing are subject to more opaque regimes of control.

Third, formalization differs in the ways in which a land approval system allows landowners to legally convert rural parcels into urban uses. This formalization is nominally controlled by a land-use plan and associated spatial requirements which new village extensions must follow. It is in this third kind of formalization that the distinction between Indian and Chinese modes of urbanization comes to the foreground. Landowners in Delhi and Bangalore can apply for regularization on the condition that they transfer the remaining land of the access structure to the municipality. Village extension is more contested in Beijing and Guangzhou, as land development

is the primary means to raise municipal revenue. Whereas land sales to the municipality limits the village's growth, it also provides the villagers with financial resources to invest in their remaining land. While Guangzhou lacks a formal land approval mechanism, there is a fixed percentage of rural land that can be converted to urban use without further government approval. Villages in Delhi and Bangalore are thus subject to a formal land approval system – whereas villages in Beijing and Guangzhou are more restrained in their transformation of land.

**Mapping difference**

The different ways in which formalization unfolds, affect the co-production of villages as shown in maps 9.1. In every city in this study, the official enumeration of urban villages is below the actual number of villages mapped. What is at stake here is not the 'correct' enumeration of 'rural' and 'urban' villages, but to recognize that urbanizing villages are much more widespread than commonly assumed and that problems facing urban villages transcend the city's administrative boundaries. Villages within these official enumerations are considered 'urban' in an administrative sense, rather than as a socio-spatial condition, even though villages that are classified administratively as rural can be more urban morphologically and functionally, while those villages classified as 'urban' can remain rural in their morphology and functional mix. Urbanization is conceptualized as the formalization of village governance – an assumption that is rarely challenged in current research or policy making. Informed by the three cases in each city, what does a comparison between the metropolitan maps reveal about the ways municipal practices have impacted the subsequent growth of urban villages in each city? The variation is explored along three dynamics – the relationship between rural densities and the ability to self-organize and resist municipal formalization – the way villages are embedded into the city – and centre-periphery differences that result from pressure on land and changing policy over time. .

A key difference between the four cities is the village's density prior to urbanization. While all cities in this research were selected for high pre-urban densities and nucleated villages, there remain large differences. In absolute numbers and without distinguishing between urban, rural and any demolished villages, Beijing, Guangzhou, Delhi and Bangalore respectively had 430, 450, 350 and 610 villages within the 1600km$^2$ study area. An estimate can be made for the pre-urban density of these four cities by looking at the spatial extent of the old core's built-up area and the average dwelling density in rural villages around these four cities. These figures have been compiled in table 9.2 and allows a rough estimate of the dwelling density in each city prior to urbanization. Guangzhou and Delhi stand out

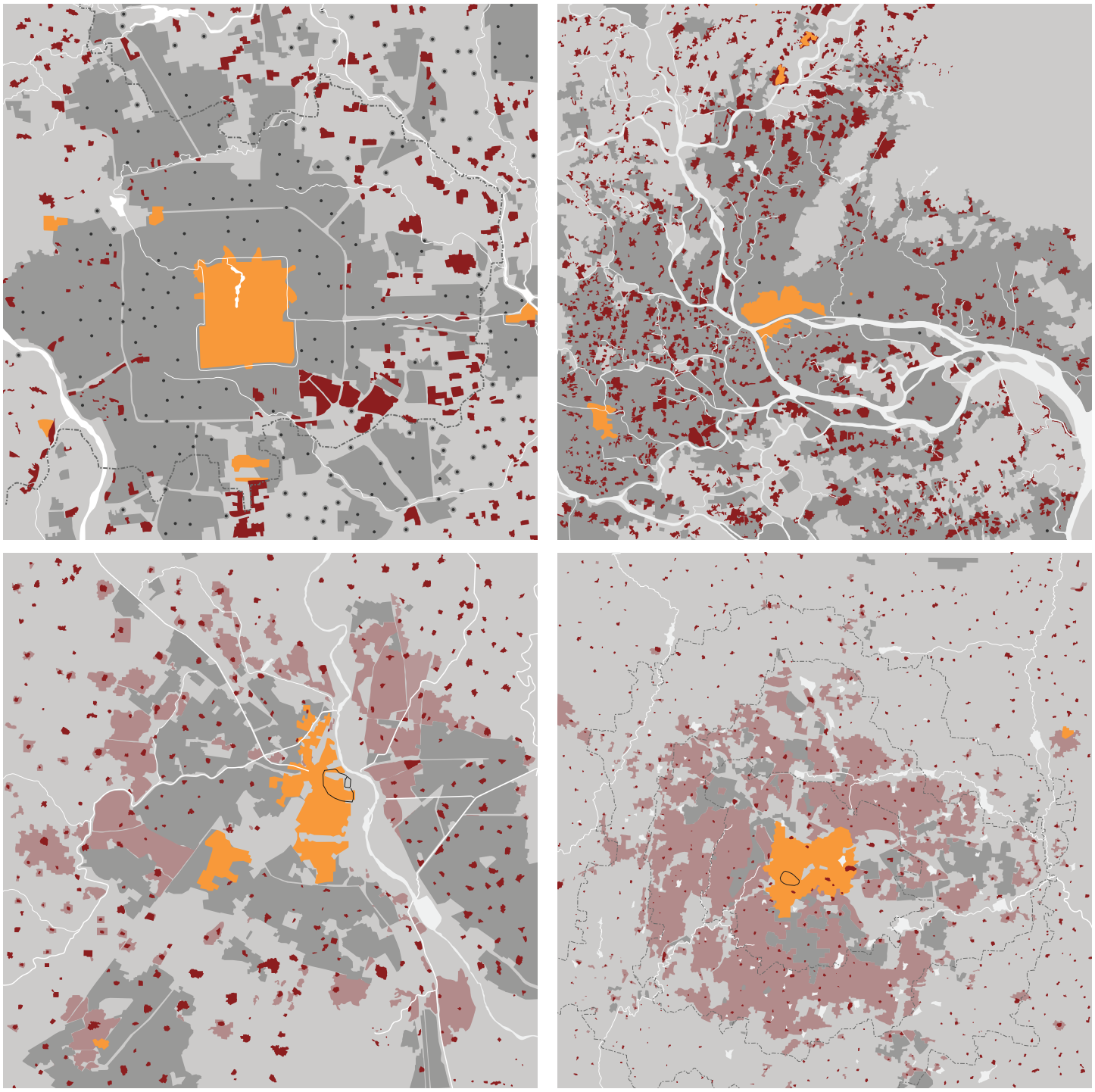
| | Number of villages | Rural land per village | Average size built-up area | dwelling density | Pre-urban dwelling estimate |
|---|---|---|---|---|---|
| Beijing | **430** | **3.5km** | **25 ha** | **15/ha** | **160000** |
| Guangzhou | **450** | **3.1km** | **17 ha** | **40/ha** | **300000** |
| Delhi | **350** | **4.3km** | **17 ha** | **65/ha** | **380000** |
| Bangalore | **610** | **2.5km** | **10 ha** | **35/ha** | **210000** |

**9.1** the pre-urban dwelling estimate is significantely higher in Guangzhou and Delhi, compared to Beijing and Bangalore

as having much higher densities compared to Beijing and Bangalore. This distinction coincides with the separate legal status and higher degrees of autonomy of villages in Guangzhou and Delhi. Do villages with larger population have a more organized governance structure, and are they subsequently be better able to negotiate with the municipality and capitalize on the opportunities generated by urbanization? Could more nucleated villages with higher pre-urban densities deal more effectively with the densification that is associated with urbanization?

A second key difference between the four cities is the way in which villages are embedded into the urban fabric. The previous chapter discussed the different aspects in the formal envelopment of the village and the narrative of 'envelopment' suggest that urban villages are necessarily surrounded by the formal city. Villages can be also be embedded by more informal development or remain surrounded by agriculture yet still urbanizing in response to the city. In Guangzhou and Beijing, the village morphologies are distinguished sharply from the formal city. While there are formal business and developers leasing land from the village, the scale of these activities is limited. Delhi and Bangalore stand out as having many urban villages that are embedded in informally planned subdivisions. As was demonstrated in the case description of each city, these informal extensions are not easily distinguished from the village on which land these extensions take shape. This blurring between village and informal subdivisions is geared to the regulatory framework in Delhi and Bangalore which allows eventual regularization of new village extensions. To what extend is all informal settlement of land in Delhi and Bangalore part of a village extension process?

A final key difference between the distribution of villages in the four cities is the way in which they are structured by centre-periphery differences. The narrative of envelopment is geared to an economic process in which



**9.2** city scale comparison reveals stark differences *between* cities and *within* cities

urbanization till 1950

formal

urban village

informal

market forces generate increasing formalization closer to the city centre where prices are higher. However, this costly process of regularizing or supplanting informally grown villages with formal development, has led some municipalities to formulate policy in anticipation of eventual formalization. Delhi and Beijing have imposed a clear containment strategy that aims to restrict the size of villages in the urban periphery before they have a chance to grow. This process of inhibiting the formation of new independent urban development around large urban centres is what DeLanda (2006) calls the 'causal shadow ' that is projected outwards from such cities. Peripheral villages in Bangalore and Guangzhou are still growing without any concerted municipal effort to restrict their growth. It is tempting to link these differences to Beijing's and Delhi's status as capital cities, where the perception of being in control is more important to its legitimacy than in Guangzhou and Bangalore. To what degree does the political role of a city and the image it intends to project affect the urbanization of villages?

While this study focuses on India and China, there are similar village urbanization processes happening across the global south. Many authors have called for an urban theory that is focused on cities in the global south (Roy, 2009; Watson, 2009), yet the condition of urban villages that is so prolific in this region has stayed out of the limelight. Many Asian cities have grown in a densely populated rural context – especially the *kampungs* in Indonesia and the *ashwaiyyat* in Egypt have potential to be researched through the same lens. Parallels are less clear to Latin America, where rural densities were never as high as in most parts of Asia. However, even there are potential links such as in the *ejido* land in Mexico—i.e. land that, distributed to landless peasants to hold in common after the Mexican Revolution, is illegal to sell, lease, or rent (Lombard, 2016). And perhaps there are even links to Europe, where the envelopment and integration of villages is now largely a historic event, but from which lessons might be drawn for contemporary urbanization processes.

**Induced illegality**

Payne (2001) and Martin and Mathema (2009) argued that a lack of knowledge about urban design can create inappropriate spatial standards which are impossible to follow, pushing residents into illegality. In the case of urban villages, the built form of the old village core predates any formal codification, which would allow a municipality to base their formal codes on the existing built form. However, this research shows that municipal codes make little attempt to codify the existing built form and rather focus on codes that 'normalize' the villages in the image of formal development . This not only applies to the old core, but also to village extensions, which are often already laid out prior to administrative incorporation by the municipality.

Guangzhou stands out here as the municipal codes on plot size are linked to the size of the plots as they already existed in the villages and are descriptive as such. Retrospective changes in the building code, such as in Bangalore, are geared to newly built formal parts of the city which has left older parts of the city that formerly complied in legal limbo. In an extension of the argument made by Watson (2003), the desire to create 'proper' communities through master planning practices has induced illegality within urban villages.

It has been argued that much of the built form in the global south exists in a 'state of exception' (Agamben, 2003) which generates flexibility in exercising top-down power (Roy, 2005; Valverde, 2011). In urban villages, this state of exception plays out in two distinct ways. One form of exception happens in relation to a very extensive set of formal codes, covering the built form in substantial detail, such as in Bangalore. The codes are often rendered in convoluted language, creating a market for experts who act as translators to such codes. As it is near impossible to understand and subsequently abide all codes, the government allows these disparities in a state of exception, which become part of a related apparatus of favours and bribes . The second form of exception plays out in relation to the absence of formal building codes, where the village in its entirety is an exception to the masterplan. The absence of any municipal codes allows urban villages to develop on their own – they exist in exception to the formal planning apparatus , but without the same kind of leverage that is generated in the former. Beijing exemplifies this kind of exceptional state – urban codes are so vague that it effectively leaves all the control over the built environment to the arbiter of those rules – the government. Villagers either have no access to the rules or cannot act upon them as they are difficult to interpret. This second state of exception does not open up a legal space for favours and bribes, but rather induces a state of extreme insecurity .

This research suggest that urban villages are capable of managing their own urbanity, but are often stripped of the means to do so. Governments render urban villages illegal, while coalitions of government and market strip the village of its land and resources. The quantity of affordable housing produced in urban villages questions the role governments and developers currently play in affordable housing. Furthermore, the public space network that emerges in urban villages supports pedestrian movement and high functional mix, qualities that are often absent in many formally planned parts of the city. The persistent failure of municipal regulations to effectively manage the morphology of urban villages calls into question whether a municipality governing millions of people, is the adequate scale to organize building regulations. This is

not about condemning formalization per se but about understanding the limits of formalization, especially in relation to scale. While the schisms in scale are more pertinent now than ever, this question is an old one – Aristotle commented that "ten people would not make a city, and with a hundred thousand people it is a city no longer. It should be big enough to be self-sufficient for living the good life after the manner of a political community, but not so big that citizens lose personal touch with each other, to decide questions of justice and to distribute offices according to merit, it is necessary for the citizens to know each other's personal characters " (Aristotle in Lynch, 1984, p. 239). Urban villages exhibit a similar balancing act between adequate size to organize village extensions and effectively negotiate with the municipal government but maintaining social ties that enable the management of their urban environment.

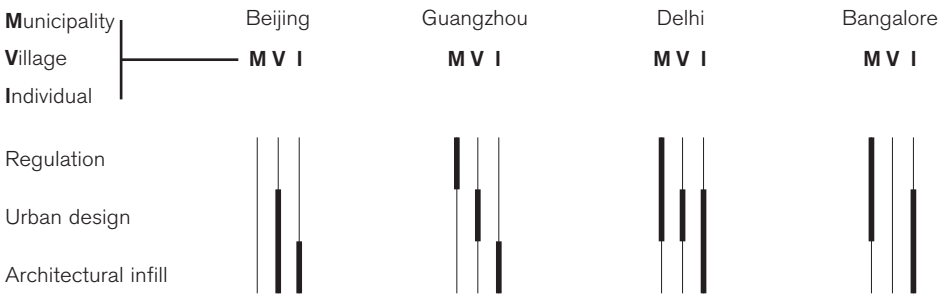
## Experimentation

Informal urbanism has often been characterized as a response to (excessive) formalization . This research contends that this reaction is not an automated response, predetermined by the formal framework, nor is formalization the only structuring element to the ways in which informal urbanism operates. Informal urbanism is always a form of experimentation – the success of any particular adaptation cannot be known in advance and requires testing. It is experimental because the adaptations take place in an ever-changing context – even adaptations that worked elsewhere might not automatically succeed when redeployed. Experimentation lies at the core of the emergent morphological structures described in chapter eight – built form cannot emerge without experimentation. Drawing upon the work of Caniggia and Maffei (2001), Kropf (2001) argued that the typological process is an evolutionary process that operates in a cycle of building, alteration, evaluation and rebuilding. It is a "process [that] is iterative and recursive and, like trial and error, learning or the process of 'generate and test', is a form of feedback" (2001, p. 34). Experimentation here is defined broadly – not just as the conscious act of initiating an experiment such as has been conceptualized from a formal perspective through the ways governments test ideas (Evans, 2016) – but all forms of spatial adaptation. These countless everyday and ordinary experiments are interlinked through four ideas that emerged from the research. One, experimentation happens through all agents and across all scales , even if the rate of experimentation is highest at the smallest scale. Two, urban villages are both subject to vertically organized formalization and horizontally organized coordination

that shift as governance structures change. Three, experimentation happens primarily in those parts of the morphology that are less strictly regulated by municipal codes. Four, three kinds of experimentation emerge in relation to the prescriptiveness of the formal codes, namely variation, negotiation and evasion.

**Multiple agent and scales**

Experimentation is not the exclusive preserve of individuals. Unlike formally planned areas where the public space is produced by a single agent (i.e. the state), informally produced public space is never produced by a single agent (Dovey, 2012; Zillmann, 2000). In contrast to most informal settlement, public space and plots in urban villages almost always precede the architectural infill. The co-production of urban villages through multiple agents is currently understood primarily through research on urban villages in southern China, in which the architectural infill is produced by individual families, public space designed by the village, and both are regulated by the municipality. Critically, this research has shown these are shifting roles – individual landowners can become the designers of public space; the municipality can become actively involved in design of public space; and villages can become both regulators and producers of architectural infill. Diagram 9.3 shows how in each city, each agent has taken different roles in the co-production process. This research has thus demonstrated that the three-tiered production of space that came out of research on urban villages in southern China, does not apply uniformly to urban villages in different contexts. It also demonstrated that the village-governance level is itself composed of smaller community level organizations, such as clans, production teams and residence welfare organizations. Such shifting roles changes the ways in which coordination and experimentation is conducted. In a vertical governance structure, there is a clear distinction between who regulates and sets the formal framework and who conducts experiments. When multiple agents are positioned in similar roles, vertical coordination shifts to horizontal coordination as adjacent development that




**9.3** agents at different levels are engaged at different scale, resulting in differention forms of coordination

is independently planned requires alignment. Experiments are increasingly done in relation to neighbors and less in relation to a regulatory body .

Public space structures can emerge through the separate decisions of multiple agents at very small scales (Marshall, 2009). The work of Hakim (2008) is exemplary of the ways in which neighborhoods emerge from experimentation at the level of the interface and architecture, where rules change as experience is accumulated. Unlike other forms of contemporary informal settlement that are characterized by the accretion of such small-scale experiments, residents in urban villages experiment at a range of scales that extends to the urban design scale. The study of morphological change suggest that the rate of experimentation is the inverse of scale - lowest at the level of the urban design, moderate at the level of architecture and high at the level of the interface. Whereas experimentation at the lower scales often involves numerous iterations as older structures are demolished and replaced, experimentation in urban design tends to be confined to adaptation to changing circumstances and building upon experience from earlier village extensions. While McFarlane (2011) argued that "incrementalism is not a process of linear addition", the inertia of built form means that the incremental process is often characterized by a linear process of adaptations as urban design responds to the agricultural parcels, architecture responds to its urban design and interface adaptations responds to its architecture. Incremental reconfiguration that breaks this scalar logic is rare.

**Types of experimentation**

The formal rules are interpreted, manipulated and experimented with by the villagers. Current literature sees the relationship between the formal regulation and the informal responses either as complementary, supplementary or adversarial (Altrock, 2012), respectively outside, within and against the formal framework. This research observed three kinds experimentation that analogous to this distinction – *evasion* of formal enforcement, *variation* within a formal framework and *negotiation* of a formal rule.

Strictly enforced municipal regulation that prevents experimentation within particular spatial elements often leads to *evasion* of that rule into experimentation within unregulated aspects of the built form. Height restrictions for example – which are the most common means to 'control' villages, leads to horizontal expansion through encroachment, filling-in of public space and cantilevering. Rather than engaging in an adversarial relationship, experimental adaptions seek an unregulated space that relates to formal codes in a complementary arrangement.

When formal codes are not precisely codified or strictly enforced,

they are likely to be *negotiated* through alternative interpretations and obscured in difficult to enforce locations. An example of such negotiation can be found in Bangalore's setback zones that should legally be kept free, but are occupied through various tactics.

Perhaps the most evident example of *variation* is the way in which Guangzhou's urban villages vary in their plot dimensions within a fixed surface area set by the municipality. The informal codes that govern these are supplementary to the formal regulation.

It is thus insufficient to define informal merely as the absence of codification and enforcement – the two principal criteria used to define formal practices (Davis, 2006; Helmke & Levitsky, 2004; North, 1990). *Evasion* is experimentation that seeks to avoid enforcement of a codified rule, *variation* is experimentation that complies with enforcement of a codified rule, while *negotiation* is experimentation that seeks to challenge the way a code is defined.. This mix in experimentation differs in each city because of the different kinds of codes in place such as the distinction between building and land approval, and the strictness of those codes.

These informal codes do not only respond to the formal framework, but also to each other. They are not a harmonious set of agreements among the villagers, but rather a more contested practice. While informal practices might contest local governments, they in turn become accepted practices among residents, generating an internal regime. For example – a municipal code might require a two-metre setback, while the accepted standard in the village is built-to-line, which on occasion might be transgressed as encroachments are added in public space. The set of community practices might be illegal, but socially accepted, while the transgressions are both legally and socially unaccepted, and yet they exist.

Kropf (2001) alludes to the testing of new spatial types through two criteria – the testing of 'internal coherence' which is concerned with the structural integrity and functionality to the builder, and the 'external viability', by which Kropf means any kind of outside variable. This research demonstrates that this external viability is critically composed of two distinct components – adherence to formal codes and acceptance within the community. These are conceptually different – while adherence to a legal code is a singular event much like a transaction and with defined criteria, community acceptance is a continuous process in which blurry boundaries between accepted and unaccepted shift more gradually. This is not to say that urban village communities are entirely egalitarian. While this research does not focus on the complex social dynamics within urban villages, through the interviews it became clear that community acceptance is closely interlinked with the ways influential people exercise power within those communities

## Mediation

Experience and experiment share the same root – to conduct experiments is to gain experience into learning what adaptations work, and which do not. Existing literature on urban informality argues that residents obtain spatial knowledge which they learn through everyday behavior and which they use to construct, navigate and extend their neighborhoods (Davis, 2006; Dovey & Ristic, 2015; Hillier & Hanson, 1984; Rapoport, 1982). In McFarlane' book (2011) *Learning the city*, he distinguishes three components of learning – coordination, translation and dwelling. Whereas the previous section on experimentation discussed the coordination between different scales and agents in the co-production process, this section focuses on translation, or the ways in which coordinating elements are interpreted and the production of knowledge is structured through intermediaries. Borrowing from Hutchins' (1995) conception that knowledge is distributed and organized through mediating structures, McFarlane (2011, p. 19) argues that learning in cities happens through mediating structures which "might be as varied as language, models, procedures, rules, documents, instruments, traffic lights, market layouts, ideas, discourses".

This research draws attention to a key mediating structure – the built form itself. The urban design and architectural infill are intermediaries in two ways – as *performative* structures in the ways their configuration allows certain uses, and as *commemorative* structures in the ways they are testimony to past experimentation. The key argument is presented here through four interlocking ideas. One, experimentation is mediated by built form through its role as an embodied storage device, which allows it to be *emulated* to fit new circumstances and where changes to those circumstances can be *anticipated*. Two, experimentation is dependent on a well-functioning public space that provides an 'arena' in which the effects of adaptations can be evaluated by the community. Three, adaptations are not a zero-sum game, but one in which the consumption of commons generates other kinds of commons. Four, retrieving and monitoring of this built information is a form of translation that is mediated by visual relations.

### Emulation and anticipation

Informal settlement has been prized for the social capital that emerges in them (Carpenter, Daniere, & Takahashi, 2004; Martin & Mathema, 2006; Perlman, 2005), but less is known about how such social capital affects the built environment. Critical to the spread of experimental practices through communities are the ways in which nearby examples are emulated and potential change is anticipated. Davis (2006) has pointed out that *tradition* and *innovation* within building cultures are complementary concepts – emulation is not merely to copy, but to innovate traditional practices. Spatial

practices do not simply 'diffuse' through a community, but are mediated through its built environment (McFarlane, 2011). Anticipation happens in relation to the formalization of municipal codes, but also to expected changes such as increased density. Emulation and anticipation extend through all levels of scales, including the urban design. In Guangzhou for example, the public space grid of the new village extensions is a modified version of the traditional layout of the old village core, and each subsequent village extension is further adapted based on past experience.
Critical to the practices of emulation and anticipation is that they produce legitimacy. A common slum-upgrading narrative is that secure tenure will enable or even unleash formal development within that community. In urban villages, this logic flows both ways – the spatiality of formality precedes, and is even a condition to, formal regularization. New extensions in Delhi and Bangalore for example, anticipate municipal codes by ensuring that their lanes are laid out in such a way that they are eligible for regularization. Village extensions or new buildings lend themselves legitimacy by emulating formal development, even if the that formal development itself contains illegalities. In other words, the induced illegality that is produced through municipal codes can be circumvented by emulating the spatial language of legality.

Emulation and anticipation are premised on the idea that built form is an embodied form of memory, a storage device that allows communities to copy, borrow and adapt new forms in relation to changing circumstances. Kropf (2013, p. 146) distinguishes two sources of design ideas, "the range of current and 'unexpressed' ideas in the heads of the population and the range of forms embodied in the [urban] fabric." These spatial forms are not retrieved from the urban fabric as concrete plans or sections, but rather in a more abstract relational form known as type or a 'shared cognitive schema' (Rapoport, 1982) which can persist for decades through their 'replicative inertia' (Kropf, 2001). The built environment thus has a 'commemorative' role as the spatial repository for such schemas, the two most common features of which are the aspect of orientation and the aspect of plot ratio. Unlike aesthetic fashions that are limited to a single level of scale – such as the paving of a street or the façade of a building – orientation is a relational property that is inherently multi-scalar. Even the high-density inner villages in Delhi and Guangzhou for example, still exhibit the same orientation of the rural morphology, affecting cantilevering and serration decades after their formal envelopment. Only if those multiple scales transform at the same time can the embedded orientation be changed. A second recurring feature of this abstract schema draws upon Kellett's (2005, 2013) insights in the ways which villagers intend to meet specific 'urban' images with regard to their (perceived) status. This perceived status is most closely

embedded in the plot ratio, or the relationship between plot size and building footprints. Lower plot ratios, such as through setbacks are associated with higher status. Beijing for example, new extensions intended for local villagers are specifically modeled on the morphology of the old core of the village, while housing aimed at middle-class groups emulates nearby formal neighborhoods, and housing built for migrant workers is modeled after existing compounds for factory workers. This cognitive schema affects experiments made by villagers but also applies to outsiders that scrutinize urban villages that fail to meet their projected image of the city.

**Arenas**

Arefi (2011, p. 52) argued that the strong social capital with informal settlements enables conflict resolution that is predominantly *mediated* rather than *adjudicated.* Rather than a rigid formal framework that experiments are evaluated against, experiments are built, tested and contested through an iterative process. Emulation and anticipation are emergent practices, because they rely on the separate assessment and interpretation by its residents of three built aspects – the spatial properties of the new adaption, the available space for new adaptations and spatial requirements that are anticipated for future use. As adaptations are constructed and used, resident's assessment and interpretation will differ from other users of public space, who will contest the adaptation, possibly feeding back into its design, construction and use. Contesting experiments does not happen automatically – adaptations need to be observed, discussed and evaluated. The functioning of these practices is critical to the management of urban commons and Ostrom (1990, p. 100) argued that "appropriators and their officials [should] have rapid access to low-cost local arenas to resolve conflicts"... Traditionally, villages had informal courtrooms such as the *chaupal* or katte, but these has largely ceased to function. More organized urban villages resolve conflicts through the village committee, but the most common 'arena' where conflicts are resolved is the actual public space itself.

Public space in urban villages is hence simultaneously the site of appropriation and the 'arena' where such appropriation is contested. In those village where formal codes exist, adaptations are contested by municipal officers, but most often contesting originates from within the community. Daily use of public space creates a continuous process of monitoring – a tactile form of monitoring whereby testing and using public space are collapsed into the same activity. While public space is ascribed an important role in public life and civic culture (Amin, 2008), this 'sense of the commons' is primarily about social values related to urbanity, and not about the ability of public space to allow new appropriations and additions to be evaluated. Entunneling of laneways and low-light conditions lower opportunities for

social interaction and evaluation of appropriations, the lack of which further allows such appropriations to escalate . Increased use of laneways for parking or the removal of serrated edges has similar effects on the capacity of the laneway to perform its role as a local arena to resolve conflicts. Jacobs (1961) famously argued that eyes on the street can monitor social behaviour in public space, but here the opposite process is witnessed, whereby 'eyes on the building' can help monitor the built behaviour.

According to Ostrom (1990), successfully managing the commons depends on monitoring the available resources and to impose sanctions on those who transgress their allowed use. Ostrom (1990, p. 30) defines appropriation as the process of "withdrawing resource units from a resource system" and from such perspective every public space appropriation adds to the depletion of that resource. Urban commons however work differently, since it is not a finite resource – contrary to intuition, appropriation of public space can actually allow more effective monitoring of subsequent appropriation of the urban commons. 'Transgressions' such as serrated edges, cantilevers and other semi-fixed elements encourage social life and provide the interactions necessary for evaluation of the built environment. This is not a zero-sum game – limited consumption of urban commons does not have to impede its functioning and can create capacities for other, potentially unforeseen urban commons to emerge, such as the social fabric in laneways. Such assessment that appropriations do not only 'eat-up' open space or are necessarily contesting the power of the state is not new. Talen (2009) uses the example of medieval Paris to explain how a requirement to clean the streets in front of their dwellings led to the effect of encouraging encroachment into the street – "since residents felt a sense of entitlement in exchange for this responsibility, but it was also a motivation to keep streets narrow and to minimize frontage" (2009, p. 150). Where formal rules restrict all manner of appropriation, this social process is precluded.

**Visibility**

Evaluation and monitoring of experiments in public space arenas is closely interlinked to relations of visibility – the adaptations must be observed in order to be evaluated. Built form enables or restricts users to access that information – a performative aspect linked to the commemorative role of public space. The built form can only meaningfully act as a storage device when that spatial information can be retrieved and emulated – a process of translation in McFarlane' (2011) framework for learning. It is translation, because it not only involves objectively seeing, but subjectively "perceiving how to use the affordances of documents objects and situations" (2011, p. 21). Limited visibility affects the perception of informal settlement from the outside and it has been demonstrated how residents respond to such formal

gaze (Dovey & King, 2011; Ghertner, 2010; Watson, 2009).

Little attention, however, has been given to the ways in which urban village residents themselves see and perceive each other and the formal city. Firstly, visibility plays out in the ways in which urban village residents emulate nearby development – an informal gaze onto the formal city. Secondly, visibility plays out *within* informal settlement as municipal officers walk through the village and are limited in what they can see by dead-end laneways and cantilevering structures that obstruct views. More importantly, relations of visibility also exist among urban village residents as they add to and adapt their urban environment. For example, functional clustering is geared to the need of shops to be perceived by the highest intensity of flows of potential customers. Likewise, the clustering of appropriations relies on visual adjacency that validates the addition of new appropriations.

Critical to determining what gets seen and evaluated is the presence and movement of people through public space. While overutilization can deteriorate urban commons (Webster, 2007), underutilization has no critical mass to maintain the urban commons. While walking itself has been conceptualized as a learning experience as people become familiar their environment (Matos Wunderlich, 2008), in urban villages, walking becomes a critical part of the performative role of public space. Hakim's (2014) performative coding in medieval Islamic cities depends on the act of walking as it establishes rights of way. In addition to walking, urban villages feature 2-wheelers or other small motorized devices that perform similarly to walking – they operate at low speeds and without the bubble of a car, which allows the user to interact with others in public space. Different modes of transport, and whether they can pass each other in a laneway, generate different rights of way and different limits to appropriation of public space.
As was noted in the last chapter, the data from this research shows that the rhythm of walking changes as a village gets more urban – from one that is slower and intermittent with moments of stationary engagement, to one that is more constant. Increasing movement increases the performative demands on public space, but less stationary activity reduces opportunity for engagement and discussion on potential encroachment of the urban commons. Increased movement potentially increases 'shared knowledge' as individuals all encounter similar transgressions, but the emergence of 'common knowledge', which is critical to coordinating behavior (Thomas, DeScioli, Haque, & Pinker, 2014), is dependent on interaction among users. Common knowledge about the built environment is an emergent knowledge that is established relationally between the built environment, people in public space and their interaction.

The thesis responds to a broad call (Dovey, 2012; Duarte, 2009;

Kellett, 2011; McCartney & Krishnamurthy, 2018; Mukhija, 2001; Rapoport, 1988; Smith, 2010) to document the spatiality and informal settlement, to accentuate their morphological differences and to investigate the ways in which they transform. The introductory chapter defined urban villages through the process of envelopment, the gradual acquisition and embedding of rural villages within the formal city. The comparison in chapter 8 discussed the three key morphological processes of village extension and subdivision, architectural densification and diversification, and interface intensification. This chapter on co-production discussed the three governance processes that affect these morphological transformations, namely formalization, experimentation and mediation. These seven processes produce a broad range of village urbanization trajectories.

## *final words* **Constant fit**

The introductory chapter laid out the descriptive intensions of this research which consciously refrained from making a normative stance on urban villages. This research was written with the intent to shift focus onto the ordinary and to abstain from judgements that either vilifies or glorifies these urban environments. Yet, this research touched upon normative assessments, such as in the way the municipalities treat villages in their own policy documents and direct policy towards their normalization or in the way that the villagers evaluate their own village extension and emulate them into versions that they consider better adapted. Self-governance of the built environment is dependent on a well-functioning public space in which new additions, adaptations and experiments can be evaluated by the community. These adaptations are crucial to allow incremental growth and 'constant fit'. Constant fit borrows the idea of 'fitness' from Lynch (1984, p. 118) who described it as the "degree to which the form and capacity of spaces match the pattern and quantity of actions by people". As urban villages are places of rapid social change, the morphology requires constant change to remain 'fit' – the key to which is incremental growth. Constant fit depends on incremental change, which in turn depends on the accumulated knowledge gained through experimentation. Davis (2006, p. 132) has argued that the "availability and sharing of the rules across society, the capacity for cross-fertilization of the rules and the ability for the culture to change the rules when necessary" are critical to achieve fitness between built form and its people. How does this capacity for incremental change reflect back on the on three interrelated urban needs discussed in the introduction – image & upgrading strategies , access & public space, and legality & affordability.

Urban villages are often condemned for their 'unfinished' appearance.

Yet, is it exactly in this state of open-endedness that the adaptive quality lies that keeps urban villages both liveable and affordable. Affordability is the affordance that is generated when the supply of public space, plots and buildings is adequately geared to the income level of its inhabitants. It is argued that incremental upgrading of houses allows households to save small sums of money over time, which also adds to the ability to adjust the house to personal preferences (Dovey, 2014; Turner, 1972; Wakely & Riley, 2011). While this financial and functional aspect is certainly an asset of incrementality, this research argues that it is of equally important asset of incrementality is the capacity of  a spatial configuration to adept according to increasing demands.  While urban poverty and slums are portrayed as a political and economic problem whereby an enormous demand for housing and a limited supply of land, drives up prices, this perspective scarcely acknowledges that the supply of land is at its core a spatial problem. If demand for space increases without an increase in supply, then economic improvement in employment and income might actually exacerbate urban poverty. When urban environments do not allow incremental densification of its architectural infill, either prices will rise, or overcrowding will ensue. For an urban village to embody 'fitness' in a low-density context at the edge of the city, it might only need 10-15% of its land as public space to function, while in a high-density context the urban villages would need much more public open space in the range of 30-40%. The costs to formally retrofit an urban design for higher densities are often very high, such as was demonstrated in the example of the addition of back lanes in Singapore (Chong & Eun, 1992). However, to design a neighborhood that does not require retrofitting with much public open space will drive up the prices and preclude its occupation by the urban poor. The paradox that is buried in here can only be addressed by incremental change.

The incremental change that allows constant fit requires shifting relations between public and private, built and un-built. Urbanization is the production as well as the maintenance of the urban commons. The most important urban commons that are generated are the capacity for movement, access and associated benefits, and the capacity for building with sufficient light and air. Foster (2009) argued that the informal settlement of land externalizes these in order to reduce the cost required in the construction. This research suggest that externalization is not negative per se and that internalization of particular urban commons can lead to the degeneration of other kinds of commons. For example, when a building covers the entire plot, it is entirely reliant on the public space to produce the urban commons of natural light. While it externalizes access to light, the building also provides a direct interface with public space, through which processes of intensification can generate urban commons such as business opportunities and social life.

This is reminiscent of the building culture that Hakim (2014) describes in the Mediterranean – the production of commons is dependent and relational. In the most rural villages, this dependency is much lower, for example in the case of access to light which is provided internally by an open space at the back of the house or in the form of a courtyard.

As the village densifies, it becomes increasingly dependent and interrelated – a process that necessitates social interaction to coordinate actions. Critically, incremental spatial change also requires incremental change to the relations among people. This necessity is most pronounced in smaller plots, which have less capacity to internalize pressure on commons and are more dependent on a functional public open space to supply these. Small plots are thus disproportionally affected by entunneling and the loss of the social role of public space. Larger plots have more capacity to internalize pressure on commons, but also a bigger negative impact on adjacent plots if they fail to do so. For example, large plots often have setbacks with compound walls that internalizes access to light and parking requirements, but from which no shared benefits can emerge. This relationship between the capacity to produce commons within one's own plot, and being dependent on neighboring areas, also plays out at the level of the settlement. Small laneways are dependent on larger spaces to provide for social engagement or parking. Permeability emerges as the laneway configuration of adjacent neighbors lines up to provide through movement.

This thesis has been concerned with the urbanization of urban villages, the incremental change and subsequent intensification of urban life within them. The attentive reader at this point might recognize similarities between the practices that constitute the village urbanization process, and the research methodology employed. The features that characterized the research – comparison, iterative testing of categories, observation of embodied practices – in many ways map onto the ways in which villagers manage their own urban environments. The learning that has taken places in urban villages as different spatial configurations are experimented, monitored and adapted, mirrors the learning that is embodied in this research. The central role of perception and visibility in mediating the urbanization of urban villages, recurs as a methodological feature in the 'plotting' (Corner, 1999) of maps that offer new ways of seeing the urban village. Much  might be gained from bringing into contact diverse village communities, so that practices that are deemed successful spread. Perhaps this applies even more so to municipal governments, who are often caught in redefining and re-projecting their own established practices onto the city. Such planning practices would require a shift of the current narratives that emphasize unique histories, but convergent futures in meeting global standards imagery. To what extent is the inverse true – are cities

characterized by a similar set of past urbanization trajectories, which are becoming increasingly divergent? Is the apparent ubiquity of globalization, neoliberalism, commercialization, individualization and digitalization just a veneer that masks a set of processes that are at their core highly similar? Do the ways in which informal urbanism plays out transcend the cultural differences that are invoked to ascertain distinct cultural identities?

# List of figures


**1.1** The dense urban fabric of an urban village - what are the urban codes that mediate this process?
**3.1** (mis)representation of urban village as collection of unchanged courtyard houses – photo taken in Beijing urban planning center
**3.2** representation of three methodological concerns: external-internal; isomorphism; multi-scalar
**3.3** interrelations between four scales of analysis
**3.4** case selection of cities mapped in relation to potential cities of 8 million or more
**3.5** detail from L500 "Kuang-Chou" [ed: Guangzhou], 1954, Army Map Service, 1:250,000 [figure not to scale]
**3.6** village selection for each city based on framework of three interrelated criteria: distance to centre, density and expansions
**3.7** Conceptual framework for mapping laneways and their encroachment.
**3.8** the distinction between cantilevered and non-cantileverd interfaces
**3.9** the distinction between serrated and non-serrated edges
**4.1** Urban villages in Beijing
**4.2** figure ground in Zhejiangcun
**4.3** public space in Zhejiangcun
**4.4** Typical set of laneways for old core and new village extensions
**4.5** functional mix in Zhejiangcun
**4.6** building height in Zhejiangcun
**4.7** appropriation in Zhejiangcun
**4.8** activities in Zhejiangcun
**4.9** cantilevers in Zhejiangcun
**4.10** interfaces in Zhejiangcun
**4.11** view of wholesale market upon exiting the village
**4.12** two ways in which a cantilevered balcony facilitates further appropriation
**4.13** laneway before government cleansing - photo sourced from baidu.maps
**4.14** figure ground in Hengjiezicun
**4.15** public space in Hengjiezicun
**4.16** variations on plot-level in urban design of new village extensions
**4.17** Typical set of laneways for old core and new village extensions
**4.18** functional mix in Hengjiezicun
**4.19** building height in Hengjiezicun
**4.20** appropriation in Hengjiezicun
**4.21** activities in Hengjiezicun
**4.22** cantilevers in Hengjiezicun
**4.23** interfaces in Hengjiezicun
**4.24** remaining courtyard house with two layers of encrusting
**4.25** standardized units with built-in lantern – the houses intended for local villagers (left) show additional encrusting
**4.26** transformation of laneways through cantilevering
**4.27** serrated edges are occupied by built appropriations, losing its social function
**4.28** figure ground in Magezhuangcun
**4.29** public space in Magezhuangcun
**4.30** Typical set of laneways for old core and new village extensions
**4.31** functional mix in Magezhuangcun
**4.32** building height in Magezhuangcun
**4.33** appropriation in Magezhuangcun
**4.34** activities in Magezhuangcun
**4.35** cantilevers in Magezhuangcun
**4.36** interfaces in Magezhuangcun
**5.1** Urban villages in Guangzhou
**5.2** figure ground in Shipai
**5.3** public space in Shipai
**5.4** Typical set of laneways for old core and new village extensions
**5.5** functional mix in Shipai
**5.6** building height in Shipai
**5.7** traditional public space in front of ancestrall hall and new semi-public space carved out from buildings
**5.8** building orientation is geared to cantilevering, serrated edges and ultimately social life
**5.9** appropriation in Shipai
**5.10** activities in Shipai

**5.11** cantilevers in Shipai
**5.12** interfaces in Shipai
**5.13** in-situ upgrading of paving and ground-level facades
**5.14** figure ground in Jiangxia
**5.15** public space in Jiangxia
**5.16** variations on plot-level in urban design of new village expansions
**5.17** Typical set of laneways for old core and new village extensions
**5.18** functional mix in Jiangxia
**5.19** building height in Jiangxia
**5.20** appropriation in Jiangxia
**5.21** activities in Jiangxia
**5.22** cantilevers in Jiangxia
**5.23** interfaces in Jiangxia
**5.24** public spaces in new extensions
**5.25** the owners of the north-facing buildings (left) have added sunshades to compensate for the lack of cantilevers (right)
**5.26** community space in between the village pond and ancestrall hall
**5.27** figure ground in Xiabei
**5.28** public space in Xiabei
**5.29** functional mix in Xiabei
**5.30** building height in Xiabei
**5.31** Typical set of laneways for old core and new village extensions
**5.32** appropriation in Xiabei
**5.33** activities in Xiabei
**5.34** cantilevers in Xiabei
**5.35** interfaces in Xiabei
**5.36** Architecturall infill in new extensions
**5.37** Architectural infill of the zone between the main lane and parallel side lanes
**5.38** Haphazard and substandard development or livable community?
**5.39** The demolition of the existing morphology announced by nearby billboard
**5.40** Redevelopment and 'normalization' in Liede – the future of urban villages?
**6.1** Urban villages in Delhi
**6.2** figure ground in Munirka
**6.3** public space in Munirka
**6.4** Typical set of laneways for old core and new village extensions
**6.5** functional mix in Munirka
**6.6** building height in Munirka
**6.7** appropriation in Munirka
**6.8** activities in Munirka
**6.9** cantilevers in Munirka
**6.10** interfaces in Munirka
**6.11** serrated edge in residential lane
**6.12** incremental floor additions
**6.13** the end of the laneways becomes increasingly private
**6.14** figure ground in Mahipalpur
**6.15** public space in Mahipalpur
**6.16** Typical set of laneways for old core and new village extensions
**6.17** plot-size transition
**6.18** functional mix along inter-village route
**6.19** functional mix in Mahipalpur
**6.20** building height in Mahipalpur
**6.21** open gutter transforms into serrated edge
**6.22** incremental upgrading of the gutter
**6.23** appropriation of the gutter
**6.24** ramps to car parking invade public space
**6.25** appropriation in Mahipalpur
**6.26** activities in Mahipalpur
**6.27** cantilevers in Mahipalpur
**6.28** interfaces in Mahipalpur
**6.29** figure ground in Bharthal
**6.30** public space in Bharthal
**6.31** Typical set of laneways for old core and new village extensions
**6.32** functional mix in Bharthal
**6.33** building height in Bharthal
**6.34** appropriation in Bharthal
**6.35** activities in Bharthal
**6.36** cantilevers in Bharthal
**6.37** interfaces in Bharthal
**6.38** 3-4 metre laneway in different stages of intensification in Bhartal, Mahipalpur and Munirka
**7.1** Urban villages in Bangalore
**7.2** figure ground in Shoolay
**7.3** public space in Shoolay
**7.4** Typical set of laneways for old core and new village extensions
**7.5** functional mix in Shoolay
**7.6** building height in Shoolay
**7.7** appropriation in Shoolay

**7.8** activities in Shoolay
**7.9** cantilevers in Shoolay
**7.10** interfaces in Shoolay
**7.11** Cantilevering within plot boundary
**7.12** Temporary appropriation of entire width of laneway
**7.13** Contemporary buildings emulate serrated edge from traditional buildings
**7.14** figure ground in Koramangala
**7.15** public space in Koramangala
**7.16** variations on plot-level in urban design of new village expansions and BDA developments
**7.17** Typical set of laneways for old core and new village extensions
**7.18** functional mix in Koramangala
**7.19** building height in Koramangala
**7.20** appropriation in Koramangala
**7.21** activities in Koramangala
**7.22** cantilevers in Koramangala
**7.23** interfaces in Koramangala
**7.24** BDA development with setbacks, no encroachment, no appropriation and no people
**7.25** Incrementally added laneways
**7.26** figure ground in Kudlu
**7.27** public space in Kudlu
**7.28** Typical set of laneways for old core and new village extensions
**7.29** functional mix in Kudlu
**7.30** building height in Kudlu
**7.31** appropriation in Kudlu
**7.32** activities in Kudlu
**7.33** cantilevers in Kudlu
**7.34** interfaces in Kudlu
**7.35** traditional mud-brick and roof-tiled houses in first village extension
**8.1** village development comparison
**8.2** old cores have similar component parts that differ primarely in their configuration
**8.3** total lane-way length and area for different lane-way widths
**8.4** emergent outcomes of urbanization – permeability and visiblity
**8.5** urban villages differ in their relation with the formal city (a) and their morphological mix (b)
**8.6** building height comparison
**8.7** activies comparison
**8.8** functional mix comparison
**8.9** cantilevers comparison
**8.10** interfaces comparison
**8.11** diagram of most common adaptations in relation to orientation
**8.12** appropriation comparison
**9.1** the pre-urban dwelling estimate is significantely higher in Guangzhou and Delhi, compared to Beijing and Bangalore
**9.2** city scale comparison reveals starck differences *between* cities and *within* cities
**9.3** agents at different levels are engaged at different scale, resulting in differention forms of coordination

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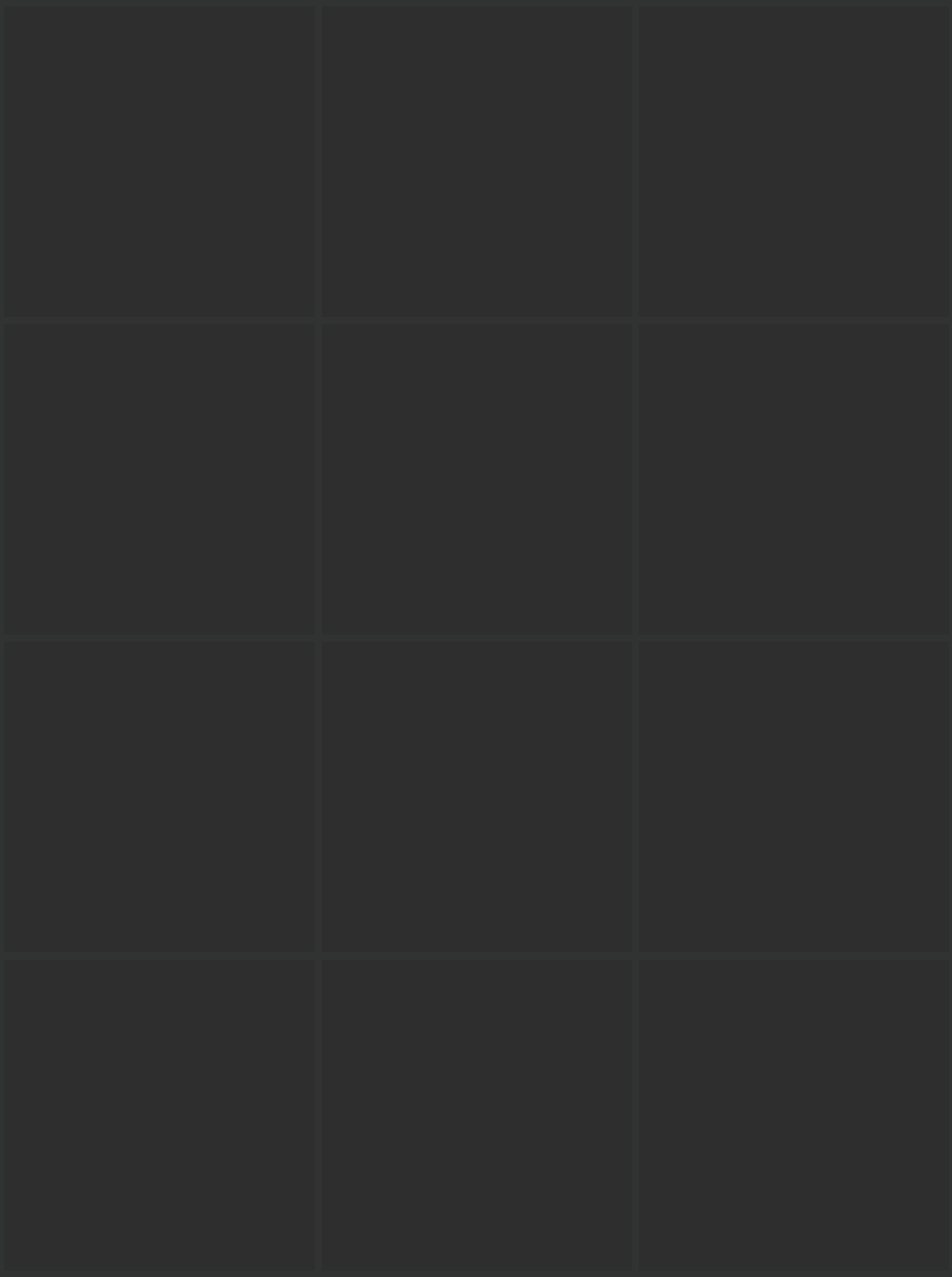

# urban villages